Fort Bend County, Texas
Invitation for Bid

Construction of South Post Oak Sportsplex Baseball Fields Phase II for Fort Bend County
BID 23-012

SUBMIT BIDS TO:

Fort Bend County
Purchasing Department
301 Jackson
Richmond, TX 77469

Note: All correspondence must include the term "Purchasing Department" in address to assist in proper delivery.

SUBMIT NO LATER THAN:

Tuesday, December 13, 2022
2:00 PM (Central)

LABEL ENVELOPE:

BID 23-012
South Post Oak Sportsplex

ALL BIDS MUST BE RECEIVED IN AND TIME/DATE STAMPED BY THE PURCHASING OFFICE OF FORT BEND COUNTY BEFORE THE SPECIFIED TIME/DATE STATED ABOVE.

BIDS RECEIVED AS REQUIRED WILL THEN BE OPENED AND PUBLICLY READ.

BIDS RECEIVED AFTER THE SPECIFIED TIME, WILL BE RETURNED UNOPENED.

Results will not be given by phone.
Results will be provided to bidder in writing after the Commissioners Court awards.

Requests for information must be in writing and directed to:
Brooke Lindemann
Senior Buyer
Brooke.Lindemann@fortbendcountytx.gov

Vendor Responsibilities:

- Download and complete any addendums. (Addendums will be posted on the Fort Bend County website no Later than 48 hours prior to bid opening)
- Submit response in accordance with requirements stated on the cover of this document.
- DO NOT submit responses via email or fax.

Prepared: 11/2/2022
Issued: 11/6/2022

COUNTY PURCHASING AGENT

Fort Bend County, Texas

Vendor Information

Jaime Kovar
Purchasing Agent

Office (281-341-8640

Legal Company Name (top line of W9)			
Business Name (if different from legal name)			
Federal ID # or S.S. #		DUNS #	
Type of Business	___ Corporation/LLC ___ Partnership ___ Sole Proprietor/Individual ___ Tax Exempt Organization		Age in Business?
Publicly Traded Business	___ No ___ Yes Ticker Symbol _____		
Remittance Address			
City/State/Zip			
Physical Address			
City/State/Zip			
Phone/Fax Number	Phone: _____ Fax: _____		
Contact Person			
E-mail			
Check all that apply to the company listed above and provide certification number.	DBE-Disadvantaged Business Enterprise ☐ SBE-Small Business Enterprise ☐ HUB-Texas Historically Underutilized Business ☐ WBE-Women's Business Enterprise ☐	**Certification #** _____ **Certification #** _____ **Certification #** _____ **Certification #** _____	Cert Date _____ _____ _____ _____
Company's gross annual receipts	<$500,000 _____	$500,000-$4,999,999 _____	Exp Date _____ _____ _____ _____
	$5,000,000-$16,999,999 ___	$17,000,000-$22,399,999 _____	
	>$22,400,000 _____		
NAICs codes (Please enter all that apply)			
Signature of Authorized Representative			
Printed Name			
Title			
Date			

THIS FORM MUST BE SUBMITTED WITH THE SOLICITATION RESPONSE

1.0 GENERAL REQUIREMENTS:

1.1 Read this entire document carefully. Follow all instructions. You are responsible for fulfilling all requirements and specifications. Be sure you understand them.

1.2 General Requirements apply to all advertised bids; however, these may be superseded, whole or in part, by the scope, special requirements, specifications, special specifications or other data contained herein.

1.3 Governing Law: Bidder is advised that these requirements shall be fully governed by the laws of the State of Texas and that Fort Bend County may request and rely on advice, decisions and opinions of the Attorney General of Texas and the County Attorney concerning any portion of these requirements.

1.4 Bid Document Completion: Fill out, initial each page, sign, and return ONE (1) complete bid document to the Fort Bend County Purchasing Department. An authorized representative of the bidder must sign the Contract Sheet. Do not complete the date at the top of the contract sheet. The bid document must be in a sealed envelope marked with the appropriate bid number and title. The contract will be binding only when signed by the County Judge, Fort Bend County and a purchase order authorizing the item(s) desired has been issued. The use of correction fluid is not acceptable and may result in the disqualification of bid. If an error is made, the bidder must draw a line through error and initial each change. All response, typed or written, information must be clear and legible.

If a pricing form in Excel is included and posted on the County website amongst this bid document, the Vendor must download, complete and save the Excel file of the pricing form on a flash drive. The Excel file on the flash drive must be downloadable by the Purchasing Department in order to copy and paste the vendor's pricing to the County's tabulation. The flash drive must be included in the same sealed envelope with the respondent's completed bid document along with a printed copy of the pricing form.

1.5 Bid Returns: Bidders must return all completed bids to the Fort Bend County Purchasing Department at 301 Jackson, Suite 201 Richmond Texas no later than 2:00 P.M. on the date specified. Late bids will not be accepted. Bids must be submitted in a sealed envelope, addressed as follows: Fort Bend County Purchasing Agent, Travis Annex, 301 Jackson, Suite 201 Richmond, Texas 77469.

1.6 Addenda: No interpretation of the meaning of the drawings, specifications or other bid documents will be made to any bidder orally. All requests for such interpretations must be made in writing addressed to Brooke Lindemann, Senior Buyer, 301, Jackson, Suite 201, Richmond, Texas, 77469, E-mail: Brooke.Lindemann@fortbendcountytx.gov. Any and all interpretations and any supplemental instructions will be in the form of written addenda to the contract

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documents which will be posted on Fort Bend County's website. Addenda will **ONLY** be issued by the Fort Bend County Purchasing Agent. It is the sole responsibility of each bidder to insure receipt of any and all addenda. All addenda issued will become part of the contract documents. Bidders must sign and include it in the returned bid package. Failure to provide acknowledged addenda(s) will result in disqualification of bid response. Deadline for submission of questions and/or clarification is no later than **Monday, December 5, 2022 at 9:00AM (central)** Requests received after the deadline will not be responded to due to the time constraints of this bid process.

1.7 Letters of Reference: All bidders must submit, **WITH BID**, at least three (3) letters of reference from clients for whom a project similar to that specified herein has been successfully accomplished. Letters of reference must include brief description, project measurements, clients' name, contact person and telephone number.

1.8 Bid Bond: All bidders must submit, **WITH BID**, a cashier's check or certified check for at least five percent (5%) of the total bid price, payable to the order of Fort Bend County, or a Bid Bond in the same amount issued by a surety, acceptable to Fort Bend County, authorized to do business in the State of Texas, as a guarantee that the Bidder will do the work described herein at the rates stated herein. Unsuccessful bidder's Cashier's Check or Certified Check will be returned only after a written request to do so have been received in the Office of the Fort Bend County Purchasing Agent.

1.9 Material Safety Data Sheets: Under the "Hazardous Communication Act", commonly known as the "Texas Right to Know Act", a bidder must provide to Fort Bend County and using departments, with each delivery, material safety data sheets, which are, applicable to hazardous substances defined in the Act. Bidders are obligated to maintain a current, updated file in the Fort Bend County Purchasing Department. Failure of the bidder to maintain such a file will be cause to reject any bid applying thereto.

1.10 Pricing: Prices for all goods and/or services shall be firm for the duration of this Contract and shall be stated on the bid sheet. Prices shall be all inclusive. No price changes, additions, or subsequent qualifications will be honored during the course of the Contract. All prices must be written in ink or typewritten. If there are any additional charges of any kind, other than those mentioned above, specified or unspecified, bidder MUST indicate the items required and attendant costs or forfeit the right to payment for such items.

1.11 Term Contracts: If the Contract is intended to cover a specific time period, said time will be given in the specifications under scope.

1.12 Recycled Materials: Fort Bend County encourages the use of products made of recycled materials and shall give preference in purchasing to products made of

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recycled materials if the products meet applicable specifications as to quantity and quality. Fort Bend County will be the sole judge in determining product preference application.

1.13 Evaluation: Evaluation shall be used as a determinant as to which bid items or services are the most efficient and/or most economical for Fort Bend County. It shall be based on all factors which have a bearing on price and performance of the items in the user environment. All bids are subject to tabulation by the Fort Bend County Purchasing Department and recommendation to Fort Bend County Commissioners Court. Compliance with all bid requirements, delivery and needs of the using department are considerations in evaluating bids. Pricing is NOT the only criteria for making a recommendation. The Fort Bend County Purchasing Department reserves the right to contact any bidder, at any time, to clarify, verify or request information with regard to any bid.

1.14 Disqualification of Bidder: Upon signing this bid document, a bidder offering to sell supplies, materials, services, or equipment to Fort Bend County certifies that the bidder has not violated the antitrust laws of this state codified in section 15.01, et seq., Business & Commerce Code, or the federal antitrust laws, and has not communicated directly or indirectly the bid made to any competitor or any other person engaged in such line of business. Any or all bids may be rejected if Fort Bend County believes that collusion exists among the bidders. Bids in which the prices are obviously unbalanced may be rejected. If multiple bids are submitted by a bidder and after the bids are opened, one of the bids is withdrawn, the result will be that all of the bids submitted by that bidder will be withdrawn; however, nothing herein prohibits a vendor from submitting multiple bids for different products or services.

1.15 Awards: Fort Bend County reserves the right to award this Contract on the basis of lowest and best bid in accordance with the laws of the State of Texas, to waive any formality or irregularity, to make awards to more than one bidder, to reject any or all bids. In the event the lowest dollar bidder meeting specifications is not awarded a contract, the bidder may appear before the Commissioners Court and present evidence concerning its responsibility.

1.16 Contract Obligation: Fort Bend County Commissioners Court must award the Contract and the County Judge or other person authorized by the Fort Bend County Commissioners Court must sign the Contract before it becomes binding on Fort Bend County or the bidders. Department heads are not authorized to sign agreements for Fort Bend County. Binding agreements shall remain in effect until all products and/or services covered by this purchase have been satisfactorily delivered and accepted.

2.0 SCOPE:

It is the intent of Fort Bend County to contract with one (1) or more vendors for all materials, supplies, equipment, tools, services, labor and supervision necessary to complete the

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construction of South Post Oak Sportsplex Baseball Fields Phase II ("Project"), located at 5535 Hobby Road, Houston, Texas. Vendor is to demolish the existing concession building in its entirety and replace with a new pre-engineered building of approximately 4,422 square feet. Vendor is to construct a six (6) bay pre-engineered building of approximately 10,156 square feet with self-retractable netting systems and restrooms, two (2) press boxes of approximately 112 square feet each, and a sidewalk per the plans. Vendor to complete the improvements of each baseball field by properly re-grading the field and install new turf and required equipment, demolition of the existing parking lot and replace with a new concrete parking lot, and minor renovation of the small storage room located on the north side of the batting cage building. Vendor to provide fencing, outside seating with park benches, new trees, flag pole at the entrance, two (2) new stadium lights for the softball field, and remote access controlled cameras. Include six (6) 20' standard shipping containers as storage on a concrete pad, simulated stone walls throughout the entire south and east side perimeter of the complex property, and install new stadium light poles with LED light fixture on the 50-yard football practice field.

3.0 MANDATORY PRE-BID CONFERENCE and SITE VISIT(s):

A mandatory pre-bid conference with mandatory site visit(s) immediately following will be conducted on **Wednesday, November 30, 2022 at 9:00AM** (CST). The mandatory pre-bid conference and site-visit will be held at the South Post Oak Sportsplex, 5535 Hobby Road, Houston, Texas. **Attendance is mandatory and all interested vendors must attend to discuss the requirements of this bid. The mandatory pre-bid and mandatory site visit(s) will not be rescheduled due to tardiness or any other issues that may arise; no exceptions.**

4.0 LIQUIDATED DAMAGES:

If the Project is not substantially complete within the contract time as adjusted by extension of time approved by Commissioner Court, Fort Bend County will deduct (from the final payment, as liquidated damages), the sum of two-hundred fifty ($250.00) per calendar day that the Project remains not substantially complete, such sum is agreed upon as a reasonable and proper measure of damages which Fort Bend County will sustain per day by failure of Contractor to substantially complete work within the contract time. It is understood that said sum shall be considered as liquidated damages and shall in no sense be considered as a penalty against the Contractor.

5.0 COMPLETION TIME AND PAYMENT:

5.1 Fort Bend County shall pay the Contractor in current funds for the Contractor's performance of the Contract the contract sum, as stated herein, after receipt of notice to proceed and a purchase order issued by the Fort Bend County Purchasing Agent.

5.2 Based upon Applications for payment submitted to the Facilities Department, Fort Bend County shall make progress payments on account of the contract sum to the Contractor as provided below and elsewhere in the contract documents.

5.2.1 The period covered by each application for payment shall be one calendar month ending on the last day of the month.

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5.2.2 Provided an application for payment is received by the Facilities Department not later than the 15th day of a month, Fort Bend County shall make payment to the Contractor not later than the 15th day of the next month. If an application for payment is received by the Facilities Department after the application deadline fixed above, payment shall be made by Fort Bend County not later than 30 days after the Facilities Department receives the application for payment.

5.2.3 Application for payment shall indicate the percentage of completion of each portion of the Project as of the end of the period covered by the application for payment.

5.2.4 Subject to the provisions of the contract documents, the amount of each progress payment shall be computed as follows:

5.2.4.1 Take that portion of the contract sum properly allocable to completed Project less retainage of ten percent (10%).

5.2.4.2 Add that portion of the contract sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved by Fort Bend County, suitably stored off the site at a location agreed upon in writing), less retainage of ten percent (10%).

5.2.4.3 Subtract the aggregate of previous payments made by Fort Bend County.

5.2.4.4 The progress payment amount as determined in above shall be further modified under the following circumstances:

Add, upon substantial completion of the Project, a sum sufficient to increase the total payments to one hundred percent (100%) of the contract sum, less such amounts as Fort Bend County shall determine for incomplete work and unsettled claims.

5.2.4.5 Final payment, constituting the entire unpaid balance of the contract sum, shall be made by Fort Bend County to the Contractor when the Contract has been fully performed by the Contractor.

5.3 Before the first application for payment, the Contractor shall submit to the Facilities Department a schedule of values allocated to various portions of the work, prepared in such form and supported by such data to substantiate its accuracy as the Facilities Department may require. This schedule, unless objected to by the Facilities Department shall be used as a basis for reviewing the Contractor's application for payment.

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5.4 Contractor must provide with each application for payment a contractor's affidavit certifying bills against the Contractor for labor, material and expendable equipment employed in the performance of Contractor have been paid in full prior to acceptance of final payment from Fort Bend County.

5.5 The Contractor will permit Fort Bend County, or any duly authorized agent of Fort Bend County, to inspect and examine the books and records of the Contractor for the purpose of verifying the amount of work performed under the Contract. Fort Bend County's right to inspect survives the termination of the Contract for a period of five years.

6.0 LIMIT OF APPROPRIATION:

Prior to the execution of this Contract, Contractor has been advised by County, and Contractor clearly understands and agrees, such understanding and agreement being of the absolute essence to this Contract, that County shall have available only those funds specifically allocated in this Contract to fully discharge any and all liabilities which may be incurred by County in bringing this Project to an absolute conclusion, resulting in a complete, fully furnished, fully equipped and fully usable facility, and that the total of any and all basic construction costs, costs of providing the required services and materials, all fees and compensation of any sort to the Contractor, and any and all costs for any and all things or purposes coming inuring under or out of this Contract, irrespective of the nature thereof, shall not exceed said specifically allocated sum, notwithstanding any word, statement or thing contained in or inferred from the preceding provision of this Contract which might in any light by any person be interpreted to the contrary.

7.0 RIGHT TO ASSURANCE:

Whenever Fort Bend County in good faith has reason to question the Contractor's intent to perform, Fort Bend County may demand that the Contractor give written assurance of its intent to perform. In the event that a demand is made and no assurance is given within five (5) days, Fort Bend County may treat this failure as an anticipatory repudiation of the Contract.

8.0 PERFORMANCE AND PAYMENT BONDS:

Performance and Payment Bonds: In the event the total accepted bid price exceeds $25,000 the Contractor must provide to the Office of the County Purchasing Agent, a performance bond and a payment bond, each in the amount of 100% of the total contract sum within ten (10) calendar days after receipt of notification of bid award. Such bonds shall be executed by a corporate surety duly authorized and admitted to do business in the State of Texas and licensed in the State of Texas to issue surety bonds with a Best Rating of "A" or better. Fort Bend County reserves the right to accept or reject any surety company proposed by the Contractor. In the event Fort Bend County rejects, the proposed surety company, the Contractor will be afforded five (5) additional days to submit the required bonds issued by a surety company acceptable to Fort Bend County.

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9.0 POWER OF ATTORNEY:

An attorney-in-fact who signs a bid bond, performance bond or payment bond must file with each bond a certified and effectively dated copy of his or her power of attorney.

10.0 INSURANCE:

10.1 All respondents shall submit, with response, a current certificate of insurance indicating coverage in the amounts stated below. In lieu of submitting a certificate of insurance, respondents may submit, with response, a notarized statement from an Insurance company, authorized to conduct business in the State of Texas, and acceptable to Fort Bend County, guaranteeing the issuance of an insurance policy, with the coverage stated below, to the firm named therein, if successful, upon award of this Contract.

10.2 At contract execution, contractor shall furnish County with properly executed certificates of insurance which shall evidence all insurance required and provide that such insurance shall not be canceled, except on 30 days prior written notice to County. Contractor shall provide certified copies of insurance endorsements and/or policies if requested by County. Contractor shall maintain such insurance coverage from the time Services commence until Services are completed and provide replacement certificates, policies and/or endorsements for any such insurance expiring prior to completion of Services. Contractor shall obtain such insurance written on an Occurrence form (or a Claims Made form for Professional Liability insurance) from such companies having Best's rating of A/VII or better, licensed or approved to transact business in the State of Texas, and shall obtain such insurance of the following types and minimum limits:

10.2.1 Workers' Compensation insurance. Substitutes to genuine Workers' Compensation Insurance will not be allowed.

10.2.2 Employers' Liability insurance with limits of not less than $1,000,000 per injury by accident, $1,000,000 per injury by disease, and $1,000,000 per bodily injury by disease.

10.2.3 Commercial general liability insurance with a limit of not less than $1,000,000 each occurrence and $2,000,000 in the annual aggregate. Policy shall cover liability for bodily injury, personal injury, and property damage and products/completed operations arising out of the business operations of the policyholder.

10.2.4 Business Automobile Liability coverage with a combined Bodily Injury/Property Damage limit of not less than $1,000,000 each accident. The policy shall cover liability arising from the operation of licensed vehicles by policyholder.

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10.3 County and the members of Commissioners Court shall be named as additional insured to all required coverage except for Workers' Compensation and Professional Liability (if required). All Liability policies including Workers' Compensation written on behalf of contractor, excluding Professional Liability, shall contain a waiver of subrogation in favor of County and members of Commissioners Court.

10.4 If required coverage is written on a claims-made basis, contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of two (2) years beginning from the time that work under the agreement is completed.

10.5 Contractor shall not commence any portion of the work under this Contract until it has obtained the insurance required herein and certificates of such insurance have been filed with and approved by Fort Bend County.

10.6 No cancellation of or changes to the certificates, or the policies, may be made without sixty (60) days prior, written notification to Fort Bend County.

10.7 Approval of the insurance by Fort Bend County shall not relieve or decrease the liability of the Contractor.

11.0 INDEMNIFICATION:

Respondent shall save harmless County from and against all claims, liability, and expenses, including reasonable attorney's fees, arising from activities of respondent, its agents, servants or employees, performed under this agreement that result from the negligent act, error, or omission of respondent or any of respondent's agents, servants or employees.

11.1 Respondent shall timely report all such matters to Fort Bend County and shall, upon the receipt of any such claim, demand, suit, action, proceeding, lien or judgment, not later than the fifteenth day of each month; provide Fort Bend County with a written report on each such matter, setting forth the status of each matter, the schedule or planned proceedings with respect to each matter and the cooperation or assistance, if any, of Fort Bend County required by Respondent in the defense of each matter.

11.2 Respondent's duty to defend, indemnify and hold Fort Bend County harmless shall be absolute. It shall not abate or end by reason of the expiration or termination of any contract unless otherwise agreed by Fort Bend County in writing. The provisions of this section shall survive the termination of the contract and shall remain in full force and effect with respect to all such matters no matter when they arise.

11.3 In the event of any dispute between the parties as to whether a claim, demand,

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suit, action, proceeding, lien or judgment appears to have been caused by or appears to have arisen out of or in connection with acts or omissions of Respondent, Respondent shall never-the-less fully defend such claim, demand, suit, action, proceeding, lien or judgment until and unless there is a determination by a court of competent jurisdiction that the acts and omissions of Respondent are not at issue in the matter.

11.4 Respondent's indemnification shall cover, and Respondent agrees to indemnify Fort Bend County, in the event Fort Bend County is found to have been negligent for having selected Respondent to perform the work described in this request.

11.5 The provision by Respondent of insurance shall not limit the liability of Respondent under an agreement.

11.6 Respondent shall cause all trade contractors and any other contractor who may have a contract to perform construction or installation work in the area where work will be performed under this request, to agree to indemnify Fort Bend County and to hold it harmless from all claims for bodily injury and property damage that may arise from said Respondent's operations. Such provisions shall be in form satisfactory to Fort Bend County.

11.7 Loss Deduction Clause - Fort Bend County shall be exempt from, and in no way liable for, any sums of money which may represent a deductible in any insurance policy. The payment of deductibles shall be the sole responsibility of Respondent and/or trade contractor providing such insurance.

12.0 PREVAILING WAGES:

This project is subject to the prevailing wage rate requirements of Chapter 2258 of the Government Code. The Contractor shall pay Fort Bend County sixty dollars ($60.00) for each worker employed by the Contractor for the provision of services described herein for each calendar day or part of the day that the worker is paid less than the below stated rates. Contractors may also visit www.wdol.gov/dba.aspx.

General Decision Number: TX20220247 10/14/2022
Superseded General Decision Number: TX20210247

State: Texas
Construction Type: Building
County: Fort Bend County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658.

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Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022, Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022, Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/07/2022
1	01/21/2022
2	02/18/2022
3	02/25/2022
4	03/11/2022
5	04/22/2022
6	07/08/2022
7	08/05/2022
8	09/16/2022
9	10/14/2022

ASBE0022-009 06/01/2022	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation)	$ 26.88	15.41
BOIL0074-003 01/01/2021		
BOILERMAKER	$ 29.47	24.10
CARP0551-008 04/01/2021		

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CARPENTER (Excludes Acoustical Ceiling Installation, Drywall Hanging, Form Work and Metal Stud Installation)	$ 25.86	9.08
ELEC0716-005 08/30/2021 ELECTRICIAN (Excludes Low Voltage Wiring and Installation of Alarms)	$ 33.20	10.37
ELEV0031-003 01/01/2022 ELEVATOR MECHANIC	$ 47.04	36.885+a+b

FOOTNOTES:

A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day; and Veterans Day.

ENGI0450-002 04/01/2014		
POWER EQUIPMENT OPERATOR Cranes	$ 34.85	9.85
IRON0084-002 06/01/2022 IRONWORKER (ORNAMENTAL AND STRUCTURAL)	$ 26.76	7.88
PLAS0783-001 04/01/2021 PLASTERER	$ 26.04	9.02
*PLUM0068-002 10/01/2022 PLUMBER	$ 37.83	11.71
PLUM0211-010 10/01/2021		
PIPEFITTER (Including HVAC Pipe Installation)	$ 37.03	12.56
SHEE0054-003 04/01/2020 SHEET METAL WORKER (Excludes HVAC Duct and Unit Installation)	$ 29.70	13.85
*SUTX2014-023 07/21/2014		
ACOUSTICAL CEILING MECHANIC	$ 16.41	3.98
BRICKLAYER	$ 19.86	0.00
CAULKER	$ 15.36	0.00

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CEMENT MASON/CONCRETE FINISHER	$ 13.82**	0.00
DRYWALL FINISHER/TAPER	$ 16.30	3.71
DRYWALL HANGER AND METAL STUD INSTALLER	$ 17.45	3.96
ELECTRICIAN (Alarm Installation Only)	$ 17.97	3.37
ELECTRICIAN (Low Voltage Wiring Only)	$ 18.00	1.68
FLOOR LAYER: Carpet	$ 20.00	0.00
FORM WORKER	$ 11.87**	0.00
GLAZIER	$ 19.12	4.41
INSULATOR – BATT	$ 14.87**	0.73
IRONWORKER, REINFORCING	$ 12.10**	0.00
LABORER: Common or General	$ 10.79**	0.00
LABORER: Mason Tender – Brick	$ 13.37**	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.50**	0.00
LABORER: Pipelayer	$ 12.94**	0.00
LABORER: Roof Tearoff	$ 11.28**	0.00
LABORER: Landscape and Irrigation	$ 9.49**	0.00
LATHER	$ 19.73	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.10**	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93**	0.00
OPERATOR: Bulldozer	$ 20.77	0.00
OPERATOR: Drill	$ 16.22	0.34
OPERATOR: Forklift	$ 15.64	0.00
OPERATOR: Grader/Blade	$ 13.37**	0.00

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OPERATOR: Loader	$ 13.55**	0.94
OPERATOR: Mechanic	$ 17.52	3.33
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03	0.00
OPERATOR: Roller	$ 16.00	0.00
PAINTER (Brush, Roller and Spray), Excludes Drywall Finishing/Taping	$ 16.77	4.51
ROOFER	$ 15.40	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 17.81	2.64
SHEET METAL WORKER (HVAC Unit Installation Only)	$ 16.00	1.61
SPRINKLER FITTER (Fire Sprinklers)	$ 22.17	9.70
TILE FINISHER	$ 12.00**	0.00
TILE SETTER	$ 16.17	0.00
TRUCK DRIVER: 1/Single Axle Truck	$ 14.95**	5.23
TRUCK DRIVER: Dump Truck	$ 12.39**	1.18
TRUCK DRIVER: Flatbed Truck	$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer Truck	$ 12.50**	0.00
TRUCK DRIVER: Water Truck	$ 12.00**	4.11
WATERPROOFER	$ 14.39**	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($15.00) or 13658 ($11.25). Please see the Note at the top of the wage determination for more information.
Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work,

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up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

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Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

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3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

13.0 PERMITS:

It shall be the sole responsibility of the successful bidder to obtain all required permits in the name of Fort Bend County.

14.0 CONTRACTOR'S RESPONSIBILITY FOR WORK:

14.1 Preconstruction Work. Contractor shall do (or cause to be done) the following as preconstruction work:

14.1.1 On an as needed basis as determined by Fort Bend County, cause the Contractor's personnel to meet with Fort Bend County and the Engineer to discuss the status of the Project.

14.1.2 Review drawings and specifications with the Engineer to permit the Contractor and the Engineer to determine the compliance of the proposed facility with applicable building codes.

14.2 Construction Work. Contractor shall do (or cause to be done) the following as construction work:

14.2.1 Perform (or cause to be performed) all preparatory work at the construction site required herein, including (without limitation) soil and concrete testing and demolition of improvements existing at the construction site and all actions necessary for compliance with all laws and regulations as to actions to be taken by owners or contractors before construction begins, including without limitation those in regard to archaeological and environmental requirements.

14.2.2 Construct and install (or cause to be constructed and installed) the Project on the construction site in accordance with this Contract and the drawings and specifications approved by Fort Bend County.

14.2.3 Furnish (or cause to be furnished) all materials, supplies, equipment, tools, labor, supervision, utilities, transportation, and other materials and services necessary to complete the Project described herein.

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14.2.4 Materials testing necessary for the Project and required by laws and regulations, construction industry standards as approved by Fort Bend County and this Contract; the frequency of testing shall be approved by Fort Bend County. **It is the contractor's responsibility to engage a material testing laboratory to perform testing on the structural concrete to be used for foundation work in this project. The cost of testing shall be incidental to bid item for drill shaft foundation. Testing of concrete shall comply with current TXDOT criteria. Contractor has to submit the name of the testing laboratory, intended to be used by the contractor for this project, for County's approval.**

14.3 Standards for Review and Approval. Fort Bend County acknowledges that in order to meet the deadlines for the completion of the Project, and in order to accomplish the efficient completion of the Project, the Contractor may submit matters to Fort Bend County in stages for approval or consent. Upon receipt of any matter submitted by the Contractor for review and approval, Fort Bend County shall review the same and shall diligently and promptly (but in any event within 14 calendar days for any such matter, other than a proposed change order, and within 28 calendar days for a proposed change order) give the Contractor notice of Fort Bend County's approval or disapproval, setting forth in detail all reasons for any disapproval. Fort Bend County's right to disapprove any such matter submitted (other than a proposed change order) shall be limited to the elements thereof (a) which do not conform substantially to matters previously approved, (b) which are new elements not previously presented and approved and the Contractor is unable to demonstrate that such new element is reasonably necessary for completion of the Project, or (c) which depict matters that are violations of this Contract or applicable laws and regulations.

14.3.1 If Fort Bend County disapproves of a particular matter or Proposed Change Order, the Contractor shall have the right to resubmit such matter or Proposed Change Order to Fort Bend County, altered to satisfy Fort Bend County's basis for disapproval. Any resubmission shall be subject to review and approval by Fort Bend County.

14.3.2 Fort Bend County and the Contractor shall attempt in good faith to resolve any disputes concerning the approval of any aspect of the Project expeditiously, so as not to delay the completion of the Project in accordance with this Contract.

14.3.3 Expedited Approvals. Fort Bend County recognizes the importance of expeditious action upon all matters submitted to Fort Bend County for review and approval and of expeditious response to those aspects of the Project requiring approval by governmental authorities having jurisdiction there over. Fort Bend County agrees to exercise its rights of review and approval hereunder with due diligence, reasonableness, and good faith. Fort Bend County shall use its reasonable efforts to expedite any required

review of the Project or other matters by any governmental authority.

14.4 Changes.

14.4.1 General. Fort Bend County may make changes to the Project by altering, adding to, or deducting from the Project. All changes in the Project which (a) require an adjustment in the contract sum or an adjustment in the final completion date or (b) involve a material change in the overall scope or function of the Project shall be requested and authorized before commencing such changes by use of written change order notices, Proposed Change Orders and Change Orders, which change order procedure shall be the exclusive means to effect such changes in the Project.

14.4.2 Change Order Procedure. If at any time Fort Bend County desires to make any change in the Project requiring the issuance of a Change Order, Fort Bend County shall so advise the Contractor in writing by delivery to the Contractor of a written notice describing the change. Upon receipt of such notice initiated by Fort Bend County, the Contractor shall within a reasonable period of time advise Fort Bend County of the Contractor's proposal for the adjustments, if any, in the contract sum, the schedule of values, and the final completion date attributable to such change by delivering a written notice thereof (the "Proposed Change Order") to Fort Bend County. Such Proposed Change Order shall contain a description of the proposed change and shall set forth the Contractor's estimate of the increase or decrease, if any, in the contract sum and the change, if any, in the schedule of values and the final completion date attributable to such change. If the Contractor desires to make a change in the Project requiring the issuance of a change order, the Contractor shall deliver to Fort Bend County a Proposed Change Order. Upon execution by Fort Bend County, a Proposed Change Order shall constitute (and be defined herein as) a "Change Order" for purposes of this Contract. The Contractor shall forthwith perform the work as changed in accordance with such Change Order. All work performed pursuant to a Change Order shall be performed in accordance with the terms of this Contract. All Proposed Change Orders shall be submitted for approval by Fort Bend County. No action, acquiescence or inaction by Fort Bend County or any representative of Fort Bend County shall be construed to be a waiver of requirements set forth in this Contract in regard to Change Orders or ratification of a violation of such requirements, and all acts in violation of this provision shall be considered void.

14.4.3 Change Order Authorization. Each Change Order shall be signed by Fort Bend County and an authorized representative of the Contractor.

14.4.4 Contract Sum Adjustments. The contract sum and the schedule of values shall be adjusted only as a result of a Change Order requiring such

adjustment. Any extra work performed without a proper Change Order shall be considered voluntary and not subject to additional compensation. The Contractor shall not be entitled to an adjustment in the contract sum (or a Change Order permitting such adjustment) or to damages as a result of any delays in the Project caused by the acts or omissions of Fort Bend County, provided that this sentence is not applicable to delays that constitute more than 90 days in any 365-day period or cause the Project to be interrupted for a continuous period of 45 days through no fault of the Contractor.

14.4.5 When Fort Bend County and the Contractor agree upon the adjustments in the contract sum, the schedule of values, and the final completion date attributable to such adjustment, such agreement will be documented by preparation and if approved by the Fort Bend County Commissioners Court, execution of an appropriate Change Order.

14.5 Site Access. Prior to the transfer date, Fort Bend County and the Contractor shall have uninterrupted access to the construction site. Subsequent to the transfer date, Fort Bend County will permit the Contractor, the Engineer, and their representatives and subcontractors to enter upon the Project at times reasonably necessary to complete the punch list items.

14.6 Applicable Laws and Regulations. Contractor shall in its performance of the Project comply with all applicable laws and regulations. Any delays in the prosecution of the Project caused by any changes in the laws and regulations or the application or enforcement of the laws and regulations may entitle the Contractor to an extension of time.

14.7 Familiarity with Project. The Contractor represents and accepts that it has: (a) visited the property(ies), (b) taken such other steps as may be necessary to ascertain the nature and location of the Project and the general and local conditions which affect the Project or the cost thereof, (c) investigated the labor situation as regards to the Project, (d) examined the property(ies), the obstacles which may be encountered and all other observable conditions having a bearing upon the performance of the Project, the superintendence of the Project, the time of completion and all other relevant matters, and (e) reported to Fort Bend County the results of all of the foregoing. The Contractor represents that it is familiar with all phases of the Project and the matters that may affect the Project or its prosecution under this Contract.

14.8 Standard of Performance. The Contractor shall prosecute (or cause to be prosecuted) the Project in accordance with the best efforts for the construction and development of projects similar to the Project in the State of Texas, using qualified, careful, and efficient contractors and workers and in conformity with the provisions of this Contract. The Contractor shall perform the work in a good and workmanlike manner.

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14.9 Warranty of Contractor. The Contractor warrants to Fort Bend County that: (i) the Contractor possesses the skill and knowledge ordinarily possessed by well-informed members of its trade or profession and the Contractor will use its best efforts to ensure that the services provided under this Contract will be performed, delivered, and conducted in accordance with the best professional standards and in accordance with industry standards, and (ii) the Contractor is fully experienced and properly qualified to perform the class of work provided for herein, and that it is properly equipped, organized and financed to perform such work, and (iii) following the date of acceptance of this Contract, the services provided by the Contractor to Fort Bend County will conform to the representations contained in this Contract, including all attachments, schedules and exhibits. All warranties provided by the Contractor in this Contract shall be cumulative, shall be deemed consistent and not in conflict, are intended to be given full force and effect and to be interpreted expansively to give the broadest warranty protection to Fort Bend County.

14.10 Contractor's Personnel. Contractor shall employ only competent, skilled personnel for the Project. Prior to the final completion date, the Contractor shall maintain a superintendent who shall be authorized to act on behalf of the Contractor and with whom Fort Bend County may consult at all reasonable times. The superintendent shall not be transferred from the Project without Fort Bend County's consent (which shall not be unreasonably withheld or delayed); provided, however, the superintendent shall not be assigned solely to the Project and shall be entitled to spend reasonable time working on matters unrelated to the Project so long as such work on other matters does not render the superintendent unavailable to the Project or unavailable to Fort Bend County. However, such obligation to furnish the superintendent and such staff personnel shall not be construed (a) to preclude the promotion within the Contractor's organization of any person assigned to the Project or (b) to give rise to any liability of the Contractor if any person assigned to the Project (including, without limitation, the superintendent) leaves the Contractor's employment. If the superintendent is transferred from the Project, Fort Bend County shall have the right to approve the replacement superintendent (which approval will not be unreasonably withheld or delayed). The Contractor, the Architect, and the other subcontractors shall comply with all applicable health, safety, and loss prevention rules of applicable governmental authorities. The Contractor shall, at its own expense, remove from the Project any person who fails to comply with such rules and instructions. The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ on the Project any unfit person or anyone not skilled in the work assigned to him. Fort Bend County may, upon written notice to the Contractor, require the Contractor to remove an individual immediately from providing services for the following reasons: violation of the terms and conditions of this Contract; violation of Fort Bend County’s or the Contractor’s work rules and regulations; criminal activity; or violation of state, federal, or municipal statutes. Fort Bend County may, upon thirty (30) days written notice to the Contractor, require the removal of any individual from providing services without cause.

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14.11 Inspection. The Project and all parts thereof shall be subject to inspection from time to time by inspectors designated by Fort Bend County. No such inspections shall relieve The Contractor of any of its obligations hereunder. Neither failure to inspect nor failure to discover or reject any of the work as not in accordance with the drawings and specifications or any provision of this Contract shall be construed to imply an acceptance of such work or to relieve the Contractor of any of its obligations hereunder. Fort Bend County agrees that its right of inspection shall be used reasonably and in a timely manner so as not to delay orderly completion of the Project.

14.12 Protection Against Risks. The Contractor shall take all precautions which are necessary and adequate, against conditions created during the progress of the Project which involve a risk of bodily harm to persons or a risk of damage or loss to any property. The Contractor shall regularly inspect all work, materials and equipment to discover and determine any such conditions and shall be responsible for discovery, determination, and correction of any such conditions. The Contractor shall comply with all federal, state, and local occupational hazard and safety standards, codes and regulations applicable in the jurisdiction where the Project is being performed. The Contractor shall include the substance of this clause in its entirety in all subcontracts for any work to be performed at the construction site.

14.13 Equipment. Except as expressly provided herein to the contrary, the Contractor shall furnish (or cause to be furnished) all construction, transportation, installation, tools, and other equipment and facilities required for the performance of the Project within the times specified herein. Such equipment and facilities shall be serviceable and kept fit for the uses intended. Defective items shall be removed from the construction site promptly and at the Contractor's cost. The Contractor shall schedule (or cause to be scheduled) its other operations so as to not interfere with its duty to timely furnish the necessary equipment and facilities and personnel to operate the same at the times necessary for the orderly completion of the Project.

14.14 Materials. Except as may be specifically provided otherwise in the Contract or approved in advance by Fort Bend County, the Contractor shall provide Fort Bend County with copies of material testing reports and to cause all materials, equipment, and fabricated items incorporated in the Project to be new and of a suitable grade of their respective kinds for their intended use.

15.0 TERMINATION:

15.1 Fort Bend County may terminate the Contract if the Contractor:

15.1.1 Persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials.

15.1.2 Fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractor.

15.1.3 Persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction.

15.1.4 Otherwise is guilty of substantial breach of a provision of the Contract Documents.

15.2 When any of the above reasons exists, Fort Bend County may, without prejudice to any other rights or remedies of Fort Bend County and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

15.2.1 Take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor.

15.2.2 Finish the Project by whatever reasonable method Fort Bend County may deem expedient.

15.3 Either party may terminate this Contract at any time by providing thirty (30) days written notice.

15.4 When Fort Bend County terminates the Contract for one of the reasons stated in this section, the Contractor shall not be entitled to receive further payment until the Project is finished. Therefore, the Contractor shall be promptly paid for all work actually and satisfactorily completed.

16.0 COMPLETION, TRANSFER, AND ACCEPTANCE:

16.1 Final Completion. Upon the occurrence of the final completion date, the punch list items shall be promptly commenced and thereafter completed within thirty (30) days after final completion.

16.2 Transfer and Acceptance. Upon the occurrence of final completion, care, custody and control of the Project shall pass to Fort Bend County. As referenced herein, the "Transfer Date" shall mean the date on which the care, custody and control of the Project passes to Fort Bend County. Subsequent to the Transfer Date all risk of loss with respect to the Project shall be by Fort Bend County and the Contractor shall be thereafter obligated to cover the Project with their Insurance.

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17.0 SUSPENSION BY FORT BEND COUNTY FOR CONVENIENCE:

17.1 Fort Bend County may, without cause, order the Contractor in writing to suspend, delay or interrupt the Project in whole or in part for such period of time as Fort Bend County may determine.

17.2 An adjustment shall be made for increase in the cost of performance, caused by suspension, delay or interruption. No adjustment shall be made to the extent:

17.2.1 That performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible.

17.2.2 That an equitable adjustment is made or denied under another provision of this Contract.

17.3 Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

18.0 INDEPENDENT CONTRACTOR:

The Contractor shall be an independent contractor and any provisions of this Contract that may appear to give Fort Bend County the right to direct the Contractor as to the details of the manner of doing the Project shall be deemed to mean that the Contractor shall follow the desires of Fort Bend County in the results of the Project only and not in the means whereby the Project is to be accomplished. The Contractor shall be responsible as to the details of completing the Project. Neither the agents, representatives, nor employees of the Contractor, shall be deemed to be the agents, representatives, or employees of Fort Bend County. The Contractor further represents that it accepts a fiduciary role and responsibility with respect to Fort Bend County and will, to its best abilities, act in the best interests of Fort Bend County and the timely completion of the Project. The Contractor agrees and understands that neither it nor any of its agents or employees may act in the name of Fort Bend County except and unless specifically authorized in writing by Fort Bend County to do so. The Contractor shall furnish construction administration and management services and use the Contractor's best efforts to complete the Project in an expeditious and economical manner consistent with the interests of Fort Bend County.

19.0 NOTICE

19.1 All written notices, demands, and other papers or documents to be delivered to Fort Bend County under this Contract shall be delivered to the Sheriff's Office, 301 Jackson, Richmond, Texas 77469, or at such other place or places as Fort Bend County may from time to time designate by written notice delivered to the Contractor. For purposes of notice under this Contract, a copy of any notice or communication hereunder shall also be forwarded to the following address: Fort Bend County, 301 Jackson Street, Suite 719, Richmond, Texas 77469, Attention: County Judge.

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19.2 All written notices, demands, and other papers or documents to be delivered to the Contractor under this Contract shall be delivered to the Authorized Representative identified in the Contract documents or such other place or places as the Contractor may designate by written notice delivered to Fort Bend County.

20.0 RECORDS:

20.1 Fort Bend County shall be the absolute and unqualified owner of all drawings, preliminary layouts, record drawings, sketches and other documents prepared pursuant to the Contract by Contractor.

20.2 The Contractor agrees to maintain and preserve for a period of at least five years after the earlier of the expiration of the defects period or termination of this Contract, accurate and complete records relating to the performance of the Project. The Contractor agrees to, upon request, provide Fort Bend County with such records.

21.0 SUCCESSORS AND ASSIGNS:

21.1 Fort Bend County and the Contractor bind themselves and their successors, executors, administrators and assigns to the other party of this Contract and to the successors, executors, administrators and assigns of such other party, in respect to all covenants of this Contract.

21.2 Neither Fort Bend County nor the Contractor shall assign, sublet or transfer its interest in this Contract without the prior written consent of the other.

21.3 Nothing herein shall be construed as creating any personal liability on the part of any officer or agent of any public and/or governmental body that may be a party hereto.

22.0 PUBLIC CONTACT:

Contact with the news media, citizens of Fort Bend County or governmental agencies shall be the sole responsibility of Fort Bend County. Under no circumstances, whatsoever, shall Contractor release any material or information developed in the performance of its services hereunder without the express written permission of Fort Bend County, except where required to do so by law.

23.0 MODIFICATIONS:

This instrument contains the entire Contract between the parties relating to the rights herein granted and obligations herein assumed. Any oral or written representations or modifications concerning this instrument shall be of no force and effect excepting a subsequent written modification signed by both parties hereto.

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24.0 SILENCE OF SPECIFICATIONS:

The apparent silence of specifications as to any detail, or the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and that only material and workmanship of the finest quality are to be used. All interpretations of specifications shall be made on the basis of this statement. The items furnished under this contract shall be new, unused of the latest product in production to commercial trade and shall be of the highest quality as to materials used and workmanship. Manufacturer furnishing these items shall be experienced in design and construction of such items and shall be an established supplier of the item bid.

25.0 SEVERABILITY:

In the event one or more of the provisions contained in these requirements or the specifications shall for any reason be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision hereof and these requirements or the specifications shall be construed as if such invalid, illegal, or unenforceable provision had never been contained herein.

26.0 GOVERNING FORMS:

In the event of any conflict between the terms and provisions of these requirements and the specifications, the specifications shall govern. In the event of any conflict of interpretation of any part of this overall document, Fort Bend County's interpretation shall govern.

27.0 TAX EXEMPT:

Fort Bend County is exempt from state and local sales and use taxes under Section 151.309 of the Texas Tax Code. This Contract is deemed to be a separate contract for Texas tax purposes, and as such, Fort Bend County hereby issues its Texas Exemption for the purchase of any items qualifying for exemption under this Contract. Contractor is to issue its Texas Resale Certificate to vendors and subcontractors for such items qualifying for this exemption, and further, contractor should state these items at cost.

28.0 ENTIRE AGREEMENT:

The Parties agree that this Contract contains all of the terms and conditions of the understanding of the parties relating to the subject matter hereof. All prior negotiations, discussions, correspondence and preliminary understandings between the parties and others relating hereto are superseded by this Contract. By entering into this Contract, the parties do not intend to create any obligations, express or implied, other than those specifically set out in this Contract.

29.0 APPLICABLE LAW AND VENUE

This Contract shall be construed under and in accord with the laws of the State of Texas, and all obligations of the parties created hereunder are performable in Fort Bend County, Texas, and that

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venue for any litigation arising out of or related to this Contract shall lie solely in the court of appropriate jurisdiction located in Fort Bend County, Texas.

30.0 ATTACHMENTS:

The following being incorporated herein by reference for all purposes as though fully set forth herein word for word.

30.1 Attachment #1 - Pricing Sheet
30.2 Attachment #2 – Project Manual – Volume I
30.3 Attachment #3 – Project Manual – Volume II
30.4 Attachment #4 - Drawings

31.0 AWARD:

This contract will be awarded to the low bidder per item or overall bid.

32.0 TEXAS ETHICS COMMISSION FORM 1295:

32.1 Effective January 1, 2016 all contracts executed by Commissioners Court, regardless of the dollar amount, will require completion of Form 1295 "Certificate of Interested Parties", per the new Government Code Statute §2252.908. All vendors submitting a response to a formal Bid, RFP, SOQ or any contracts, contract amendments, renewals or change orders are required to complete the Form 1295 online through the State of Texas Ethics Commission website. Please visit: https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm.

32.2 On-line instructions:

32.2.1 Name of governmental entity is to read: Fort Bend County.

32.2.2 Identification number used by the governmental entity is: B23-012.

32.2.3 Description is the title of the solicitation: Construction of South Post Oak Sportsplex

32.3 Apparent low bidder(s) will be required to provide the Form 1295 within three (3) calendar days from notification; however, if your company is publicly traded you are not required to complete this form.

33.0 STATE LAW REQUIREMENTS FOR CONTRACTS:

The contents of this section are required by Texas Law and are included by County regardless of content.

33.1 Agreement to Not Boycott Israel Chapter 2271 Texas Government Code: Contractor verifies that if Contractor employs ten (10) or more full-time

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employees and this Agreement has a value of $100,000 or more, Contractor does not boycott Israel and will not boycott Israel during the term of this Agreement.

33.2 Texas Government Code Section 2251.152 Acknowledgment: By signature on vendor form, Contractor represents pursuant to Section 2252.152 of the Texas Government Code, that Contractor is not listed on the website of the Comptroller of the State of Texas concerning the listing of companies that are identified under Section 806.051, Section 807.051 or Section 2253.153.

34.0 HUMAN TRAFFICKING:

By acceptance of this contract, Contractor acknowledges that Fort Bend County is opposed to human trafficking and that no County funds will be used in support of services or activities that violate human trafficking laws

35.0 ADDITIONAL REQUIRED FORMS:

All vendors submitting are required to complete the attached and return with submission:

35.1 Vendor Form

35.2 W9 Form

35.3 Tax Form/Debt/Residence Certification

35.4 Contractor Acknowledgement of Stormwater Management Program

35.5 Pricing Sheet, as stated in Attachment #1.

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Contract Sheet
Bid 23-012

THE STATE OF TEXAS
COUNTY OF FORT BEND

This memorandum of agreement made and entered into on the _____ day of _____, 20_____, by and between Fort Bend County in the State of Texas (hereinafter designated County), acting herein by County Judge KP George, by virtue of an order of Fort Bend County Commissioners Court, and _____ (hereinafter designated Contractor).

(company name)

WITNESSETH:

The Contractor and the County agree that the bid and specifications for the **Construction of South Post Oak Sportsplex Baseball Fields Phase II for Fort Bend County** which are hereto attached and made a part hereof, together with this instrument and the bond (when required) shall constitute the full agreement and contract between parties and for furnishing the items set out and described; the County agrees to pay the prices stipulated in the accepted bid.

It is further agreed that this contract shall not become binding or effective until signed by the parties hereto and a purchase order authorizing the items desired has been issued.

Executed at Richmond, Texas this _____day of _____20_____.

Fort Bend County, Texas

By:_____
County Judge, KP George

By:_____
Signature of Contractor

By:_____
Printed Name and Title

Attachment # 1 - Pricing

Bid 23-012
Construction of South Post Oak Sportsplex Baseball Fields Phase II

Item 1. Demolition, paving and sitework

$_____

Calendar days for completion _____

Item 2. Building demolition, partial sitework, paving and utility

$_____

Calendar days for completion _____

Item 3. Baseball field turf, equipment, building "D" turf

$_____

Calendar days for completion _____

Item 4. Landscape, fence, shipping containers

$_____

Calendar days for completion _____

Total bid (Items 1 through 4) $_____

Total Calendar days for completion (Items 1 through 4) _____

Acknowledgement of Receipt of Addendum(s), if issued by Purchasing, to the Request for Proposal Document.

Addendum No 1 dated _____ Received _____

Addendum No 2 dated _____ Received _____

Addendum No 3 dated _____ Received _____

_____
Name of Respondent

_____
Signature of Authorized Representative

_____
Printed Name of Representative

PROJECT MANUAL

Project Number 6001-02

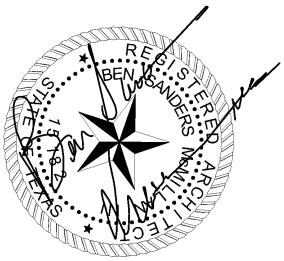
VOLUME I

For

Fort Bend County
South Post Oak Sportsplex
Baseball Fields Upgrades – Phase II

Houston, Texas 77053

Fort Bend Co. Bid 23-012



ISSUED FOR BID & CONSTRUCTION
7 September 2022

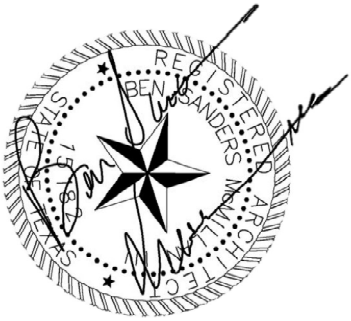
IDG ARCHITECTS, Inc.
440 Benmar Drive, Suite No. 3335
Houston, Texas 77060

PROJECT DIRECTORY

OWNER

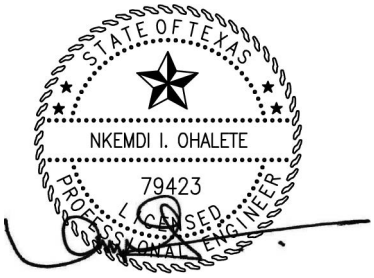
Fort Bend County Parks Department
955 Hwy. 6
Missouri City, Texas 77459
Contact: Darren McCarthy, Director Parks & Fairgrounds
Email: Darren.mccarthy@fortbendcountytx.gov

ARCHITECT



IDG+ Architects, Inc.
440 Benmar Drive, Suite 3335
Houston, Texas 77060
Phone: 832-44-2462
Ben S. McMillan III, AIA, NCARB
Email: bmcmillan@idgarch.com
Contact: Ismael Kabre
Email: ikabre@idgarch.com

CIVIL



Nedu Engineering Services, Inc.
6776 Southwest Frwy., Suite 320
Houston, Texas 77074
832-541-7784
713-268-1667 Fax
Contact: N. Innocent Ohalete
Email: nkemdi@neduengineers.com

STRUCTURAL

RDP Engineers, Inc.
104 Industrial Blvd., suite 111
Sugar Land, Texas 77478
281-276-1555
Contact: Raj Patel
Email: raj@rdpengineers.com

MEP

Marshall Engineering Corporation
715 N. Houston Avenue
Humble, Texas 77338
281-852-4131
281-852-4631 Fax
Contact: Tony Marshall
Email: tony@marshallengineeringco.com

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DIVISION 12 – FURNISHINGS

DIVISION 13 – SPECIAL CONSTRUCTION

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DIVISION 21 – FIRE SUPPRESSION

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DIVISION 23 – HVAC

SECTION 00 01 01

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G001	Drawing Index
G002	Accessibility Standards
G003	Code Analysis

CIVIL

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	Plat (Sheet 2 of 2)
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C3	Grading Plan
C3-1	Utility Plan
C4	Drainage Plan
C5	Detention and Drainage Calculations
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C7	SWPPP Layout
C8	SWPPP Details
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ARCHITECTURAL

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MECHANICAL

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GENERAL

G000	Cover Sheet
G001	Drawing Index
G002	Accessibility Standards
G003	Code Analysis
G004	Life Safety Plan

CIVIL

	Survey
	Plat (Sheet 1 of 2)
	Plat (Sheet 2 of 2)
C1	General Notes
C3	Grading Plan
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C4	Drainage Plan
C5	Detention and Drainage Calculations
C6	Paving Layout
C9	Storm Details
C11	Paving Details

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ARCHITECTURAL

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GENERAL

G000 Cover Sheet
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G002 Accessibility Standards
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G004 Life Safety Plan

CIVIL

	Survey
	Plat (Sheet 1 of 2)
	Plat (Sheet 2 of 2)
C1	General Notes
C3	Grading Plan
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C4	Drainage Plan
C5	Detention and Drainage Calculations
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ARCHITECTURAL

AD100	Demolition Site Plan
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G000	Cover Sheet
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G002	Accessibility Standards
G003	Code Analysis

CIVIL

	Survey
	Plat (Sheet 1 of 2)
	Plat (Sheet 2 of 2)

LANDSCAPE

L100	Landscape Plan

ARCHITECTURAL

A100	Site Plan
A108	Enlarged Site Plans
A109	Site Details

2501 Central Parkway, Suite A
Houston, Texas 77092
713.343.4482 | www.oneatlas.com

October 18, 2021

Gwendolyn F. Climmons
Fort Bend County Parks & Recreation Department
5855 Sienna Springs Way
Missouri City, TX 77459

SUBJECT: Comprehensive Pre-Demolition Asbestos Survey
Concession Stand Building
5535 Hobby Road, Houston, Texas 77053
Atlas Project No.: Z073FBC001

Dear Ms. Climmons:

In accordance with your request, ATC Group Services, LLC, dba Atlas Technical (Atlas), has prepared this letter report, which summarizes the findings of a Comprehensive Pre-Demolition Asbestos Survey conducted at the Concession Stand at the Baseball Fields within the South Post Oak Sportsplex at the above referenced property address (the property) for Fort Bend County Parks & Recreation Department (Client).

BACKGROUND

Atlas was retained by the Client to conduct a Comprehensive Pre-Demolition Asbestos Survey of suspect building materials located in the Fort Bend County Concession Stand at the Baseball Fields. The comprehensive survey included a visual inspection and physical assessment to identify suspect asbestos-containing materials (ACM), including the sampling and laboratory analysis of suspect friable and non-friable ACM that may be impacted by an upcoming planned demolition of the building.

METHODOLOGY

The location was surveyed and bulk samples of accessible suspected ACMs were collected. Suspect ACMs included the following: 12”x12” White Vinyl Floor Tiles and Mastic, Black Vinyl Cove Base and Mastic, 2’x2’ Ceiling Tiles, Window Caulking, Concrete Masonry Unit (CMU) Brick Walls, Sheetrock and Joint Compound on Ceilings. ATC collected twenty (20) bulk samples of suspect ACMs within the surveyed areas. Sampling included both interior and exterior materials. The roof was non-suspect corrugated metal and therefore, no roof sampling was conducted. A Sample Location Drawing is included in **Attachment A** and Photographic Documentation is included in **Attachment B**.

Bulk sampling was conducted in general accordance with procedures outlined in the Asbestos Hazard Emergency Response Act (40 CFR 763.86), Texas Department of State Health Services (TDSHS), Texas Asbestos Health Protection Rules (TAHPR) and the U.S. Environmental Protection Agency (EPA) guidance document entitled Guidance for Controlling Asbestos-Containing Materials in Buildings (Document No. 560/5-85/024). The asbestos survey was performed by Mr. J. Tony Flores of Atlas (TDSHS Asbestos Inspector License No. 60-3914) on October 7, 2021. Licenses and Certifications are included as **Attachment C**.

Bulk samples were analyzed by Eurofins J3 Resources, Inc. (TDSHS Laboratory License No. 30-0273) in Houston, Texas using approved polarized light microscopy with dispersion staining (PLM/DS) methods. Eurofins is accredited with the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program and the National Voluntary Laboratory Accreditation Program (NVLAP Code No. 200525-0). The PLM/DS analytical method is modeled after EPA Publication EPA/600/R-93/116: Test Method for the Determination of Asbestos in Bulk Materials, July 1993. If a material is identified as containing greater than 1% asbestos, it is considered an ACM. A copy of the laboratory report is included in **Attachment D**.

FINDINGS AND CONCLUSIONS

A material is considered by the TDSHS, TAHPR, and EPA to be asbestos-containing if at least one sample collected from the homogeneous area has asbestos present in concentrations greater than one percent (>1.0%). Atlas conducted condition assessments and collected bulk samples of suspect ACM. Materials sampled and laboratory results are summarized in **Table 1**.

TABLE 1
Pre-Demolition Asbestos Survey
5535 Hobby Road Houston, Texas
October 07, 2021

Sample Number(s)	Material Description	Location(s)*	Approximate Quantity of ACM	Friable	Condition	Results %
A01 A02 A03	12"x12" White Vinyl Floor Tile and Yellow Mastic	Back Storage Room Back Storage Room Back Storage Room	NA	No	Poor	ND
A04 A05 A06	Black Vinyl Cove Base and Tan Mastic	Back Storage Room Back Storage Room Back Storage Room	NA	No	Poor	ND
A07 A08 A09	2'x2' Ceiling Tile	Back Storage Room Back Storage Room Back Storage Room	NA	Yes	Poor	ND
A10 A11 A12	White/Gray Window Caulking	North Concession Window East Concession Window West Concession Window	NA	No	Poor	ND
A13 A14 A15	CMU Brick and Mortar	North Exterior Wall South Exterior Wall East Exterior Wall	NA	No	Poor	ND
A16 A17 A18 A19 A20	Sheetrock, Joint Compound and Texture on Ceiling	Men's Room Women's Room Concession Room Concession Waiting Area Concession Waiting Area	NA	Yes	Poor	ND

* Refer to Drawing for Sample Locations
NA: Not Applicable
ND: None Detected

Based on the results of the sampling performed by Atlas, no asbestos was identified in any of the sampled materials.

It should be noted that additional suspect ACMs, beyond those identified during this survey, may be present within the facility in inaccessible or concealed spaces.

Any additional unidentified materials discovered during demolition activities should be treated as assumed ACM in accordance with regulations 29 CFR 1926.1101 and 1910.1001 and other applicable state and local regulations.

RECOMMENDATIONS

Based on the results of the limited asbestos survey, Atlas makes the following recommendations:

- All sampled building materials that may be impacted by the upcoming planned demolition may be disturbed and/or demolished and disposed of as common construction/demolition debris, as they all tested as non-detect for asbestos.

If any additional materials are discovered during renovation/demolition activities, such materials must be assumed to contain asbestos until sampling and analysis proves otherwise.

LIMITATIONS

This report is not to be utilized as a bidding document or as a project specification document since it does not have all the components required to serve as an Asbestos Project Design document or an Abatement Work Plan.

Our professional services have been performed, our findings obtained, and our conclusions prepared in accordance with customary principles and practices in the fields of environmental science and engineering. This statement is in lieu of other statements either expressed or implied. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated.

This report is certified to Fort Bend County Parks & Recreation Department. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and, as such, the use, or re-use, of this document or the findings, conclusions, or recommendations contained herein, shall be at the sole risk of said user.

CLOSING

We appreciate the opportunity to be of service to Fort Bend County Parks & Recreation Department for this project and look forward to working with you on future assignments. If you have questions about information in this report or if we can be of further assistance, please contact the undersigned.

Sincerely,

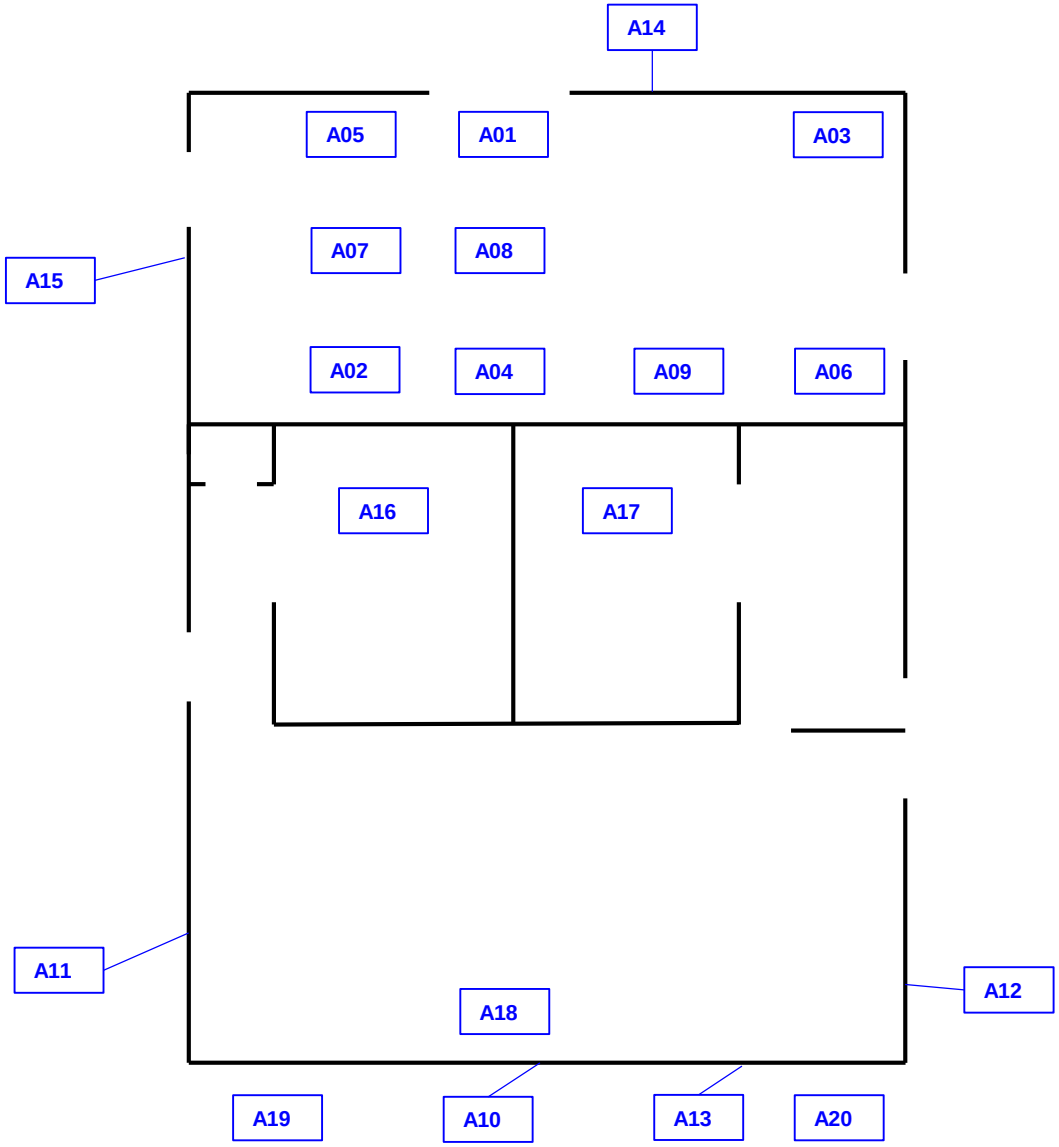
ATLAS TECHNICAL

Jose (Tony) Flores
Asbestos Inspector
TDSHS Asbestos Inspector License No. 60-3914
Direct Line: +1 346.227.7974
Email: jose.a.flores@oneatlas.com

Catherine G. McLain, MS, CIH
Industrial Hygiene Department Manager
TDSHS IAC License No. 10-5451
Direct Line +1 346.227.7971
Email: catherine.mclain@oneatlas.com

Attachments:
A: Sample Location Drawing
B: Photographic Documentation
C: Laboratory Report
D: Licenses and Certifications

ATTACHMENT A
SAMPLE LOCATION DRAWING



Asbestos Sample Location Map

Fort Bend County
5535 Hobby Road
Houston, Texas

Survey Date: **October 7, 2021**

LEGEND

00 = ACM Sample Locations

00 = Positive ACM Sample Locations

Project Number:
Z073FBC001

Drawn By: TF
Not to Scale

ATLAS

ATTACHMENT B
PHOTOGRAPHIC DOCUMENTATION

Photo 1 View of building exterior.

Photo 2 General view of kitchen.

Photo 3 General view of back storage room.

Photo 4 View of 12”x12” white vinyl floor tile.

Photo 5 View of 2’x2’ ceiling tiles.

Photo 6 View of black vinyl cove base.

ATTACHMENT C
LABORATORY REPORT

Eurofins J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 - Fax: (713) 290-0248
J3Resources.com

Bulk Asbestos Fiber Analysis by Polarized Light Microscopy (PLM)

Appx E Sub E 40 CFR 763 / EPA 600/R-93/116

Catherine McLain
Atlas Technical Consultants
2501 Central Parkway, Suite A4
Houston TX 77092

Order #: JH21131443
Project #: Z073FBC001
Date Received: 07-Oct-2021
Date Analyzed: 07-Oct-2021
Date Reported: 12-Oct-2021

5535 Hobby Rd.

Sample ID #	Sample Description	Asbestos Constituents	Non-Asbestos Constituents	
A01	LAYER 1 Floor Tile, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Mastic, Yellow, Homogeneous	None Detected	Non-Fibrous Material	100%
A02	LAYER 1 Floor Tile, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Mastic, Yellow, Homogeneous	None Detected	Non-Fibrous Material	100%
A03	LAYER 1 Floor Tile, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Mastic, Yellow, Homogeneous	None Detected	Non-Fibrous Material	100%
A04	LAYER 1 Cove Base, Black, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Mastic, Tan, Homogeneous	None Detected	Non-Fibrous Material	100%
A05	LAYER 1 Cove Base, Black, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Mastic, Tan, Homogeneous	None Detected	Non-Fibrous Material	100%
A06	LAYER 1 Cove Base, Black, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Mastic, Tan, Homogeneous	None Detected	Non-Fibrous Material	100%
A07	Ceiling Tile, White/ Gray, Homogeneous	None Detected	Cellulose Fiber Mineral Wool Non-Fibrous Material	60% 20% 20%

Arnold Flores Analyst

Scott Ward, Ph.D. Lab Director

Eurofins J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 - Fax: (713) 290-0248
J3Resources.com

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Date Analyzed: 07-Oct-2021
Date Reported: 12-Oct-2021

5535 Hobby Rd.

Sample ID #	Sample Description	Asbestos Constituents	Non-Asbestos Constituents	
A08	Ceiling Tile, White/ Gray, Homogeneous	None Detected	Cellulose Fiber Mineral Wool Non-Fibrous Material	60% 20% 20%
A09	Ceiling Tile, White/ Gray, Homogeneous	None Detected	Cellulose Fiber Mineral Wool Non-Fibrous Material	60% 20% 20%
A10	Window Caulk, Clear, Homogeneous	None Detected	Non-Fibrous Material	100%
A11	Window Caulk, Clear, Homogeneous	None Detected	Non-Fibrous Material	100%
A12	Window Caulk, Clear, Homogeneous	None Detected	Non-Fibrous Material	100%
A13	LAYER 1 Block Filler, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 CMU Brick, Gray, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 3 Concrete, Gray, Homogeneous	None Detected	Non-Fibrous Material	100%
A14	LAYER 1 Block Filler, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 CMU Brick, Gray, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 3 Concrete, Gray, Homogeneous	None Detected	Non-Fibrous Material	100%

Arnold Flores Analyst

Scott Ward, Ph.D. Lab Director

Eurofins J3 Resources, Inc.
6110 W. 34th Street, Houston, Texas 77092
Phone: (713) 290-0221 - Fax: (713) 290-0248
J3Resources.com

Bulk Asbestos Fiber Analysis by Polarized Light Microscopy (PLM)

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Catherine McLain
Atlas Technical Consultants
2501 Central Parkway, Suite A4
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Order #: JH21131443
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Date Received: 07-Oct-2021
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Date Reported: 12-Oct-2021

5535 Hobby Rd.

Sample ID #	Sample Description	Asbestos Constituents	Non-Asbestos Constituents	
A15	LAYER 1 Block Filler, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 CMU Brick, Gray, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 3 Concrete, Gray, Homogeneous	None Detected	Non-Fibrous Material	100%
A16	LAYER 1 Ceiling Texture, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Tape, Beige, Homogeneous	None Detected	Cellulose Fiber	100%
	LAYER 3 Joint Compound, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 4 Wallboard, Brown/ Pink, Homogeneous	None Detected	Cellulose Fiber Fibrous Glass Non-Fibrous Material	10% <1 90%
A17	LAYER 1 Ceiling Texture, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Tape, Beige, Homogeneous	None Detected	Cellulose Fiber	100%
	LAYER 3 Joint Compound, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 4 Wallboard, Brown/ Pink, Homogeneous	None Detected	Cellulose Fiber Fibrous Glass Non-Fibrous Material	10% <1 90%

Arnold Flores Analyst

Scott Ward, Ph.D. Lab Director

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Bulk Asbestos Fiber Analysis by Polarized Light Microscopy (PLM)

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Catherine McLain
Atlas Technical Consultants
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Date Received: 07-Oct-2021
Date Analyzed: 07-Oct-2021
Date Reported: 12-Oct-2021

5535 Hobby Rd.

Sample ID #	Sample Description	Asbestos Constituents	Non-Asbestos Constituents	
A18	LAYER 1 Ceiling Texture, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Tape, Beige, Homogeneous	None Detected	Cellulose Fiber	100%
	LAYER 3 Joint Compound, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 4 Wallboard, Brown/ Pink, Homogeneous	None Detected	Cellulose Fiber Fibrous Glass Non-Fibrous Material	10% <1 90%
A19	LAYER 1 Ceiling Texture, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Tape, Beige, Homogeneous	None Detected	Cellulose Fiber	100%
	LAYER 3 Joint Compound, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 4 Wallboard, Brown/ Pink, Homogeneous	None Detected	Cellulose Fiber Fibrous Glass Non-Fibrous Material	10% <1 90%
A20	LAYER 1 Ceiling Texture, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 2 Tape, Beige, Homogeneous	None Detected	Cellulose Fiber	100%
	LAYER 3 Joint Compound, White, Homogeneous	None Detected	Non-Fibrous Material	100%
	LAYER 4 Wallboard, Brown/ Pink, Homogeneous	None Detected	Cellulose Fiber Fibrous Glass Non-Fibrous Material	10% <1 90%

Arnold Flores Analyst

Scott Ward, Ph.D. Lab Director

ATLAS ATC

131443

ASBESTOS BULK SAMPLING - CHAIN OF CUSTODY

ATC Group Services LLC
2501 Central Parkway Houston, Texas 77092
Phone 713-343-4482 Fax 713- 977-1915

PAGE OF

Client Name: Fort Bend County Project No.: 2073FBC001 Date: 10/07/21

Site Location: 5535 Hobby Rd Prj Manager: Catherine McLain@atcgs.com Inspector: Tony F.

Sample No.	HA No.	Material Description	Classification	Homogeneous Material Location	Quantity	Condition
A01 A02 A03	01	12"x12" White VFT with Mastic	Surfacing: ; TSI: ; Miscellaneous: X; Nonfriable: X; Friable:	Back Storage Room " "	625SF	Good: ; Fair: ; Poor: X
A04 A05 A06	02	Black Vinyl Cove Base with Mastic	Surfacing: ; TSI: ; Miscellaneous: X; Nonfriable: X; Friable:	Back Storage Room " "	100 SF	Good: ; Fair: ; Poor: X
A07 A08 A09	03	2x2 ceiling tile	Surfacing: ; TSI: ; Miscellaneous: X; Nonfriable: ; Friable: X	Back Storage Room " "	625 SF	Good: ; Fair: ; Poor: X
A10 A11 A12	04	window caulking	Surfacing: ; TSI: ; Miscellaneous: X; Nonfriable: X; Friable:	North Concession window East Concession window West Concession window	50 SF	Good: ; Fair: ; Poor: X
A13 A14 A15	05	CMU Brick Wall	Surfacing: ; TSI: ; Miscellaneous: X; Nonfriable: X; Friable:	North Exterior Wall South Exterior Wall East Exterior Wall	1500SF	Good: ; Fair: ; Poor: X
A16 A17 A18	06	Sheetrock ceilings	Surfacing: X; TSI: ; Miscellaneous: ; Nonfriable: ; Friable: X	Mens Room Womens Room Concession Room / Kitchen	3000SF	Good: ; Fair: ; Poor: X
A19 A20	↓	↓	Surfacing: X; TSI: ; Miscellaneous: ; Nonfriable: ; Friable: X	Concession waiting area Concession waiting area		Good: ; Fair: ; Poor:

COMMENTS:

RELINQUISHED BY (SIGNATURE BELOW):		RECEIVED BY (SIGNATURE BELOW):		LABORATORY:	TurnAround
		S. McGrew 10/7/21		J3	X Standard 48 hours 24 Hours Other
PRINT NAME:	DATE/TIME:	PRINT NAME:	DATE/TIME:		
Tony Flores	10/7/21	S. McGrew	11:30 AM	3-Day	

ATTACHMENT D
LICENSES AND CERTIFICATIONS

Texas Department of State Health Services

ATC GROUP SERVICES LLC

is certified to perform as an

Asbestos Consultant Agency

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Texas Department of State Health Services

Asbestos Inspector

JOSE ANTONIO FLORES

License No. **603914**

Control No. **99869**

Expiration Date: **10-Feb-2023**

Texas Department of State Health Services

Asbestos Individual Consultant

CATHERINE G MCLAIN

License No. **105451**

Control No. **97806**

Expiration Date: **18-Dec-2022**

Geotechnical Evaluation

Fort Bend County – Phase II South Post Oak Park Complex Improvements Project

5535 Hobby Road

Houston, Texas

IDG Architects

440 Benmar Drive, Suite 3335 | Houston, Texas 77060

September 27, 2021 | Project No. 701202001

Environmental | Construction Inspection & Testing | Forensic Engineering & Expert Witness

Geophysics | Engineering Geology | Laboratory Testing | Industrial Hygiene | Occupational Safety | Air Quality | GIS

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September 27, 2021
Project No. 701202001

Mr. Ben McMillian
IDG Architects
440 Benmar Drive, Suite 3335
Houston, Texas 77060

Subject: Geotechnical Evaluation
Fort Bend County – Phase II South Post Oak Park Complex Improvements Project
5535 Hobby Road
Houston, Texas

Dear Mr. McMillian:

In accordance with our proposal dated May 6, 2021 and your authorization on the same date, Ninyo & Moore has performed a geotechnical evaluation for the above referenced project. The attached report presents our methodology, findings, geotechnical considerations, and recommendations for design and construction of the planned baseball fields improvements and batting cage.

We appreciate the opportunity to be of service to you during this phase of the project.

Sincerely,
NINYO & MOORE
TBPE Firm No. F-9782

Ronald A. Gutierrez
Graduate Engineer

Jeffrey S. Rodgers, PE, PG
Principal Engineer

STATE OF TEXAS
JEFFREY S. RODGERS
118726
LICENSED PROFESSIONAL ENGINEER

RAG/JSR/ls

9/27/2021

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1 INTRODUCTION

In accordance with our proposal dated May 6, 2021 and your authorization on the same date, Ninyo & Moore has performed a geotechnical evaluation for the planned baseball fields improvements and the batting cage located at 5535 Hobby Road in Houston, Texas (Figure 1). The purpose of our evaluation was to assess the subsurface conditions at the site to provide geotechnical recommendations for the design and construction of the project. This report presents the results of our evaluation, geotechnical considerations, and geotechnical design parameters for the planned baseball fields improvements and batting cage.

2 SCOPE OF SERVICES

Our scope of services included the following:

- Reviewing readily available published and in-house geological literature, including maps and reports pertaining to the project site and vicinity.
- Performing a visual reconnaissance of the site, marking out boring locations, and notifying Texas811 of the boring locations prior to drilling.
- Drilling, logging, and sampling five exploratory soil borings to depths ranging from about 5 to 15 feet below ground surface (bgs).
- Performing laboratory tests on selected samples obtained from our borings to evaluate the in-situ moisture content, percent of particles finer than No. 200 sieve, Atterberg limits, and shear strength.
- Compiling the collected data and performing engineering analyses.
- Preparing this report presenting our findings, conclusions, and recommendations regarding the design and construction of the project.

Our scope of services did not include environmental consulting services such as hazardous waste sampling or analytical testing at the site. In addition, a fault study was beyond the scope of this study. If needed, a scope and fee for these services can be provided.

3 PROPOSED CONSTRUCTION

The project consists of improvements to the South Post Oak Park Complex located in Houston, Texas. The planned improvements to the park consist of removing the existing grass on the fields and replacing it with synthetic turf. In addition, a new, approximately 60-foot wide by 150-foot long batting cage will be constructed between the two southern baseball fields.

Structural loads and grading plans were not available at the time of our proposal; however; we assume the loads will be typical for this type of structure and that finish grade will be within ±2 feet

of the existing grade. If finished floor elevation will vary from the planned grade, Ninyo & Moore should be contacted to review the new information and to evaluate the need for additional recommendations.

4 SITE DESCRIPTION

The project site is located at 5535 Hobby Road in Houston, Texas. At the time of our field evaluation, four baseball fields occupied the project site with a building in the center. A small storage building was located between the two southern fields. The baseball fields were covered with grass with the exception of the pitcher's mound, bases, and infield baselines. The field where Boring B-2 was located had grass around the infield baselines. There was an asphalt driveway from the parking lot to the center building and wrapped around to each baseball field's dugout. During our evaluation, the ground was soft and with areas of standing water. Clear Creek was located about ½-mile south of the project site.

Based on the United States Geological Survey (USGS) Almeda, Texas, 7.5-Minute Topographic Quadrangle Map (2019), the elevation at the addition site varies from about 70 feet MSL. The site slopes down to the northeast toward a channel.

Aerial photographs dated 1944 through 2020 were reviewed for this project. Photographs from 1944 through 1969 depict the site as undeveloped, vacant land. A structure is present in a photograph from 1973. The four baseball fields are first depicted in a photograph from 1981. A photograph from 1995 reveals a new paved driveway towards the middle of the four baseball fields. Aerial photographs depict the site as similar through photographs dated 2008. In a photograph dated 2008 depicts the fields were renovated, a few smaller buildings were removed and a building was added to the center of the four baseball fields. A photograph from 2010 reveal the expansion of the asphalt paving to wrap around the baseball fields, new bleachers over concrete paving and a new asphalt parking lot to the north of the baseball fields. A photograph from 2020 shows the upgrades to the infield with the exception of the field in the northeast corner. Photographs from the end 2020 depict the site in its current condition.

5 FIELD EXPLORATION

On May 18, 2021, Ninyo & Moore performed a subsurface exploration at the site to evaluate the subsurface conditions and collect soil samples for laboratory testing. Our evaluation consisted of drilling, logging, and sampling five exploratory soil borings, designated as Borings B-1 through B-5 (Figure 2). The borings were drilled using a drill rig mounted on an all-terrain vehicle (ATV) and equipped with straight-flight augers.

Soil samples were collected at selected intervals and were logged in general accordance with American Society of Testing Materials (ASTM) standard D2488. Relatively undisturbed soil samples were collected at regular intervals by hydraulically pushing Shelby tube samplers. A pocket penetrometer was used to approximate the unconfined compressive strength as an indicator of soil consistency for intact cohesive samples. The boring excavations were backfilled with soil cuttings on conclusion of our fieldwork.

Brief descriptions of field sampling procedures used are presented on Figure A-1, Explanation of Field Sampling Procedures, in Appendix A. Descriptions of the soils encountered in our borings are presented on boring logs in Appendix A.

6 LABORATORY TESTING

The soil samples collected from our drilling activities were transported to our laboratory for geotechnical laboratory testing. Selected samples were visually classified and tested to evaluate their engineering properties as a basis for providing geotechnical design recommendations and construction considerations. Laboratory testing included natural moisture contents (ASTM D2216), Atterberg limits (ASTM D4318 Method B), percent of particles finer than the No. 200 sieve (ASTM D1140), and an Unconfined Compression test (ASTM D2166).

Brief descriptions of laboratory test procedures used are presented on Figure B-1, Methods of Laboratory Testing, in Appendix B. Individual test results are presented either on the boring logs or on summaries of laboratory results found on Figures B-2 through B-4 in Appendix B.

7 GEOLOGY AND SUBSURFACE CONDITIONS

The geology and subsurface conditions at the site are described in the following sections.

7.1 Geologic Setting

The site is located in the West Gulf Coastal Plain Province of the Atlantic Plain physiographic region. This province extends from the southern tip of Texas along the Gulf Coast to the Mississippi Alluvial Plain to the east. This physiographic region is characterized as a gently sloping plain with gentle rolling hills.

The Geologic Atlas of Texas, Houston Sheet (1982) describes the geology of the site as the Beaumont Formation, a geologic formation consisting of predominantly of clay, sand and silt (Geologic Atlas of Texas, Houston Sheet, 1982).

The USDA Web Soil Survey describes the surficial soils in the areas near the northwest, southwest and southeast fields as predominately Bernard clay loam and the soils at the northeast field as Lake Charles clay. These soils types are generally medium to very high plasticity.

7.2 Subsurface Conditions

Our understanding of the subsurface conditions at the project site is based on the results of our field exploration, laboratory tests, and our experience. More detailed stratigraphic information as well as a key to the soil symbols and terms used on the boring logs is provided in Appendix A. The boring logs contain our field and laboratory test results, as well as our interpretation of conditions believed to exist between actual samples retrieved. Therefore, these boring logs contain both factual and interpretive information. Lines delineating subsurface strata on the boring logs are intended to group soils having similar engineering properties and characteristics. They should be considered approximate, as the actual transition between soil types (strata) may be gradual.

7.2.1 Existing Fill Soils

Fill soils were encountered in Borings B-2, B-4, and B-5 from the ground surface to depths of about 1 to 2 feet bgs. The fill generally consisted of clayey sand (SC) and silty clayey sand (SC-SM) in our borings.

7.2.2 Beaumont Formation

Naturally-deposited soils from the Beaumont Formation were encountered underlying the fill soils in the borings described above at the ground surface in the remaining borings, and extended to the total explored depths of about 5 to 15 feet bgs. Native soils consisted predominantly of fat clays (CH) in borings B-1 through B-4 to the termination of depth. In Boring B-5, native soils consisted of predominately of fat clays (CH) interbedded with lean and silty clays (CL, CL-ML) with varying sand fractions to the 15-foot boring termination depth.

7.3 Depth-to-Water

Each of the borings were initially drilled using dry-auger techniques in an attempt to measure depth-to-water in the open boreholes. Free water was not encountered in our borings. Fluctuations in groundwater may occur at this site as a function of seasonal moisture variation, close proximity to Clear Creek, precipitation, temperature, and groundwater withdrawal. Future construction activities may alter the surface and subsurface drainage characteristics of this site. In addition, perched groundwater may be encountered at the site, particularly after periods of heavy precipitation. Contractors should be prepared for shallow groundwater conditions at the site.

8 GEOLOGIC HAZARDS

The following sections describe potential geologic hazards at the site, including faulting, seismicity, and expansive soils.

8.1 Surface Faulting

A fault study was not part of our scope of work for this project. Based on a review of published geologic data in our library, the closest documented surface expression of a non-seismic growth fault to the project area are the Pine Island, Fuqua, and Anderson Faults, mapped about 1½ to 2 miles north and east of the project site (Campbell, 2018). These faults trend toward the direction of the site.

8.2 Seismic Design Considerations

Design of the proposed improvements should be performed in accordance with the requirements of the governing jurisdictions and applicable building codes. Table 1 presents the seismic design parameters for the site in accordance with the 2015 International Building Code (IBC) guidelines and adjusted maximum considered earthquake spectral response acceleration parameters evaluated using the web-based Structural Engineers Association of California (SEAOC) Seismic Design Map tool.

Table 1 – 2015 International Building Code Seismic Design Criteria

Site Coefficients and Spectral Response Acceleration Parameters	Values
Site Class	D
Site Coefficient, F_a	1.6
Site Coefficient, F_v	2.4
Mapped Spectral Acceleration at 0.2-second Period, S_s	0.070 g
Mapped Spectral Acceleration at 1.0-second Period, S_1	0.037 g
Spectral Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	0.112 g
Spectral Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	0.090 g
Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	0.075 g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	0.060 g

9 POTENTIAL SEASONAL MOVEMENTS

The Potential Vertical Rise (PVR) was calculated using the Texas Department of Transportation (TxDOT) Method for determining Potential Vertical Rise (PVR) (TEX-124-E), and engineering judgment and experience. The estimated ground movements due to swelling of the soils at this site

were calculated to be about 3 inches. This value was estimated using a surcharge load of 1.0 pounds per square inch (psi) and dry moisture conditions within the zone of seasonal moisture variation.

The TxDOT Method for PVR is an empirical method, and it should be noted that actual soil movements may exceed the estimated PVR, depending on moisture fluctuation, water seepage, etc. For example, movements exceeding those predicted above could occur if positive drainage of surface water is not maintained away from foundation elements or if soils are subject to an outside water source, such as leakage from a utility line or subsurface moisture migration from offsite locations.

10 GEOTECHNICAL CONSIDERATIONS

Based on the results of our subsurface evaluation, laboratory testing, and data analysis, the proposed construction is feasible from a geotechnical standpoint provided the recommendations in this report are incorporated into the design and construction of the project. Geotechnical considerations include the following:

- Due to the heterogeneous nature of the project area soils, and the relatively wide spacing between our borings, soils different than those encountered in our borings should be anticipated during construction.
- The PVR of the soils at this site was estimated to be about 3 inches. A select, engineered fill building pad will be needed to reduce the PVR to a more acceptable magnitude.
- Conventional earthmoving construction equipment may be used.
- Earthwork contractors should be made aware of the moisture sensitivity of near surface silty soils and potential compaction difficulties.
- Free water was not observed during our field exploration. However, relatively shallow groundwater and/or perched water may be encountered by the Contractor during construction, particularly after periods of heavy precipitation.
- New fill placed in the batting cage area should consist of select, engineered fill. Imported soils and soils generated from onsite excavation activities that exhibit a very low to low swell potential, have a plasticity index (PI) between 8 and 20, and have a liquid limit (LL) less than 40 can generally be used for select, engineered fill.
- Some of the onsite soils may be suitable for re-use as select, engineered fill. Soils that do not meet the select fill criteria may be re-used as general fill for site grading at the site, provided they are free of deleterious materials.

11 RECOMMENDATIONS

The following sections present our geotechnical recommendations and were developed based on our understanding of the proposed construction, the observed subsurface conditions, and our experience. If the proposed construction is changed from that discussed herein or subsurface conditions other than those shown on the boring logs are observed at the time of construction, Ninyo & Moore should be retained to review the new information and evaluate the need for additional recommendations.

Structural loads and grading plans were not available at the time of our proposal; however; we assume the loads will be typical for this type of structure and that finish grade will be within ±2 feet of the existing grade. If finished floor elevation will vary from the planned grade, Ninyo & Moore should be contacted to review the new information and to evaluate the need for additional recommendations.

11.1 Earthwork

The following sections present our general earthwork recommendations for this project. In general, local construction standards and specifications are expected to apply, unless otherwise noted.

11.1.1 Subgrade Improvement

As discussed above, a PVR of about 3 inches was calculated for the conditions observed at this site. Structural engineers in the Houston area generally consider potential seasonal soil-related movements of more than about 1-inch excessive for structures of this type. As such, soil improvement to reduce the magnitude of potential swell is needed.

The floor system of the batting cage may consist of a concrete slab designed to bear on improved soils. We recommend subgrade improvement at this site include overexcavating a portion of the existing soils and replacing it with select, engineered fill. In order to reduce the PVR to on the order of 1-inch, the floor slab should be supported on a 3½-foot-thick pad of select, engineered fill.

We also understand that potential soil movements more than 1 to 1½ inches are generally considered excessive for artificial athletic fields. As such, soil improvement to reduce the magnitude of potential swell is needed. We recommend subgrade improvement for the artificial turf include overexcavating a portion of the existing soils and replacing it with select, engineered fill. The estimated PVR for various depths of overexcavation and replacement are provided below in Table 2.

Table 2 – Estimated PVR Based on Depth of Overexcavation and Replacement with Select, Engineered Fill	
Depth of Over Excavation and Select, Engineered Fill Replacement (feet)	**Estimated PVR (inches)**
2½ feet	1½
3 feet	1¼
3½ feet	1

Select fill should meet the requirements described in Section 11.1.5 below. The pad should be placed and compacted as described in Section 11.1.7. The select fill should extend 5 feet or more beyond the structure's footprint and under adjoining flatwork.

11.1.2 Site Preparation

The site should be prepared by clearing existing vegetation. After stripping of the existing turf and overexcavation (if any) of expansive soils are performed, and prior to placement of any new fill soils, the exposed subgrade should be evaluated by proofrolling. In the batting cage area, the replacement fill should consist of select, engineered fill meeting the specifications provided in Section 11.1.5, or cohesionless soils consistent with the existing subgrade soils.

Prior to placing any fill or flatwork, the exposed subgrade should be evaluated by proofrolling. Proofrolling should be accomplished using a pneumatic-tired roller, dump truck, or similar equipment weighing approximately 20 tons and observed by the Geotechnical Engineer-of-Record or the Engineer's designated representative. Any soft or weak areas observed during the proofrolling process should be removed and replaced with compacted general fill as outlined in Section 11.1.7. In the batting cage pad area, the replacement fill should consist of select, engineered fill or cohesionless soils consistent with the existing subgrade soils.

After the proofrolling process and prior to placing any fill, the exposed subgrade should be scarified to a depth of 8 inches or more and recompacted as recommended in Section 11.1.7.

Due to the nature of the surficial soils, traffic of heavy equipment (including heavy compaction equipment) may create pumping and general deterioration of shallow soils. Therefore, some construction difficulties should be anticipated, especially during periods when these soils are saturated.

11.1.3 Wet Weather Conditions

Earthwork contractors should be made aware of the moisture sensitivity of the near surface clayey soils and potential compaction difficulties. If construction is undertaken during wet weather conditions, the surficial soils may become saturated, soft, and unworkable. Drainage trenches within the soils to be excavated, reworked and/or recompacted may be needed. Additionally, subgrade treatment techniques, such as chemical (lime) treatment, may be needed to provide a more weather resistant working surface during pad construction.

We recommend that consideration be given to construction during drier months. Alternatively, the Contractor should protect exposed areas once topsoil or existing pavement has been stripped, as well as provide positive drainage during earthwork operations.

11.1.4 Excavations

Our evaluation of the excavation characteristics of the onsite materials is based on the results of our exploratory borings, site observations, and experience with similar materials. Due to the heterogeneous nature of the project area soils, and the relatively wide spacing between our borings, soils different than those encountered in our borings should be anticipated during construction.

In our opinion, excavations at this site may be performed using conventional heavy-duty earthmoving or excavation equipment. Equipment and procedures should be used that do not cause significant disturbance to the excavation bottoms. The bottoms of excavations should expose competent soils and should be dry and free of loose, soft, or disturbed soil. Any soft, wet, weak, or deleterious materials should be overexcavated to expose strong competent soils.

Free water was not observed in our borings during our field exploration. However, relatively shallow groundwater and/or perched water may be encountered by the Contractor during construction, particularly after periods of heavy precipitation. The Contractor should anticipate encountering groundwater during construction that may result in difficulty achieving compaction of the soil, and may also result in subgrade pumping, etc., during earthwork activities. Wet or saturated soils at the excavation bases may soften under the action of light equipment and foot traffic. Drying or overexcavation of these materials may be appropriate prior to filling. If the subgrade becomes disturbed, it should be compacted before placing the backfill material.

Contractors should provide safely sloped excavations or an adequately constructed and braced shoring system in compliance with Occupational Safety and Health Administration

(OSHA) Regulations. Based on the soil conditions encountered in our borings, we recommend that an OSHA "Type C" soil classification be used for planning purposes for excavations at this site up to 20 feet deep. In general, temporary slopes in competent "Type C" soil should be inclined no steeper than 1.5:1 (horizontal to vertical). Upon excavation, soil classifications should be evaluated in the field by the Contractor's geotechnical consultant in accordance with OSHA regulations. Excavations more than 20 feet deep should be designed by the Contractor's engineer based on a site specific geotechnical analysis and evaluation of settlement-sensitive features.

Flatter slopes or bracing may be needed if excessive sloughing or raveling is observed. If material is stored or equipment is operated near an excavation, flatter slopes or stronger shoring should be used to resist the extra pressure due to superimposed loads.

11.1.5 Fill Materials

Select, engineered fill should consist of onsite and/or imported soils that exhibit relatively low plasticity indices and very low to low expansive potential. Relatively low plasticity indices are defined as a PI (plasticity index) of 20, or less, as evaluated by ASTM D 4318. We recommend select, engineered fill should have a liquid limit (LL) less than 40 and a PI between 8 and 20.

Suitable fill soils (select fill or general fill) should not include organic material, construction debris, or other non-soil fill materials. Clay lumps and rock particles should not be larger than 6 inches in dimension.

Fill materials in contact with ferrous metals should also have low corrosion potential (minimum resistivity more than 2,000 ohm-cm, chloride content less than 25 parts per million [ppm]). Fill material in contact with concrete should have a soluble sulfate content of less than 0.1 percent. The Geotechnical Engineer-of-Record should evaluate such materials and details of their placement prior to importation.

11.1.6 Re-use of Excavated Materials

Based on laboratory test results and our general observations, we anticipate many of the onsite soils do not meet the specifications provided in Section 11.1.5 and are not suitable for re-use as select, engineered fill. Soils that do not meet the criteria for select engineered fill, may be used as general fill for mass grading.

11.1.7 Fill Placement and Compaction

Fill soils, as well as scarified subgrade soils, should be moisture conditioned within the moisture range shown below in Table 3 and mechanically compacted to the percent compaction shown. Fill should generally be placed in 8-inch-thick loose lifts such that each lift is firm and non-yielding under the weight of construction equipment.

Table 3 – Summary of Compaction Recommendations

Description	Percent Compaction[1]	Moisture Content[2]
Select, Engineered Fill[3, 4]	95 or more	-2% to +2%
General Fill – Clay[4]	95 or more	-1% to +3%
General Fill – Sand	95 or more	-2% to +2%
Lime Treated Subgrade	95 or more	-1% to +3%

Note:
[1]Percent compaction is the ratio of in-situ density and the maximum dry density by ASTM D 698.
[2]The range shown refers to the optimum moisture content by ASTM D 698.
[3]Select, engineered fill should have a PI between 8 and 20 and an LL of 40 or less.
[4]Clayey soils used as fill should be processed so that particles or clods are no more than 6 inches in diameter prior to compaction.

11.1.8 Subgrade Chemical Treatment

As an alternative subgrade preparation measure beneath the artificial turf, the subgrade soils may be treated with lime prior to installation of the artificial turf system. This treatment will not reduce the PVR to be less than 1 to 1½ inches beneath the artificial turf, but will provide a firm surface for the artificial turf as well as reduce the water infiltration rate beneath the turf.

After finished subgrade elevation is achieved, the exposed surface of the subgrade soils should be scarified to a depth of 6 inches and treated with lime in accordance with City of Houston Standard Specifications. The soil and lime should be thoroughly blended for the lime treatment to be effective. Following the mixing activities, the lime-treated soils should be compacted as shown in Table 3.

We recommend about 8 to 10 percent lime be considered for estimating purposes. For construction, we recommend that the optimum lime content of the subgrade soils be evaluated by laboratory testing. Additional laboratory testing should be conducted prior to construction to evaluate the site for soluble sulfate content. The soluble sulfate content for the soils should be no more than 0.1 percent by weight.

11.1.9 Site Drainage

Adequate drainage should be provided to reduce seasonal variations in the moisture content of foundation soils. Sidewalks within 5 feet of the batting cage should be sloped away from the structure to reduce the potential for water ponding near the foundations. Finished grade within 5 feet of the batting cage should be adjusted to slope away from the structure at a slope of 2 percent, or more. The long-term performance of the foundation system depends, in part, on maintaining positive surface drainage over the life of the structure.

11.2 Foundations

Provided the batting cage area are prepared as recommended in Section 11.1.2, the planned batting cage may be supported using a shallow foundation system consisting of spread, strip, or combined footings (either formed or drilled).

11.2.1 Shallow Footings

Shallow spread, strip, and/or combined footings should bear on firm native soils or select, engineered fill at a depth of 2 feet or more below existing grade. Such footings may be designed using an allowable bearing pressure of 2,000 psf for dead loads plus sustained live loads. This value may be increased by a factor of $^1/_3$ for transient loads, such as wind and seismic. Continuous (strip) footings should have a width of 18 inches or more and isolated spread footings should have a width of 24 inches or more.

The footings may be constructed by drilling or may be excavated and formed. The footings should be reinforced in accordance with the Structural Engineer's recommendations. Foundation excavations should be protected against any significant change in soil moisture content and disturbance by construction activity.

We estimate foundation movements of 1-inch or less may occur. Differential movements are estimated to not exceed half the predicted movement. These settlement estimates are based on the assumption that the footings act as isolated elements. To reduce the potential for larger settlements beneath closely spaced footings due to stress overlap, the clear spacing between the footings should be the width of the larger adjacent footing or more.

The ultimate resistance of spread or strip footings to uplift forces is limited to the weight of the foundation plus the weight of any soil above the footings. We recommend total unit weights of about 120 pcf for soil and 150 pcf for concrete be used in calculations. The ultimate uplift resistance should be reduced by a factor of safety of 1.2 to calculate the allowable uplift capacity.

Lateral loads transmitted to the foundation will be resisted by soil-concrete friction on the base of the footings. Frictional resistance may be estimated using an allowable coefficient of friction of 0.25. The foundations should preferably be proportioned such that the resultant forces from the loads, including lateral loads, fall within the middle one-third of the footing base.

11.2.1.1 Footing Construction Considerations

The Geotechnical Engineer-of-Record or his representative should monitor foundation excavations to locate any pockets or seams of unsuitable materials (organic material, wet, soft, or loose soil), which might be encountered in excavations for footings. Unsuitable materials encountered at the foundation bearing level should be removed and replaced with select fill (as described in Section) or lean concrete (about 1,000 psi strength at 28 days).

The bottom 6 inches of foundation excavations should be performed using a smooth excavator bucket or by hand labor. Sides of excavations may slough to some extent with time. Sloughed soils and other debris in the bottom of the excavation should be removed prior to steel placement. Water should not be allowed to accumulate at the bottom of footing excavations.

Steel should be placed and concrete poured the day of excavation. If for some reason the footings cannot be poured the day of excavation, a seal slab should be placed to protect the exposed foundation soils.

11.3 Concrete

Laboratory chemical tests were not performed to evaluate the sulfate content of the site soils for this project. We assume that the soluble sulfate content at the project site less than 0.2 percent by weight. If desired, laboratory chemical testing can be performed to estimate the sulfate content of the onsite soils.

Based on our experience with similar soil conditions and area practice, we recommend the use of Type II cement for construction of concrete structures at this site. Due to potential uncertainties as to the use of reclaimed irrigation water, or topsoil that may contain higher sulfate contents, pozzolan or admixtures designed to increase sulfate resistance may be considered.

The Structural Engineer should select the concrete design strength and the water-cement ratio based on the project specific loading conditions. Higher strength concrete may be selected for increased durability and resistance to slab curling and shrinkage cracking. The concrete should

have a water-cementitious materials ratio no more than 0.50 by weight for normal weight aggregate concrete.

In order to reduce the potential for shrinkage cracks in the concrete during curing, we recommend that for slabs-on-grade, the concrete be placed with a slump in accordance with Table 6.2.1 of ACI 302.1R, “Guidelines for Floor and Slab Construction.” If a higher slump is needed for screening and leveling, a super plasticizer is recommended to achieve the higher slump without changing the recommended water to cement ratio. The slump should be checked periodically at the site prior to concrete placement. We also recommend that crack control joints be provided in slabs in accordance with the recommendations of the structural engineer to reduce the potential for distress due to minor soil movement and concrete shrinkage. We further recommend that concrete cover over reinforcing steel for slabs-on-grade and foundations are in accordance with IBC 1907.7.1. The Structural Engineer should be consulted for additional concrete specifications.

11.4 Pre-Construction Conference

We recommend a pre-construction conference be held. Representatives of the Owner, Civil Engineer, the Geotechnical Consultant, and the Contractor should be in attendance to discuss the project plans and schedule. Our office should be notified if the project description included herein is incorrect, or if the project characteristics are significantly changed.

11.5 Construction Observation and Testing

During construction operations, we recommend a qualified geotechnical consultant perform observation and testing services for the project. These services should be performed to evaluate exposed subgrade conditions, including the extent and depth of overexcavation, to evaluate the suitability of proposed borrow materials for use as fill and to observe placement and test compaction of fill soils. If another geotechnical consultant is selected to perform observation and testing services for the project, we request that the selected consultant provide a letter to the owner, with a copy to Ninyo & Moore, indicating that they fully understand our recommendations and they are in full agreement with the recommendations contained in this report. Qualified subcontractors utilizing appropriate techniques and construction materials should perform construction of the proposed improvements.

12 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of mankind at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the Client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the Client is undertaken at said parties' sole risk.

13 REFERENCES

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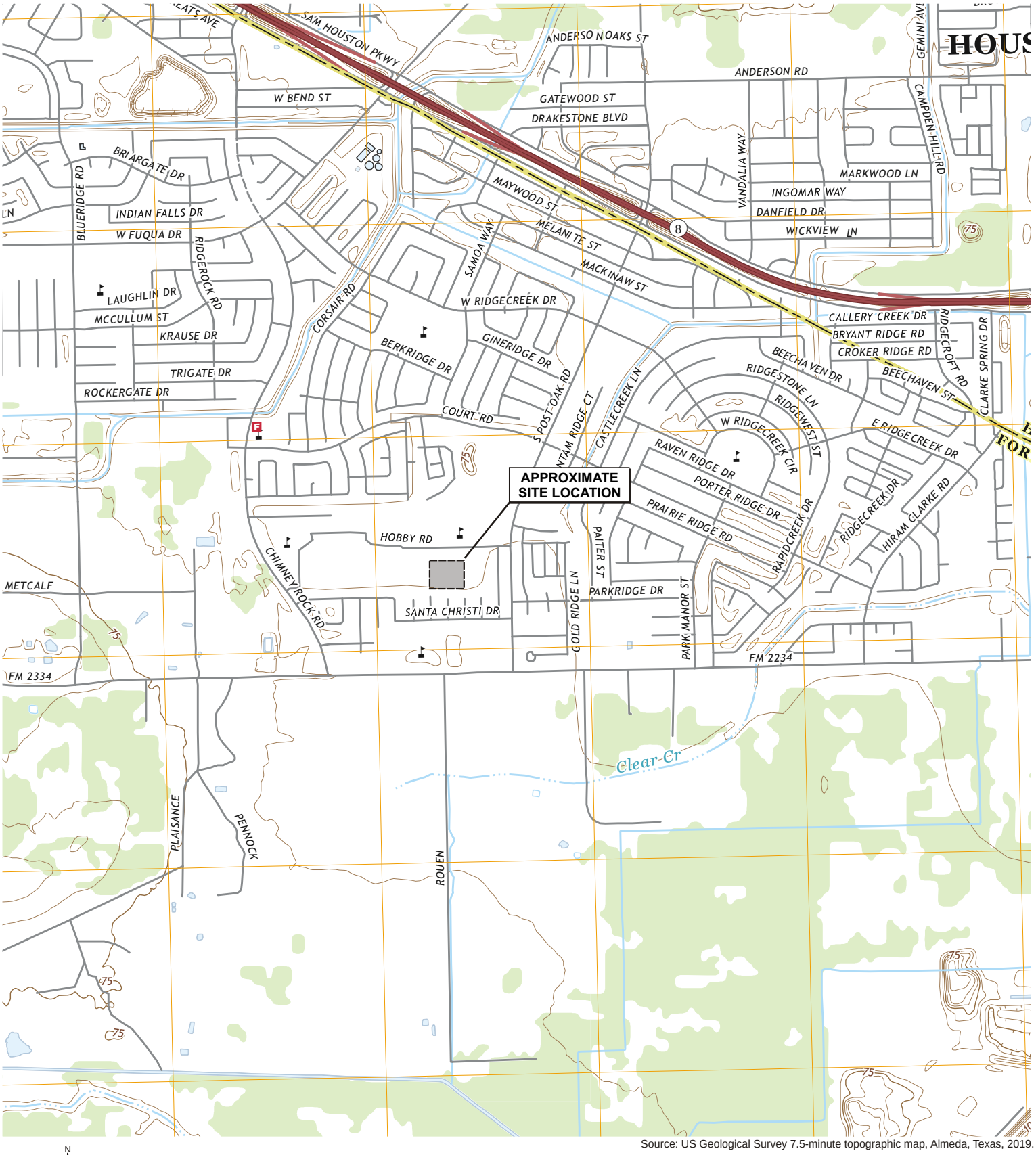
FIGURES



Source: US Geological Survey 7.5-minute topographic map, Almeda, Texas, 2019.

N

FEET

0 2000

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

FIGURE 1

SITE LOCATION

FBC - PHASE II SOUTH POST OAK PARK COMPLEX IMPROVEMENTS PROJECT
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HOUSTON, TEXAS

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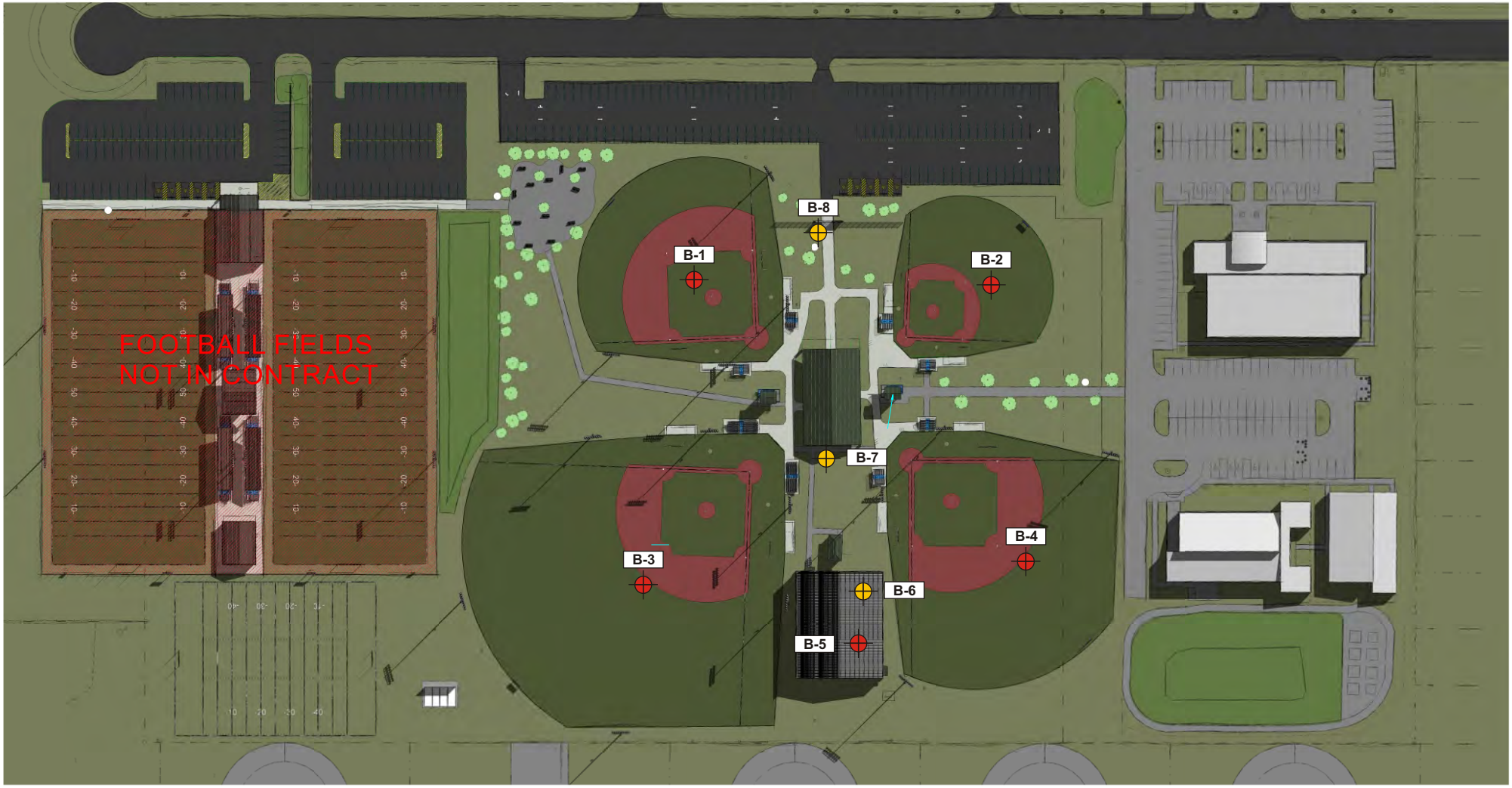
elt file no: 1202vmap0821



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FEET

0 150

SOURCE: IDG+ ARCHITECTS.

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

LEGEND

B-5 Boring Location (N&M, 05/2021)

B-8 Boring Location (Current Study)

elt file no: 1202blm0821

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FIGURE 2

BORING LOCATIONS

FBC - PHASE II SOUTH POST OAK PARK IMPROVEMENTS PROJECT
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APPENDIX A

Boring Logs

FIGURE A-1

BORING LOGS

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following method.

Shelby Tube

The Shelby tube is a seamless, thin-walled, steel tube having an external diameter of 3 inches and a length of 30 inches. The tube was connected to the drill rod or a hand tool and pushed into an undisturbed soil mass to obtain a relatively undisturbed sample of soft, cohesive soil in general accordance with ASTM D 1587. When the tube was almost full (to avoid over-penetration), it was withdrawn from the boring. The samples were removed from the sampling tubes in the field, assessed visually, and evaluated for consistency using a pocket penetrometer. A selected portion of each sample was then wrapped in aluminum foil and sealed in a plastic bag for use in future visual assessment and possible testing in our laboratory.

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	Cu ≥ 4 and 1 ≤ Cc ≤ 3[D]	GW	Well-graded gravel[E]
			Cu < 4 and/or [1 > Cc > 3][D]	GP	Poorly graded gravel[E]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[E,F,G]
			Fines classify as CL or CH	GC	Clayey gravel[E,F,G]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[H]	Cu ≥ 6 and 1 ≤ Cc ≤ 3[D]	SW	Well-graded sand[I]
			Cu < 6 and/or [1 > Cc > 3][D]	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[H]	Fines classify as ML or MH	SM	Silty sand[F,G,H]
			Fines classify as CL or CH	SC	Clayey sand[F,G,H]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay[K,L,M,N] / Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic Silt[K,L,M]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay[K,L,M,P] / Organic silt[K,L,M,Q]
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A]Based on the material passing the 3-in. (75-mm) sieve

[B]If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C]Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D]$Cu = D_{60}/D_{10}$ $Cc = (D_{30})^2 / (D_{10} \times D_{60})$

[E]If soil contains ≥ 15% sand, add "with sand" to group name.

[F]If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[G]If fines are organic, add "with organic fines" to group name.

[H]Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[I]If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J]If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K]If soil contains 15 to <30% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L]If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

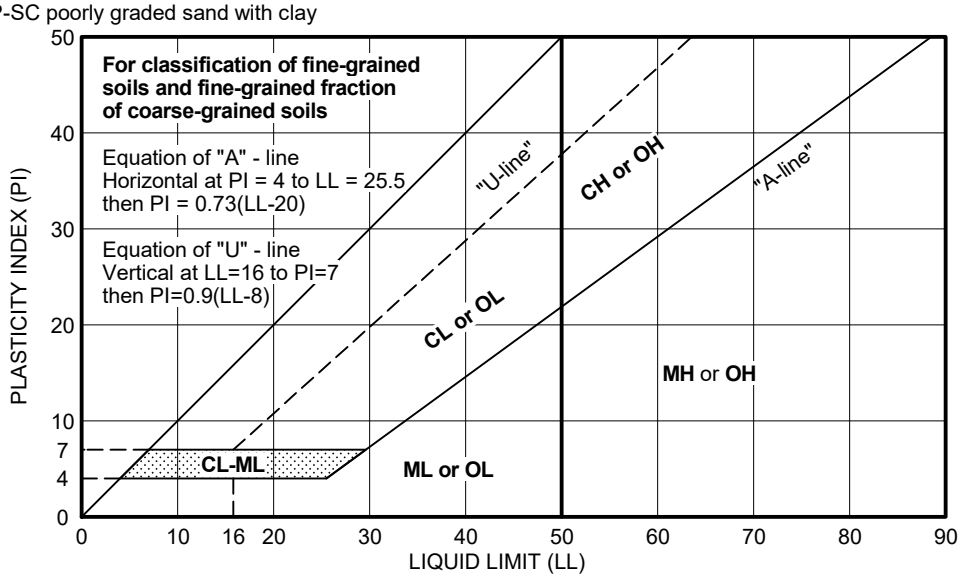
[M]If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N]PI ≥ 4 and plots on or above "A" line.

[O]PI < 4 or plots below "A" line.

[P]PI plots on or above "A" line.

[Q]PI plots below "A" line.



BASED ON TABLE 1 "SOIL CLASSIFICATION CHART" ASTM D 2487-11

FIGURE A-2

SOIL CLASSIFICATION CHART

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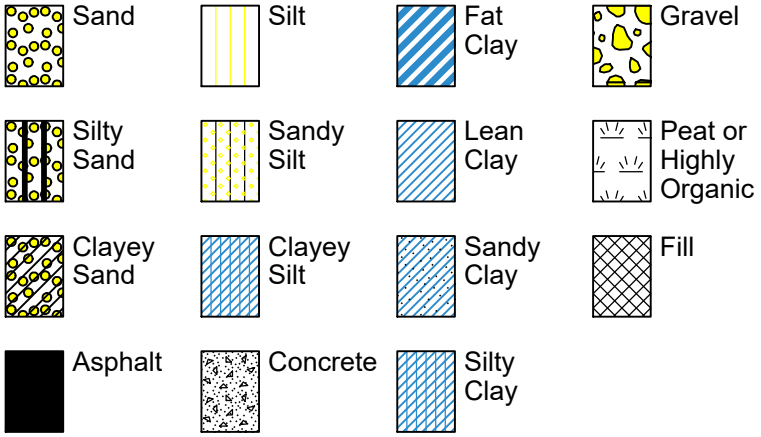
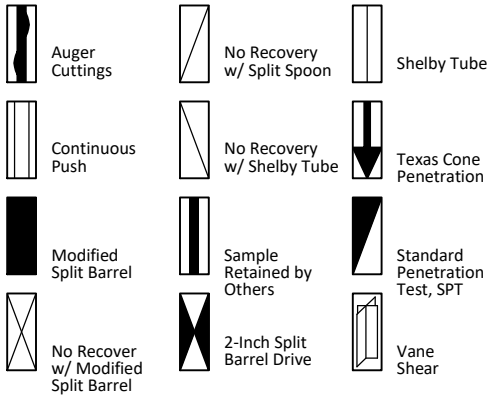
SYMBOLS

SOIL TYPES



SAMPLER TYPES



TERMINOLOGY

Terms used in this report to describe soils with regard to their consistency or conditions are in general accordance with the discussion presented in Article 45 of SOILS MECHANICS IN ENGINEERING PRACTICE, Terzaghi and Peck, John Wiley & Sons, Inc., 1967, using available information from the field and laboratory studies. Terms used for describing soils according to their texture or grain size distribution are in accordance with the UNIFIED SOIL CLASSIFICATION SYSTEM, as described in American Society for Testing and Materials D2487-11 and D2488-09a, Volume 04.08, Soil and Rock; Dimension Stone; Geosynthetics; 2015.

The depths shown on the boring logs are not exact, and have been estimated to the nearest half-foot. Lines delineating subsurface strata on the boring logs are intended to group soils having similar engineering properties and characteristics. They should be considered approximate as the actual transition between soil types (strata) may be gradual.

RELATIVE DENSITY

Cathead Hammer Penetration Resistance Blows per ft	Relative Density	Automatic Hammer Penetration Resistance Blows per ft
0 - 4	Very Loose	0 - 3
5 - 10	Loose	4 - 7
11 - 30	Medium Dense	8 - 20
31 - 50	Dense	21 - 33
> 50	Very Dense	> 33

COHESIVE STRENGTH

Cathead Resistance Blows per ft	Automatic Resistance Blows per ft	Consistency	Cohesion ksf
0 - 2	< 1	Very Soft	0 - 0.25
3 - 4	1 - 3	Soft	0.25 - 0.5
5 - 8	4 - 5	Firm	0.5 - 1.0
9 - 15	6 - 10	Stiff	1.0 - 2.0
16 - 30	11 - 20	Very Stiff	2.0 - 4.0
> 30	> 20	Hard	> 4.0

SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy.
Fissured	Containing shrinkage or relief cracks, often filled with fine sand or silt; usually more or less vertical.
Pocket	Inclusion of material of different texture that is smaller than the diameter of the sample.
Parting	Inclusion less than 1/8 inch thick extending through the sample.
Seam	Inclusion 1/8 inch to 3 inches thick extending through the sample.
Layer	Inclusion greater than 3 inches thick extending through the sample.
Laminated	Soil sample composed of alternating partings or seams of different soil type.
Interlayered	Soil sample composed of alternating layers of different soil type.
Intermixed	Soil sample composed of pockets of different soil type and layered or laminated structure is not evident.
Calcareous	Having appreciable quantities of carbonate.
Carbonate	Having more than 50% carbonate content.

DATE DRILLED 5/18/2021 BORING NO. B-1

GROUND ELEVATION ~ 67 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (Diamond - Tractor)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY Diamond LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0													1.5	CH	BEAUMONT FORMATION: Dark gray, moist, stiff, fat CLAY; roots; ferrous nodules; sand pockets.
						26	72	22	50				1.25		
													2.0		Light gray; stiff to very stiff.
															Total Depth = 5 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 5/18/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
10															
20															

FIGURE A-4

BORING LOG

GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

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DATE DRILLED 5/18/2021 BORING NO. B-2

GROUND ELEVATION ~ 69 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (Diamond - Tractor)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY Diamond LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						13	21	15	6	47				SC-SM	FILL: Light gray and reddish brown, moist, silty clayey SAND; roots.
													3.0 2.5	CH	BEAUMONT FORMATION: Dark gray, moist, very stiff, fat CLAY; ferrous nodules.
10															Total Depth = 5 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 5/18/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
20															

FIGURE A-5

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GROUND WATER OBSERVATIONS

First Observed (ft): None

After Drilling (ft): Dry

After N/A Hours (ft): N/A

BORING LOG

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DATE DRILLED 5/18/2021 BORING NO. B-3

GROUND ELEVATION ~ 69 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (Diamond - Tractor)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY Diamond LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0													3.5	CH	BEAUMONT FORMATION: Dark gray, moist, very stiff, fat CLAY; calcareous nodules; roots.
													2.5		Ferrous nodules.
						24	51	19	32				1.5		Stiff.
															Total Depth = 5 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 5/18/2021.
															Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report.
															The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
10															
20															

FIGURE A-6

GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

BORING LOG

FBC - PHASE II S. POST OAK PARK COMPLEX IMPROVEMENTS
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DATE DRILLED 5/18/2021 BORING NO. B-4

GROUND ELEVATION ~ 69 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (Diamond - Tractor)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY Diamond LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						17				36				SC	FILL: Brown and light brown, moist, clayey SAND; roots.
						31	69	25	44				1.0	CH	BEAUMONT FORMATION: Dark gray, moist, firm to stiff, fat CLAY; ferrous nodules; sand seams.
													1.5		Light gray and yellowish brown; stiff.
10															Total Depth = 5 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 5/18/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
20															

FIGURE A-7

GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

BORING LOG

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DATE DRILLED 5/18/2021 BORING NO. B-5

GROUND ELEVATION ~ 68 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (Diamond - Tractor)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY Diamond LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0														SC	FILL: Reddish brown, moist, clayey SAND; roots.
						34	67	22	45	85			1.0	CH	BEAUMONT FORMATION: Dark gray and light gray, moist, stiff, fat CLAY; few to little sand.
					103	22	67	21	46		2.3		2.5		Very stiff.
						16	28	15	13	79			2.5	CL	Light gray, moist, very stiff, lean CLAY with sand; ferrous nodules; sand seams.
						20	45	18	27				3.25		Light brown and light gray; calcareous nodules.
						19	50	19	31				3.5	CH	Light brown and light gray, moist, very stiff, fat CLAY; calcareous and ferrous nodules.
10														CL-ML	Reddish brown, moist, silty CLAY.
													3.0	CH	Reddish brown, moist, very stiff, fat CLAY; calcareous and ferrous nodules.
													2.5		
20															Total Depth = 15 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 5/18/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A-8

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GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

BORING LOG

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DATE DRILLED 8/2/2021 BORING NO. B-6

GROUND ELEVATION ~ 68 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (DAS - Truck)

DRIVE WEIGHT 140 lbs (Cathead) DROP HEIGHT 30 inches

SAMPLED BY DAS LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0													4.0	CH	FILL: Yellowish brown and dark brown, moist, very stiff, fat CLAY; roots; ferrous nodules.
													2.25	CH	BEAUMONT FORMATION: Dark brown, moist, very stiff, fat CLAY; ferrous nodules; sand pockets.
													3.5		Reddish yellow and light gray; calcareous nodules.
													2.5		Frequent calcareous nodules.
													3.75		Reddish brown and light gray.
10					107	24					2.4		3.0		Silt seams.
						21							2.0		Stiff to very stiff.
													2.0	CL-ML	Reddish brown and light gray, moist, stiff to very stiff, silty CLAY; calcareous and ferrous nodules.
				19										SM	Yellowish brown, moist, medium dense, silty SAND; clay seams.
20															Total Depth = 20 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 8/2/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A-9

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GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

BORING LOG

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5535 HOBBY ROAD
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DATE DRILLED 8/2/2021 BORING NO. B-7

GROUND ELEVATION ~ 68 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (DAS - Truck)

DRIVE WEIGHT 140 lbs (Cathead) DROP HEIGHT 30 inches

SAMPLED BY DAS LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						7	24	17	7				4.5+	CL-ML	FILL: Light brown, gray, and dark brown, moist, hard, silty CLAY; roots; calcareous nodules.
						16							2.0	CL	BEAUMONT FORMATION: Dark brown, moist, stiff to very stiff, lean CLAY; ferrous nodules; sand pockets.
						20	49	17	32				2.0		
						25	71	21	50				1.5	CH	Dark brown, moist, stiff, fat CLAY with sand; ferrous nodules.
						17				84			3.0		Light gray and reddish brown; very stiff; calcareous nodules.
10													3.5		
						21							2.5		Very stiff.
													1.25	CL	Reddish brown and light gray, moist, stiff, sandy lean CLAY; silt seams.
				39										SM	Yellowish brown and light gray, moist, dense, silty SAND.
20															Total Depth = 20 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 8/2/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A-10

Ninyo & Moore
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GROUND WATER OBSERVATIONS

First Observed (ft): None

After Drilling (ft): Dry

After N/A Hours (ft): N/A

BORING LOG

FBC - PHASE II S. POST OAK PARK COMPLEX IMPROVEMENTS
5535 HOBBY ROAD
HOUSTON, TEXAS

701202001 | 9/21

DATE DRILLED 8/2/2021 BORING NO. B-8

GROUND ELEVATION ~ 67 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (DAS - Truck)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY DAS LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						9	31	17	14				4.5+	CL	FILL: Brown and ligth gray, moist, hard, sandy lean CLAY; calcareous nodules; roots.
						18							3.0	CL	BEAUMONT FORMATION: Dark brown, moist, very stiff, lean CLAY; ferrous nodules; sand pockets.
						23							1.5	CH	Dark brown, moist, stiff, fat CLAY; ferrous nodules; sand pockets.
						22	55	19	36				2.5		Light gray and yellow brown; very stiff.
													3.25		Light gray and reddish brown; calcareous nodules.
10															Total Depth = 10 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 8/2/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
20															

FIGURE A-11

BORING LOG

GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

FBC - PHASE II S. POST OAK PARK COMPLEX IMPROVEMENTS
5535 HOBBY ROAD
HOUSTON, TEXAS

701202001 | 9/21

APPENDIX B

Laboratory Testing

FIGURE B-1

LABORATORY TESTING

Classification
Soils were visually and texturally classified using the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the boring logs in Appendix A and in the following summary tables in Appendix B.

Moisture Content
The moisture content of samples obtained from the exploratory borings was evaluated in general accordance with ASTM D 2216. The test results are presented on the boring logs in Appendix A and the Summary of Laboratory Results, Figure B-4.

No. 200 Sieve Wash
An evaluation of the percentage of particles finer than the No. 200 sieve in selected soil sample was performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure B-2, on the boring logs in Appendix A, and in the Summary of Laboratory Results, Figure B-4.

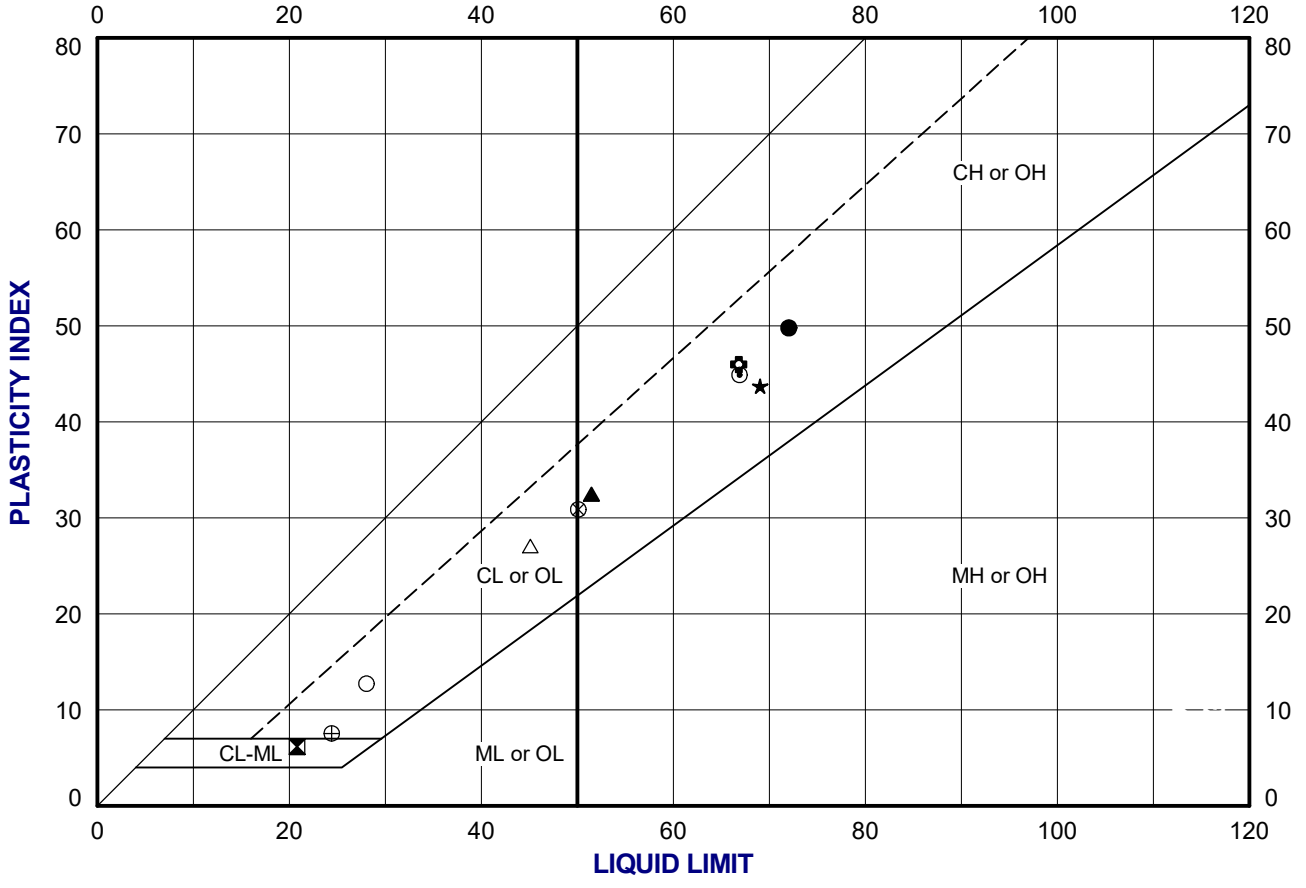
Particle Size Distribution Analysis
Particle-size distribution analysis tests were performed on selected representative soil samples in general accordance with ASTM D6913. The grain size distribution curves are shown on Figure B-4 in Appendix B. These test results were utilized in evaluating the soil classifications in accordance with the Unified Soil Classification System (USCS).

Atterberg Limits
Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318 (Method B). These test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System (USCS). The results of these tests are presented on Figure B-3, on the boring logs in Appendix A, and in the Summary of Laboratory Results, Figure B-4.

Compression Tests
An unconsolidated-undrained compression test was performed on a relatively undisturbed sample in general accordance with ASTM D2850. The test results are shown on the boring logs in Appendix A and in the Summary of Laboratory Results, Figure B-4.

SAMPLE LOCATION	DEPTH (feet)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS
B-2	0 - 2	Silty, Clayey SAND	100.0	46.8	SC-SM
B-4	0 - 2	Clayey SAND	100.0	36.4	SC
B-5	1 - 2	Fat CLAY	100.0	85.4	CH
B-5	4 - 6	Lean CLAY w/ Sand	100.0	78.8	CL
B-7	8 - 10	Fat CLAY w/ Sand	100.0	84.3	CH

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-1	2 - 4	72	22	50	CH	CH
⊠	B-2	0 - 2	21	15	6	CL-ML	SC-SM
▲	B-3	4 - 5	51	19	32	CH	CH
★	B-4	2 - 4	69	25	44	CH	CH
⊙	B-5	1 - 2	67	22	45	CH	CH
✿	B-5	2 - 4	67	21	46	CH	CH
○	B-5	4 - 6	28	15	13	CL	CL
△	B-5	6 - 8	45	18	27	CL	CL
⊗	B-5	8 - 10	50	19	31	CH	CH
⊕	B-7	0 - 2	24	17	7	CL-ML	CL-ML



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D4318.

FIGURE B-3a

ATTERBERG LIMIT TEST RESULTS

FBC - PHASE II SOUTH POST OAK PARK COMPLEX IMPROVEMENTS PROJECT
5535 HOBBY ROAD
HOUSTON, TEXAS

Ninyo & Moore
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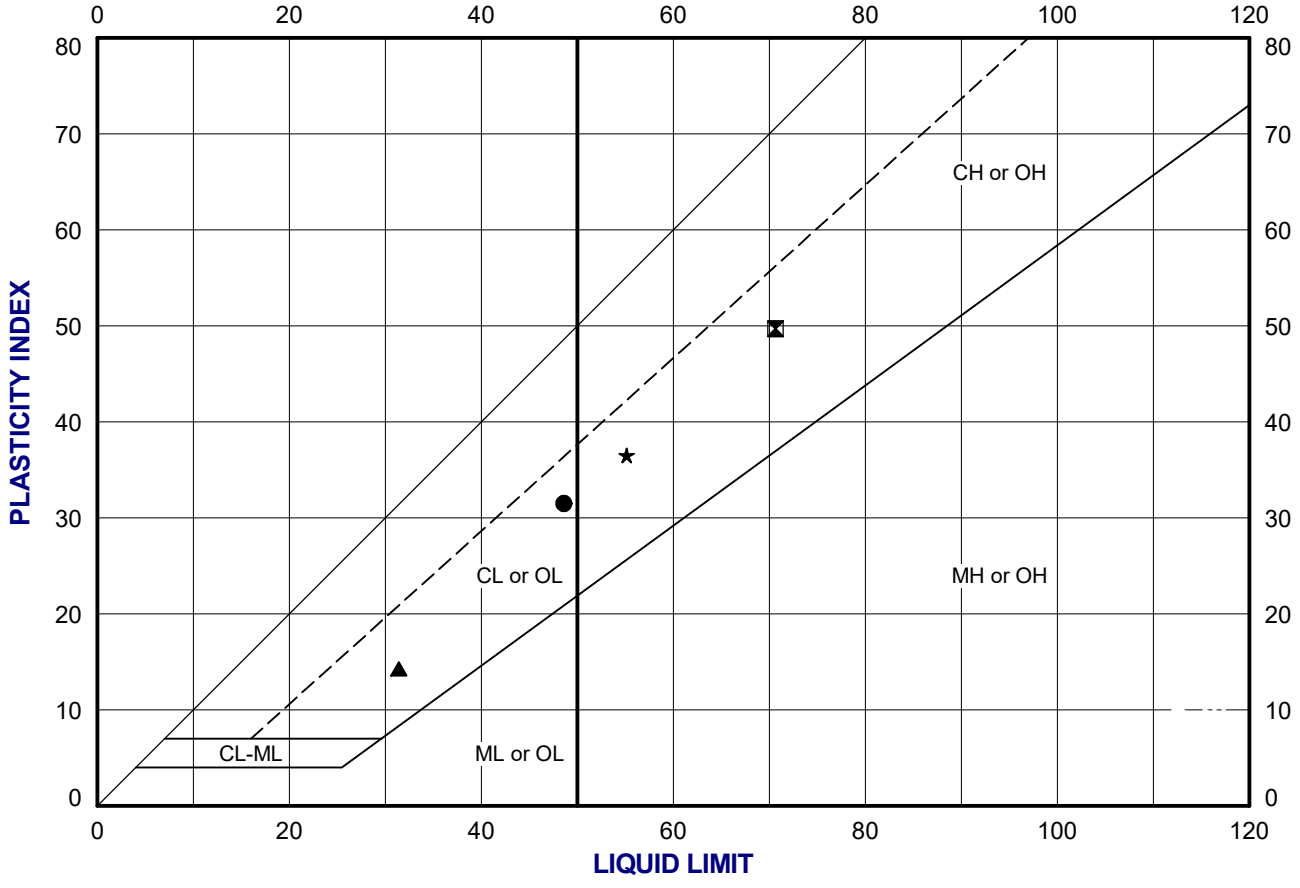
SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-7	4 - 6	49	17	32	CL	CL
⊠	B-7	6 - 8	71	21	50	CH	CH
▲	B-8	0 - 2	31	17	14	CL	CL
★	B-8	6 - 8	55	19	36	CH	CH
⊙							
✿							
○							
△							
⊗							
⊕							



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D4318.

FIGURE B-3b

ATTERBERG LIMIT TEST RESULTS

FBC - PHASE II SOUTH POST OAK PARK COMPLEX IMPROVEMENTS PROJECT
5535 HOBBY ROAD
HOUSTON, TEXAS

Borehole	Depth (feet)	Liquid Limit	Plastic Limit	Plasticity Index	Shear Strength (ksf)	%<#200 Sieve	USCS Group Symbol	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1	0 - 2				1.5[P]		CH				
B-1	2 - 4	72	22	50	1.25[P]		CH	26.0			
B-1	4 - 5				2.0[P]		CH				
B-2	0 - 2	21	15	6		46.8	SC-SM	13.0			
B-2	2 - 4				3.0[P]		CH				
B-2	4 - 5				2.5[P]		CH				
B-3	0 - 2				3.5[P]		CH				
B-3	2 - 4				2.5[P]		CH				
B-3	4 - 5	51	19	32	1.5[P]		CH	24.0			
B-4	0 - 2					36.4	SC	17.0			
B-4	2 - 4	69	25	44	1.0[P]		CH	31.0			
B-4	4 - 5				1.5[P]		CH				
B-5	1 - 2	67	22	45	1.0[P]	85.4	CH	34.0			
B-5	2 - 4	67	21	46	2.3[U]		CH	22.0	103.3		
B-5	4 - 6	28	15	13	2.5[P]	78.8	CL	16.0			
B-5	6 - 8	45	18	27	3.25[P]		CL	20.0			
B-5	8 - 10	50	19	31	3.5[P]		CH	19.0			
B-5	11 - 12				3.0[P]		CH				
B-5	13 - 15				2.5[P]		CH				
B-6	0 - 2				4.0[P]		CH				
B-6	2 - 4				2.25[P]		CH				
B-6	4 - 6				3.5[P]		CH				
B-6	6 - 8				2.5[P]		CH				
B-6	8 - 10				3.75[P]		CH				
B-6	10 - 12				2.4[U]		CH	24.0	106.7		

U = Unconfined Compression; Q = Unconsolidated-Undrained Triaxial; T = Torvane; P = Pocket Penetrometer

FIGURE B-4a

SUMMARY OF LABORATORY RESULTS

FBC - PHASE II SOUTH POST OAK PARK COMPLEX IMPROVEMENTS PROJECT
5535 HOBBY ROAD
HOUSTON, TEXAS

Borehole	Depth (feet)	Liquid Limit	Plastic Limit	Plasticity Index	Shear Strength (ksf)	%<#200 Sieve	USCS Group Symbol	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-6	13 - 14				2.0[P]		CH	21.0			
B-6	14 - 15				2.0[P]		CL-ML				
B-7	0 - 2	24	17	7	4.5+[P]		CL-ML	7.0			
B-7	2 - 4				2.0[P]		CL	16.0			
B-7	4 - 6	49	17	32	2.0[P]		CL	20.0			
B-7	6 - 8	71	21	50	1.5[P]		CH	25.0			
B-7	8 - 10				3.0[P]	84.3	CH	17.0			
B-7	10 - 12				3.5[P]		CH				
B-7	13 - 14				2.5[P]		CH	21.0			
B-7	14 - 15				1.25[P]		CL				
B-8	0 - 2	31	17	14	4.5+[P]		CL	9.0			
B-8	2 - 4				3.0[P]		CL	18.0			
B-8	4 - 6				1.5[P]		CH	23.0			
B-8	6 - 8	55	19	36	2.5[P]		CH	22.0			
B-8	8 - 10				3.25[P]		CH				

U = Unconfined Compression; Q = Unconsolidated-Undrained Triaxial; T = Torvane; P = Pocket Penetrometer

FIGURE B-4b

SUMMARY OF LABORATORY RESULTS

FBC - PHASE II SOUTH POST OAK PARK COMPLEX IMPROVEMENTS PROJECT
5535 HOBBY ROAD
HOUSTON, TEXAS

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Geotechnical & Environmental Sciences Consultants

September 27, 2021
Project No. 701202001

Mr. Ben McMillian
IDG Architects
440 Benmar Drive, Suite 3335
Houston, Texas 77060

Subject: Addendum No. 1 to Geotechnical Evaluation
Fort Bend County – Phase II South Post Oak Park Complex Improvements Project
5535 Hobby Road
Houston, Texas

Dear Mr. McMillian:

Pursuant to the request from IDG Architects, we have prepared this addendum to our report titled, "Geotechnical Evaluation – Fort Bend County – Phase II South Post Oak Park Improvements Project – 5535 Hobby Road, Houston, Texas" dated June 4, 2021.

We understand that two pre-engineered steel framed structures and an entry wall are planned at the project site. The structures will be supported on drilled-and-underreamed piers and the wall is planned to be supported on shallow foundations. Structural loading as well as grading plans were not available at the time of our study; however, we assume the loads will be typical for these structure types and that the site grade will not change by more than ±2 feet and positive drainage will be established.

FIELD EXPLORATION

On August 2, 2021, Ninyo & Moore conducted an additional subsurface exploration at the site to evaluate the subsurface conditions and collect soil samples for laboratory testing. Our evaluation consisted of drilling, logging, and sampling three additional exploratory soil borings, designated as B-6 to B-8, to depths ranging of about 10 to 20 feet below the ground surface (Figure 2). The borings were drilled using a truck-mounted drilling rig equipped with straight-flight augers.

POTENTIAL SEASONAL MOVEMENTS

The Potential Vertical Rise (PVR) was calculated using the Texas Department of Transportation (TxDOT) Method for determining Potential Vertical Rise (PVR) (TEX-124-E), the laboratory swell tests, and our engineering judgment and experience. The estimated ground movements due to

swelling of the soils at this site were calculated to be about 3 inches. This value was estimated using a surcharge load of 1.0 pounds per square inch (psi) and dry moisture conditions within the zone of seasonal moisture variation (about 10 feet).

The TxDOT Method for PVR is an empirical method, and it should be noted that actual soil movements may exceed the estimated PVR, depending on moisture fluctuation, water seepage, etc. For example, movements exceeding those predicted above could occur if positive drainage of surface water is not maintained away from foundation elements or if soils are subject to an outside water source, such as leakage from a utility line or subsurface moisture migration from offsite locations.

EXISTING FILL

Fill was observed in our boring to a depth of approximately 2 feet bgs. In practice, it is relatively difficult to accurately delineate fill soils that are visually similar to the native soils. Therefore, the recorded fill depths should be considered estimates and may vary somewhat from the actual fill depths.

Within the structure footprints, we anticipate some of the existing fill will be removed during the subgrade improvements discussed in the Subgrade Improvements section below. Any existing fill remaining at the bottom of the excavation for subgrade improvement should be removed, reworked, be moisture-conditioned and compacted as discussed in the Fill Placement and Compaction section below.

Following removal of the fill soils, the exposed subgrade should be proofrolled. Proofrolling should be accomplished using a pneumatic-tired roller, dump truck, or similar equipment weighing approximately 20 tons and observed by the Geotechnical Engineer-of-Record or the Engineer's designated representative. Any soft or weak areas observed during proofrolling should also be overexcavated. Obstructions that extend below finish grade should be removed.

Excavated fill materials that are free of organic matter and/or deleterious materials may be reworked and placed again as general fill, as outlined under the Fill Materials and Compaction section of our report.

Due to the nature of the surficial soils, traffic of heavy equipment (including heavy compaction equipment) may create pumping and general deterioration of shallow soils. Therefore, some construction difficulties should be anticipated, especially during periods when these soils are saturated.

SUBGRADE IMPROVEMENT

As discussed above, a PVR of about 3 inches was calculated for the conditions observed at this site. Structural engineers in the Houston area generally consider potential seasonal soil-related movements of more than about 1-inch excessive for structures of this type. As such, soil improvement to reduce the magnitude of potential swell is needed.

As stated in our geotechnical report, we recommend subgrade improvement at this site include overexcavating a portion of the existing soils and replacing it with select, engineered fill. In order to reduce the PVR to on the order of 1-inch, the floor slab should be supported on a 3½-foot-thick pad of select, engineered fill. Select engineered fill should be moisture conditioned and compacted as discussed in our report.

FOUNDATION RECOMMENDATIONS

Shallow Footings

The entry wall may be supported on shallow spread, strip, and/or combined footings should bear on firm native soils or select, engineered fill at a depth of 2 feet or more below existing grade. Such footings may be designed using an allowable bearing pressure of 3,000 psf for dead loads plus sustained live loads. This value may be increased by a factor of $^1/_3$ for transient loads, such as wind and seismic. Continuous (strip) footings should have a width of 18 inches or more and isolated spread footings should have a width of 24 inches or more.

Foundation excavations should be protected against any significant change in soil moisture content and disturbance by construction activity. Sides of excavations may slough to some extent with time; sloughed soils and other debris in the bottom of the excavation should be removed prior to steel placement. Water should not be allowed to accumulate at the bottom of footing excavations. Steel should be placed and concrete poured the day of excavation. If for some reason the slab cannot be poured the day of excavation, a seal slab should be placed to protect the exposed foundation soils.

We estimate foundation movements of 1-inch or less may occur. Differential movements are estimated to not exceed half the predicted movement. These settlement estimates are based on the assumption that the footings act as isolated elements. To reduce the potential for larger settlements beneath closely spaced footings due to stress overlap, the clear spacing between the footings should be the width of the larger adjacent footing or more.

Drilled-and-Underreamed Piers

The new steel-framed structures will be supported on a drilled-and-underreamed piers. Drilled-and-underreamed piers should bear on stiff, naturally deposited clays at a depth of 10 feet below the existing ground surface (at the time of our study). The piers should be designed as end-bearing units using an allowable bearing pressure of 4,000 pounds per square (psf) for dead plus sustained live loads. This value may be increased by a factor of 1/3 for transient loads, including wind and seismic. The bottom of the piers should bear at a depth such that the bells are cut from undisturbed, naturally deposited, cohesive soils.

The drilled-and-underreamed piers should be reinforced as designed by the Structural Engineer. Settlement of piers under loading is estimated to be less than about 1-inch.

The clear spacing between edges of adjacent piers should be one underream diameter or more, based on the larger underream. If piers need to be spaced closer than discussed above, due to design and/or construction restraints, Ninyo & Moore should be notified to reevaluate the allowable bearing capacities presented above for the individual piers. Differential settlements and/or eccentric loading conditions may result from piers spaced closer than discussed above. Reductions in load carrying capacities may be needed depending upon individual loading and spacing conditions.

Each pier should be designed with full-length reinforcing steel to resist the uplift pressure (soil-to-pier adhesion) due to potential soil swell along the shaft from post-construction heave and other uplift forces applied by structural loadings. The magnitude of uplift adhesion due to soil swell along the pier shaft cannot be defined precisely and can vary according to the actual in-place moisture content of the soils during construction. We recommend an uplift adhesion of about 800 psf be used in design, approximated to act over the upper 8 feet of the shaft in contact with clayey soils. The uplift adhesion can be neglected for the portion of the shaft in contact with select fill used to grade the building pad.

Resistance to uplift forces exerted on the drilled piers will be provided by the sustained axial compressive force (dead load) and the allowable uplift resistance provided by the soil located above the underreamed bell. The uplift resistance above the bell is dependent upon depth and shape factors applied to the average shear strength of the overlying soils. One method for estimating the uplift resistance provided by the soil located above the bell is by using the following semi-empirical equations by Turner (1962). The allowable uplift capacity should be calculated using the following equations.

Equation 1, for a D_f/B ratio greater than or equal to 1.5:

$$Q_a = \frac{17.4\ (B^2 - b^2)}{\text{FS}} + \frac{W_f}{1.2}$$

Equation 2, for D_f/B less than 1.5:

$$Q_a = \frac{5.2\ (D_f/\text{B})^2 (B^2 - b^2)}{\text{FS}} + \frac{W_f}{1.2}$$

where:

Q_a = allowable uplift capacity, kips;
D_f = foundation depth below lowest adjacent grade, feet;
B = diameter of underreamed bell, feet;
b = diameter of shaft, feet;
FS = factor of safety (generally 2 for transient loads); and
W_f = weight of foundation, kips.

To resist uplift forces, we recommend the diameter of the underreamed bell should be two to three times the diameter of the shaft.

Lateral loads imposed on pier foundations can be resisted by passive resistance in the surrounding soils. For passive resistance to lateral loads, we recommend a pressure of 150 psf per foot of depth be applied to the face of the shaft, up to a value of 1,500 psf. Due to possible disturbance at the surface, the lateral resistance of the top portion of the pier shafts within 3 feet of finished grade should be neglected.

Installation Considerations for Drilled-and-Underreamed Piers

Ground water was not encountered during our drilling operations. However, relatively shallow groundwater and/or perched water may be encountered during construction, particularly after periods of precipitation. As such, groundwater seepage should be anticipated during drilled shaft excavation, particularly during or after periods of precipitation. Submersible pumps, bailing tools, and/or immediate placement of concrete may be sufficient to mitigate light seepage. Ninyo & Moore should be contacted for further review and evaluation if groundwater seepage and/or underream collapse occurs during pier installation.

Temporary steel casing may be needed to reduce sloughing of soils or mitigate groundwater seepage during pier drilling operations. Such casing should be extended below the depth of the

sloughing soils before excavation begins and then removed after completion of the pier. As casing is extracted, care should be taken to maintain a positive head of plastic concrete and reduce the potential for intrusion of water seepage. The Contractor should expect the concrete level to change as the casing is removed and be prepared to both clean out the top of the pier and top-off the pier with wet concrete. We recommend a separate bid item be provided for casing on the Contractors' bid schedule.

Some field adjustments may be needed to keep the bottom of the piers above any caving soils and/or groundwater encountered during pier installation. Adjustments in the depths of the piers should be observed in the field by Ninyo & Moore personnel.

Grade Beams

Grade beams may be used to support loads by spanning the drilled-and-underreamed piers. Grade beams should be designed to transfer loads to the piers as a simply supported beam, ignoring any support from the soil between the piers. The depth of exterior and interior grade beams can be varied according to the structural requirements of the floor slab. However, we recommend that exterior grade beams extend 12 inches or more below the lowest adjacent grade.

In general, we do not recommend the use of void boxes below grade beams because of the potential to collect free water within the void space, especially if replacing the excavated subgrade soils with relatively pervious select fill materials. Additionally, backfill soils placed adjacent to grade beams should be compacted as outlined in the Field Materials and Compaction section of our report.

Interior Floor Slabs

The design of the floor slabs is the responsibility of the Structural Engineer. Placement of the reinforcement in the slab is vital for satisfactory performance. For ground supported floor slabs, the floor slab should either be constructed so that it “floats” independent of the foundations or be designed by the Structural Engineer to resist forces caused by differential movement relative to the foundations.

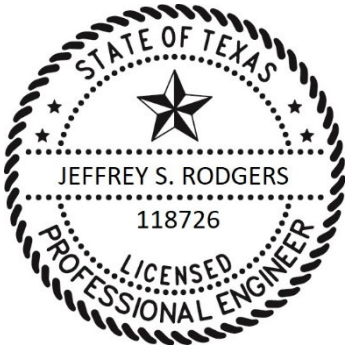
The use of a vapor retarder should be considered beneath interior concrete floor slabs in areas with moisture sensitive flooring. If a vapor retarder is needed, the slab designer and slab contractor should refer to ACI 302 for procedures and cautions about the use and placement of a vapor retarder.

We hope this provides you with the information you require at this time. We appreciate the opportunity to be of service to you during this phase of the project.

Respectfully submitted,
NINYO & MOORE
TBPE Firm No. F-9782

Ronald A. Gutierrez
Graduate Engineer

Jeffrey S. Rodgers, PE, PG
Principal Engineer



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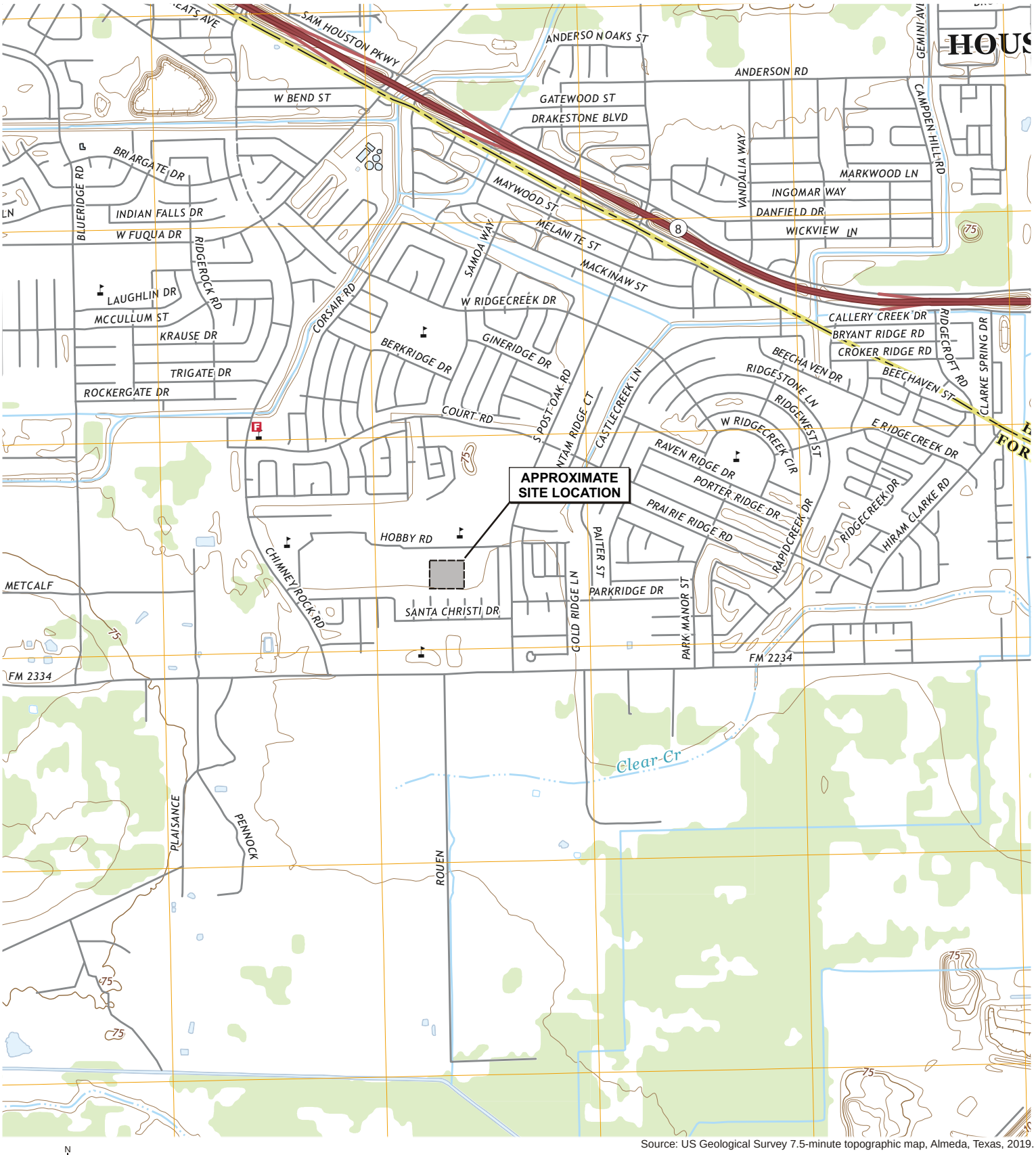
9/27/2021

FIGURES

APPENDICES

FIGURES



Source: US Geological Survey 7.5-minute topographic map, Almeda, Texas, 2019.

N

FEET

0 2000

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

FIGURE 1

SITE LOCATION

FBC - PHASE II SOUTH POST OAK PARK COMPLEX IMPROVEMENTS PROJECT
5535 HOBBY ROAD
HOUSTON, TEXAS

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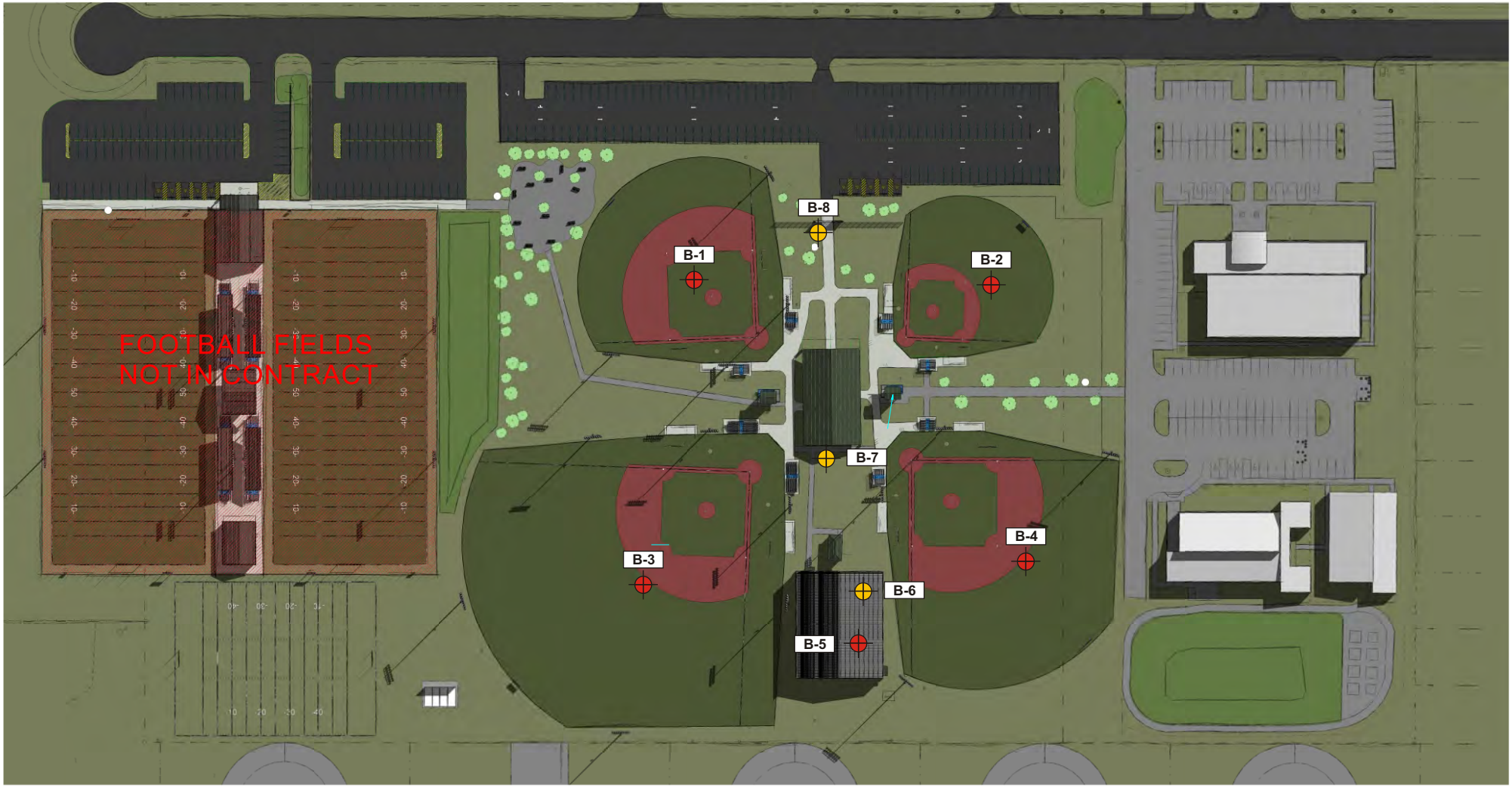
Geotechnical & Environmental Sciences Consultants

elt file no: 1202vmap0821



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FEET

0 150

SOURCE: IDG+ ARCHITECTS.

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

LEGEND

B-5 Boring Location (N&M, 05/2021)

B-8 Boring Location (Current Study)

elt file no: 1202blm0821

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

FIGURE 2

BORING LOCATIONS

FBC - PHASE II SOUTH POST OAK PARK IMPROVEMENTS PROJECT
5535 HOBBY ROAD
HOUSTON, TEXAS

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APPENDIX A

Boring Log

FIGURE A-1

BORING LOG

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following method.

Shelby Tube

The Shelby tube is a seamless, thin-walled, steel tube having an external diameter of 3 inches and a length of 30 inches. The tube was connected to the drill rod or a hand tool and pushed into an undisturbed soil mass to obtain a relatively undisturbed sample of soft, cohesive soil in general accordance with ASTM D1587. When the tube was almost full (to avoid over-penetration), it was withdrawn from the boring. The samples were removed from the sampling tubes in the field, assessed visually, and evaluated for consistency using a pocket penetrometer. A selected portion of each sample was then wrapped in aluminum foil and sealed in a plastic bag for use in future visual assessment and possible testing in our laboratory.

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	Cu ≥ 4 and 1 ≤ Cc ≤ 3[D]	GW	Well-graded gravel[E]
			Cu < 4 and/or [1 > Cc > 3][D]	GP	Poorly graded gravel[E]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[E,F,G]
			Fines classify as CL or CH	GC	Clayey gravel[E,F,G]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[H]	Cu ≥ 6 and 1 ≤ Cc ≤ 3[D]	SW	Well-graded sand[I]
			Cu < 6 and/or [1 > Cc > 3][D]	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[H]	Fines classify as ML or MH	SM	Silty sand[F,G,H]
			Fines classify as CL or CH	SC	Clayey sand[F,G,H]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay[K,L,M,N] / Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic Silt[K,L,M]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay[K,L,M,P] / Organic silt[K,L,M,Q]
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A]Based on the material passing the 3-in. (75-mm) sieve

[B]If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C]Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D]$Cu = D_{60}/D_{10}$ $Cc = (D_{30})^2 / (D_{10} \times D_{60})$

[E]If soil contains ≥ 15% sand, add "with sand" to group name.

[F]If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[G]If fines are organic, add "with organic fines" to group name.

[H]Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[I]If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J]If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K]If soil contains 15 to <30% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L]If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

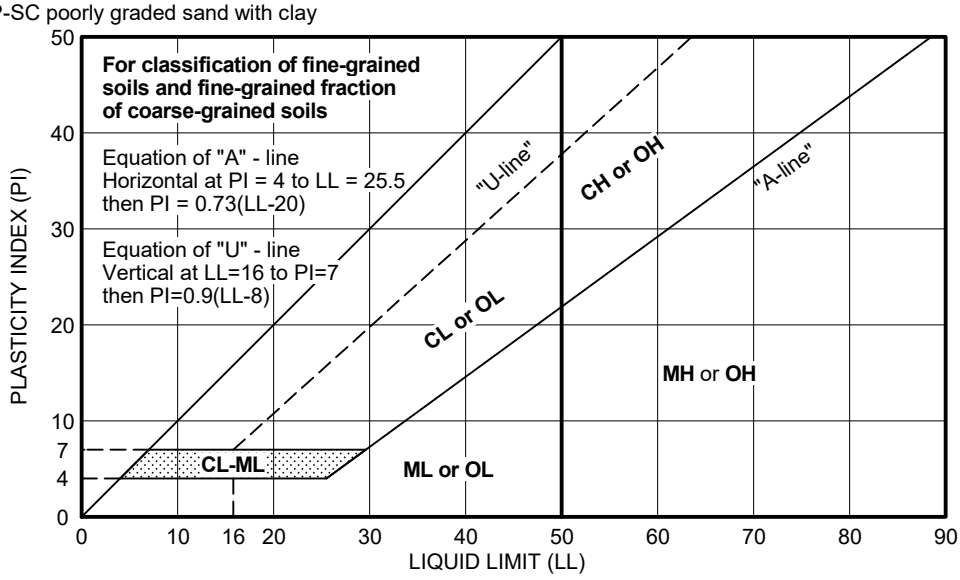
[M]If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N]PI ≥ 4 and plots on or above "A" line.

[O]PI < 4 or plots below "A" line.

[P]PI plots on or above "A" line.

[Q]PI plots below "A" line.



BASED ON TABLE 1 "SOIL CLASSIFICATION CHART" ASTM D 2487-11

FIGURE A-2

SOIL CLASSIFICATION CHART

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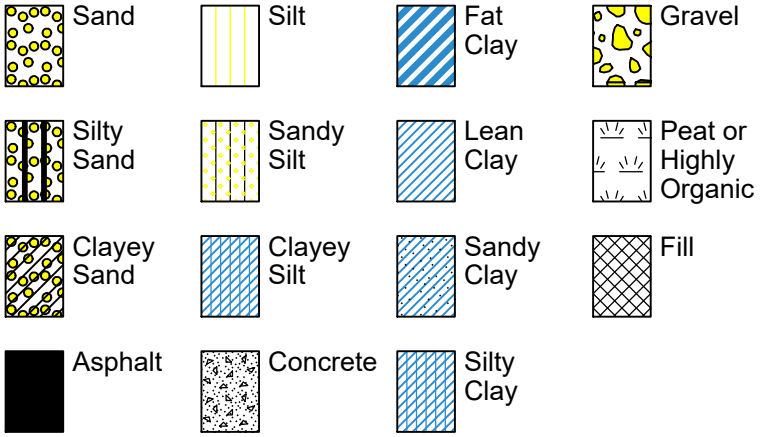
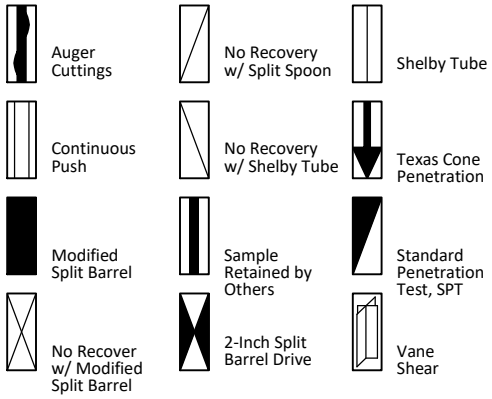
SYMBOLS

SOIL TYPES



SAMPLER TYPES



TERMINOLOGY

Terms used in this report to describe soils with regard to their consistency or conditions are in general accordance with the discussion presented in Article 45 of SOILS MECHANICS IN ENGINEERING PRACTICE, Terzaghi and Peck, John Wiley & Sons, Inc., 1967, using available information from the field and laboratory studies. Terms used for describing soils according to their texture or grain size distribution are in accordance with the UNIFIED SOIL CLASSIFICATION SYSTEM, as described in American Society for Testing and Materials D2487-11 and D2488-09a, Volume 04.08, Soil and Rock; Dimension Stone; Geosynthetics; 2015.

The depths shown on the boring logs are not exact, and have been estimated to the nearest half-foot. Lines delineating subsurface strata on the boring logs are intended to group soils having similar engineering properties and characteristics. They should be considered approximate as the actual transition between soil types (strata) may be gradual.

RELATIVE DENSITY

Cathead Hammer Penetration Resistance Blows per ft	Relative Density	Automatic Hammer Penetration Resistance Blows per ft
0 - 4	Very Loose	0 - 3
5 - 10	Loose	4 - 7
11 - 30	Medium Dense	8 - 20
31 - 50	Dense	21 - 33
> 50	Very Dense	> 33

COHESIVE STRENGTH

Cathead Resistance Blows per ft	Automatic Resistance Blows per ft	Consistency	Cohesion ksf
0 - 2	< 1	Very Soft	0 - 0.25
3 - 4	1 - 3	Soft	0.25 - 0.5
5 - 8	4 - 5	Firm	0.5 - 1.0
9 - 15	6 - 10	Stiff	1.0 - 2.0
16 - 30	11 - 20	Very Stiff	2.0 - 4.0
> 30	> 20	Hard	> 4.0

SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy.
Fissured	Containing shrinkage or relief cracks, often filled with fine sand or silt; usually more or less vertical.
Pocket	Inclusion of material of different texture that is smaller than the diameter of the sample.
Parting	Inclusion less than 1/8 inch thick extending through the sample.
Seam	Inclusion 1/8 inch to 3 inches thick extending through the sample.
Layer	Inclusion greater than 3 inches thick extending through the sample.
Laminated	Soil sample composed of alternating partings or seams of different soil type.
Interlayered	Soil sample composed of alternating layers of different soil type.
Intermixed	Soil sample composed of pockets of different soil type and layered or laminated structure is not evident.
Calcareous	Having appreciable quantities of carbonate.
Carbonate	Having more than 50% carbonate content.

DATE DRILLED 5/18/2021 BORING NO. B-1

GROUND ELEVATION ~ 67 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (Diamond - Tractor)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY Diamond LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0													1.5	CH	BEAUMONT FORMATION: Dark gray, moist, stiff, fat CLAY; roots; ferrous nodules; sand pockets.
						26	72	22	50				1.25		
													2.0		Light gray; stiff to very stiff.
															Total Depth = 5 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 5/18/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
10															
20															

FIGURE A-4

BORING LOG

GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

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DATE DRILLED 5/18/2021 BORING NO. B-2

GROUND ELEVATION ~ 69 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (Diamond - Tractor)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY Diamond LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						13	21	15	6	47				SC-SM	FILL: Light gray and reddish brown, moist, silty clayey SAND; roots.
													3.0 2.5	CH	BEAUMONT FORMATION: Dark gray, moist, very stiff, fat CLAY; ferrous nodules.
10															Total Depth = 5 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 5/18/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
20															

FIGURE A-5

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GROUND WATER OBSERVATIONS

First Observed (ft): None

After Drilling (ft): Dry

After N/A Hours (ft): N/A

BORING LOG

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DATE DRILLED 5/18/2021 BORING NO. B-3

GROUND ELEVATION ~ 69 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (Diamond - Tractor)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY Diamond LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0													3.5	CH	BEAUMONT FORMATION: Dark gray, moist, very stiff, fat CLAY; calcareous nodules; roots.
													2.5		Ferrous nodules.
						24	51	19	32				1.5		Stiff.
															Total Depth = 5 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 5/18/2021.
															Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report.
															The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
10															
20															

FIGURE A-6

GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

BORING LOG

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DATE DRILLED 5/18/2021 BORING NO. B-4

GROUND ELEVATION ~ 69 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (Diamond - Tractor)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY Diamond LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						17				36				SC	FILL: Brown and light brown, moist, clayey SAND; roots.
						31	69	25	44				1.0	CH	BEAUMONT FORMATION: Dark gray, moist, firm to stiff, fat CLAY; ferrous nodules; sand seams.
													1.5		Light gray and yellowish brown; stiff.
10															Total Depth = 5 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 5/18/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
20															

FIGURE A-7

GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

BORING LOG

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DATE DRILLED 5/18/2021 BORING NO. B-5

GROUND ELEVATION ~ 68 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (Diamond - Tractor)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY Diamond LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0														SC	FILL: Reddish brown, moist, clayey SAND; roots.
						34	67	22	45	85			1.0	CH	BEAUMONT FORMATION: Dark gray and light gray, moist, stiff, fat CLAY; few to little sand.
					103	22	67	21	46		2.3		2.5		Very stiff.
						16	28	15	13	79			2.5	CL	Light gray, moist, very stiff, lean CLAY with sand; ferrous nodules; sand seams.
						20	45	18	27				3.25		Light brown and light gray; calcareous nodules.
						19	50	19	31				3.5	CH	Light brown and light gray, moist, very stiff, fat CLAY; calcareous and ferrous nodules.
10														CL-ML	Reddish brown, moist, silty CLAY.
													3.0	CH	Reddish brown, moist, very stiff, fat CLAY; calcareous and ferrous nodules.
													2.5		
20															Total Depth = 15 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 5/18/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A-8

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GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

BORING LOG

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DATE DRILLED 8/2/2021 BORING NO. B-6

GROUND ELEVATION ~ 68 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (DAS - Truck)

DRIVE WEIGHT 140 lbs (Cathead) DROP HEIGHT 30 inches

SAMPLED BY DAS LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0													4.0	CH	FILL: Yellowish brown and dark brown, moist, very stiff, fat CLAY; roots; ferrous nodules.
													2.25	CH	BEAUMONT FORMATION: Dark brown, moist, very stiff, fat CLAY; ferrous nodules; sand pockets.
													3.5		Reddish yellow and light gray; calcareous nodules.
													2.5		Frequent calcareous nodules.
													3.75		Reddish brown and light gray.
10					107	24					2.4		3.0		Silt seams.
						21							2.0		Stiff to very stiff.
													2.0	CL-ML	Reddish brown and light gray, moist, stiff to very stiff, silty CLAY; calcareous and ferrous nodules.
				19										SM	Yellowish brown, moist, medium dense, silty SAND; clay seams.
20															Total Depth = 20 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 8/2/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A-9

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GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

BORING LOG

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DATE DRILLED 8/2/2021 BORING NO. B-7

GROUND ELEVATION ~ 68 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (DAS - Truck)

DRIVE WEIGHT 140 lbs (Cathead) DROP HEIGHT 30 inches

SAMPLED BY DAS LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						7	24	17	7				4.5+	CL-ML	FILL: Light brown, gray, and dark brown, moist, hard, silty CLAY; roots; calcareous nodules.
						16							2.0	CL	BEAUMONT FORMATION: Dark brown, moist, stiff to very stiff, lean CLAY; ferrous nodules; sand pockets.
						20	49	17	32				2.0		
						25	71	21	50				1.5	CH	Dark brown, moist, stiff, fat CLAY with sand; ferrous nodules.
						17				84			3.0		Light gray and reddish brown; very stiff; calcareous nodules.
10													3.5		
						21							2.5		Very stiff.
													1.25	CL	Reddish brown and light gray, moist, stiff, sandy lean CLAY; silt seams.
				39										SM	Yellowish brown and light gray, moist, dense, silty SAND.
20															Total Depth = 20 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 8/2/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

FIGURE A-10

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GROUND WATER OBSERVATIONS

First Observed (ft): None

After Drilling (ft): Dry

After N/A Hours (ft): N/A

BORING LOG

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DATE DRILLED 8/2/2021 BORING NO. B-8

GROUND ELEVATION ~ 67 ft MSL SHEET 1 OF 1

METHOD OF DRILLING 4¼" Straight Flight Auger (DAS - Truck)

DRIVE WEIGHT N/A DROP HEIGHT N/A

SAMPLED BY DAS LOGGED BY RAG REVIEWED BY JSR

DEPTH, feet	FIELD: WATER LEVEL	FIELD: SYMBOL	FIELD: SAMPLE TYPE	FIELD: BLOWS PER FOOT	CLASSIFICATION: DRY UNIT WEIGHT, pcf	CLASSIFICATION: WATER CONTENT, %	CLASSIFICATION: LIQUID LIMIT	CLASSIFICATION: PLASTIC LIMIT	CLASSIFICATION: PLASTICITY INDEX (PI)	CLASSIFICATION: PASSING NO. 200 SIEVE, %	SHEAR STRENGTH: UNCONFINED OR Q-TYPE COMPR, ksf	SHEAR STRENGTH: TORVANE, tsf	SHEAR STRENGTH: POCKET PEN, ksf	USCS GROUP SYMBOL	DESCRIPTION / INTERPRETATION
0						9	31	17	14				4.5+	CL	FILL: Brown and ligth gray, moist, hard, sandy lean CLAY; calcareous nodules; roots.
						18							3.0	CL	BEAUMONT FORMATION: Dark brown, moist, very stiff, lean CLAY; ferrous nodules; sand pockets.
						23							1.5	CH	Dark brown, moist, stiff, fat CLAY; ferrous nodules; sand pockets.
						22	55	19	36				2.5		Light gray and yellow brown; very stiff.
													3.25		Light gray and reddish brown; calcareous nodules.
10															Total Depth = 10 feet. Boring was backfilled with soil cuttings on conclusion of drilling on 8/2/2021. Note: Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors discussed in the report. The ground elevation shown above is an estimation only. It is based on interpretation reviewed for the purpose of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
20															

FIGURE A-11

BORING LOG

GROUND WATER OBSERVATIONS

▽ First Observed (ft): None

▼ After Drilling (ft): Dry

▼ After N/A Hours (ft): N/A

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APPENDIX B

Laboratory Testing

FIGURE B-1

LABORATORY TESTING

Classification

Soils were visually and texturally classified using the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the boring log in Appendix A and in the following summary tables in Appendix B.

Moisture Content

The moisture content of samples obtained from the exploratory boring were evaluated in general accordance with ASTM D2216. The test results are presented on the boring log in Appendix A and the Summary of Laboratory Results, Figure B-4.

No. 200 Wash

An evaluation of the percentage of particles finer than the No. 200 sieve in selected soil samples was performed in general accordance with ASTM D1140. The results of the tests are presented on Figure B-2, on the boring log in Appendix A, and in the Summary of Laboratory Results, Figure B-4.

Atterberg Limits

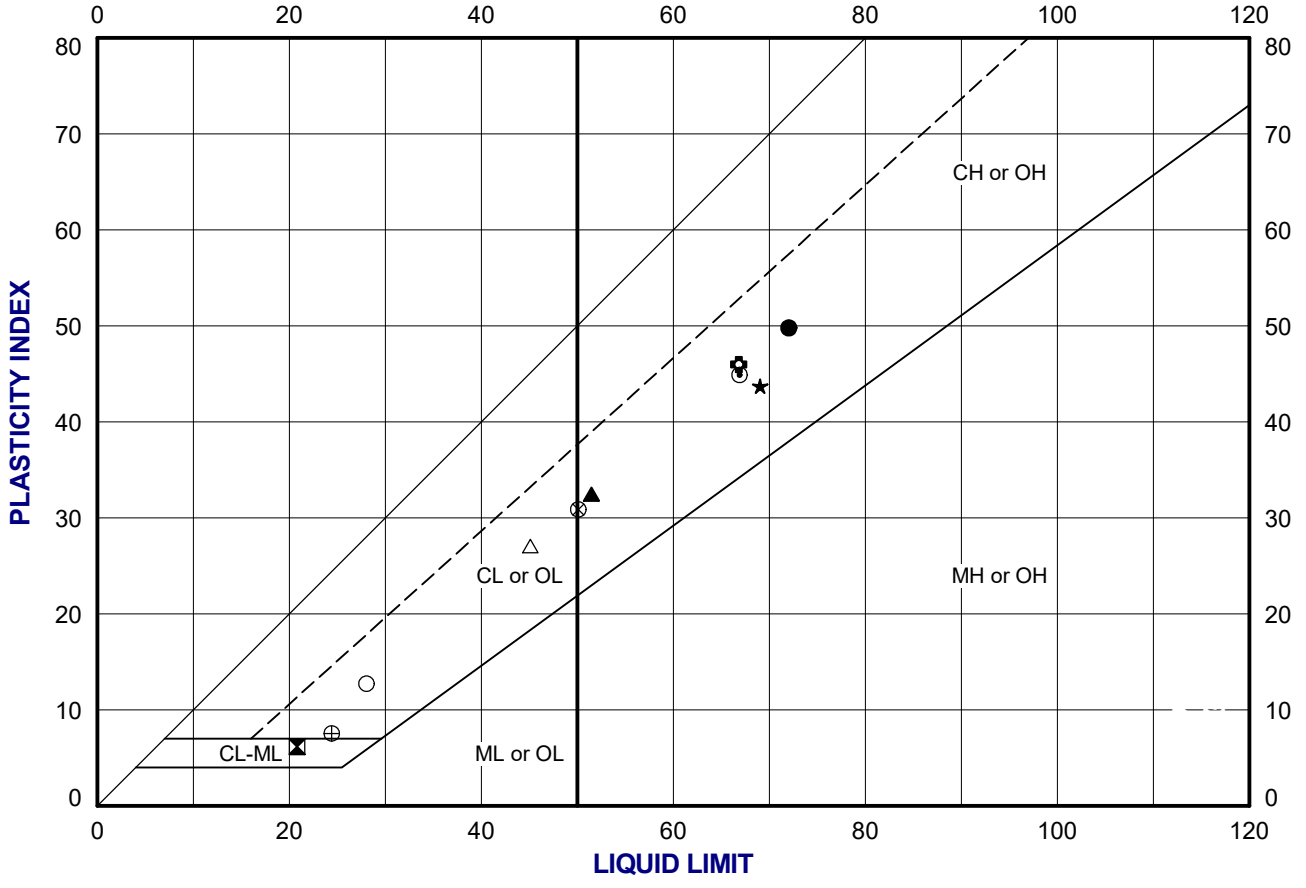
Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D4318 (Method B). These test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System (USCS). The results of these tests are presented on Figure B-3, on the boring log in Appendix A, and in the Summary of Laboratory Results, Figure B-4.

Unconfined Compression Test

An unconfined compression test was performed on a relatively undisturbed sample in general accordance with ASTM D2166. The test results are shown on the boring log in Appendix A and in the Summary of Laboratory Results, Figure B-4.

SAMPLE LOCATION	DEPTH (feet)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS
B-2	0 - 2	Silty, Clayey SAND	100.0	46.8	SC-SM
B-4	0 - 2	Clayey SAND	100.0	36.4	SC
B-5	1 - 2	Fat CLAY	100.0	85.4	CH
B-5	4 - 6	Lean CLAY w/ Sand	100.0	78.8	CL
B-7	8 - 10	Fat CLAY w/ Sand	100.0	84.3	CH

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-1	2 - 4	72	22	50	CH	CH
⊠	B-2	0 - 2	21	15	6	CL-ML	SC-SM
▲	B-3	4 - 5	51	19	32	CH	CH
★	B-4	2 - 4	69	25	44	CH	CH
⊙	B-5	1 - 2	67	22	45	CH	CH
✿	B-5	2 - 4	67	21	46	CH	CH
○	B-5	4 - 6	28	15	13	CL	CL
△	B-5	6 - 8	45	18	27	CL	CL
⊗	B-5	8 - 10	50	19	31	CH	CH
⊕	B-7	0 - 2	24	17	7	CL-ML	CL-ML



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D4318.

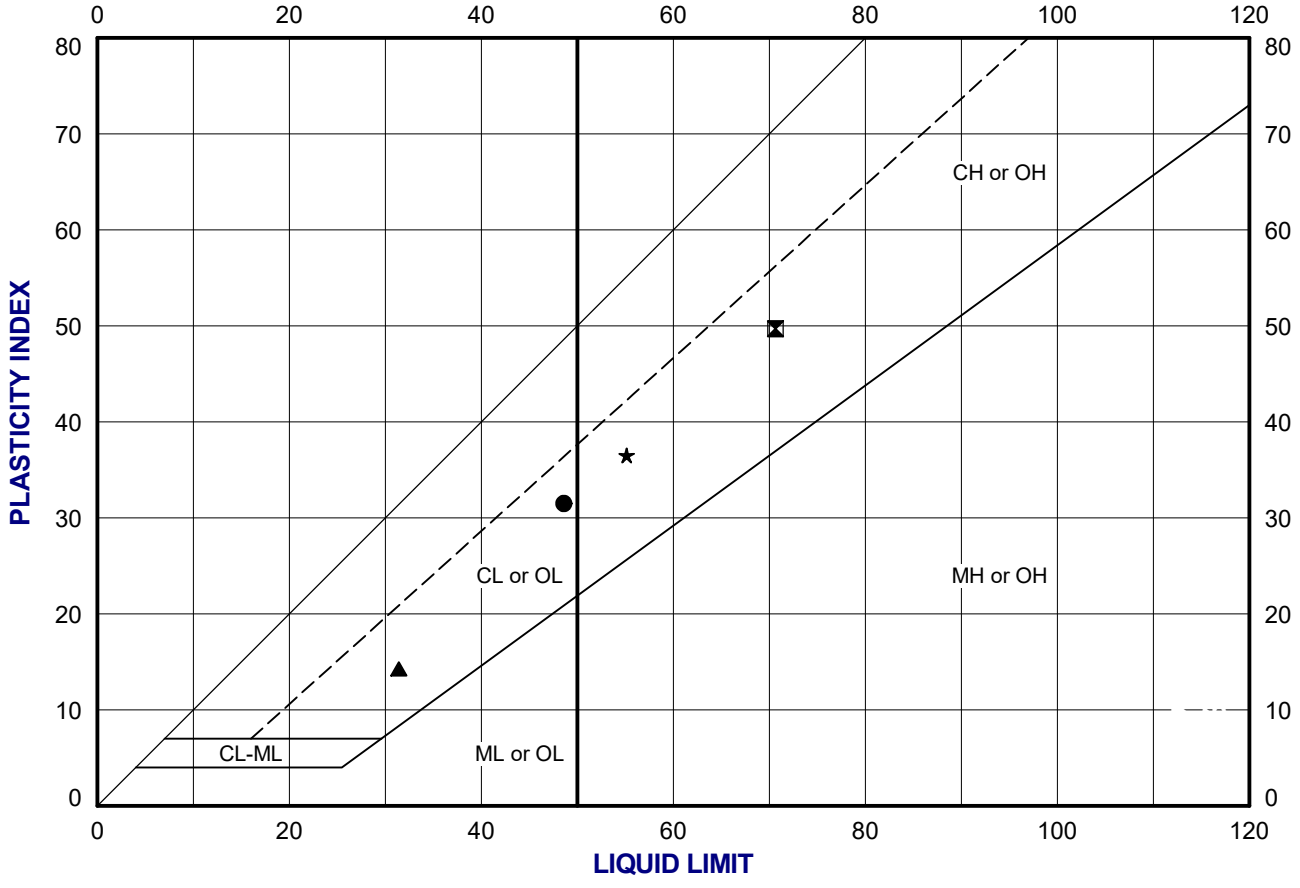
FIGURE B-3a

ATTERBERG LIMIT TEST RESULTS

FBC - PHASE II SOUTH POST OAK PARK COMPLEX IMPROVEMENTS PROJECT
5535 HOBBY ROAD
HOUSTON, TEXAS

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-7	4 - 6	49	17	32	CL	CL
⊠	B-7	6 - 8	71	21	50	CH	CH
▲	B-8	0 - 2	31	17	14	CL	CL
★	B-8	6 - 8	55	19	36	CH	CH
⊙							
✿							
○							
△							
⊗							
⊕							



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D4318.

FIGURE B-3b

ATTERBERG LIMIT TEST RESULTS

FBC - PHASE II SOUTH POST OAK PARK COMPLEX IMPROVEMENTS PROJECT
5535 HOBBY ROAD
HOUSTON, TEXAS

Borehole	Depth (feet)	Liquid Limit	Plastic Limit	Plasticity Index	Shear Strength (ksf)	%<#200 Sieve	USCS Group Symbol	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1	0 - 2				1.5[P]		CH				
B-1	2 - 4	72	22	50	1.25[P]		CH	26.0			
B-1	4 - 5				2.0[P]		CH				
B-2	0 - 2	21	15	6		46.8	SC-SM	13.0			
B-2	2 - 4				3.0[P]		CH				
B-2	4 - 5				2.5[P]		CH				
B-3	0 - 2				3.5[P]		CH				
B-3	2 - 4				2.5[P]		CH				
B-3	4 - 5	51	19	32	1.5[P]		CH	24.0			
B-4	0 - 2					36.4	SC	17.0			
B-4	2 - 4	69	25	44	1.0[P]		CH	31.0			
B-4	4 - 5				1.5[P]		CH				
B-5	1 - 2	67	22	45	1.0[P]	85.4	CH	34.0			
B-5	2 - 4	67	21	46	2.3[U]		CH	22.0	103.3		
B-5	4 - 6	28	15	13	2.5[P]	78.8	CL	16.0			
B-5	6 - 8	45	18	27	3.25[P]		CL	20.0			
B-5	8 - 10	50	19	31	3.5[P]		CH	19.0			
B-5	11 - 12				3.0[P]		CH				
B-5	13 - 15				2.5[P]		CH				
B-6	0 - 2				4.0[P]		CH				
B-6	2 - 4				2.25[P]		CH				
B-6	4 - 6				3.5[P]		CH				
B-6	6 - 8				2.5[P]		CH				
B-6	8 - 10				3.75[P]		CH				
B-6	10 - 12				2.4[U]		CH	24.0	106.7		

U = Unconfined Compression; Q = Unconsolidated-Undrained Triaxial; T = Torvane; P = Pocket Penetrometer

FIGURE B-4a

SUMMARY OF LABORATORY RESULTS

FBC - PHASE II SOUTH POST OAK PARK COMPLEX IMPROVEMENTS PROJECT
5535 HOBBY ROAD
HOUSTON, TEXAS

Borehole	Depth (feet)	Liquid Limit	Plastic Limit	Plasticity Index	Shear Strength (ksf)	%<#200 Sieve	USCS Group Symbol	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-6	13 - 14				2.0[P]		CH	21.0			
B-6	14 - 15				2.0[P]		CL-ML				
B-7	0 - 2	24	17	7	4.5+[P]		CL-ML	7.0			
B-7	2 - 4				2.0[P]		CL	16.0			
B-7	4 - 6	49	17	32	2.0[P]		CL	20.0			
B-7	6 - 8	71	21	50	1.5[P]		CH	25.0			
B-7	8 - 10				3.0[P]	84.3	CH	17.0			
B-7	10 - 12				3.5[P]		CH				
B-7	13 - 14				2.5[P]		CH	21.0			
B-7	14 - 15				1.25[P]		CL				
B-8	0 - 2	31	17	14	4.5+[P]		CL	9.0			
B-8	2 - 4				3.0[P]		CL	18.0			
B-8	4 - 6				1.5[P]		CH	23.0			
B-8	6 - 8	55	19	36	2.5[P]		CH	22.0			
B-8	8 - 10				3.25[P]		CH				

U = Unconfined Compression; Q = Unconsolidated-Undrained Triaxial; T = Torvane; P = Pocket Penetrometer

FIGURE B-4b

SUMMARY OF LABORATORY RESULTS

FBC - PHASE II SOUTH POST OAK PARK COMPLEX IMPROVEMENTS PROJECT
5535 HOBBY ROAD
HOUSTON, TEXAS

SECTION 01 01 00 SUMMARY OF WORK

PART ONE - GENERAL

1.1 GENERAL

A. Scope of work for the construction of a New Baseball Field Upgrades is established in documents prepared by the architectural firm of **IDG Architects and it's consultants**, located in Houston, Texas.

B. Drawings and general provisions of Contract including General Conditions, Supplementary Conditions, Contracting Requirements and Division 1 Sections apply to the Work.

1.2 CONTRACTOR USE OF PREMISES

A. General: Staging area and parking for construction employees shall be fully coordinated with Owner, Architect and Contract Document requirements.

B. Use of Site: Limit the use of the premises to work in areas indicated. Confine construction operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

C. Driveways & Entrances: Keep driveways and entrances serving the premises clear and available to site activities and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on Project site.

1.3 WORK SEQUENCE:

A. Construct Work to accommodate the Owner's use of the premises during the construction period; coordinate the construction schedule and operations with the Owner's Representative.

1. Bid Package 1: Demolition, Paving and Site Work.
2. Bid Package 2: Buildings A, B, C, D. Building E Renovation. Partial Sitework, Partial Paving and Partial Utility.
3. Bid Package 3: Baseball Fields Turf, Baseball Fields Equipment and Building "D" Turf.
4. Bid Package 4: Landscape, Simulated Stone Wall Fence and new Shipping Containers.

B. Construct the Work in stages to provide for public convenience.

1. Do not close off public use of facilities until completion of construction. Will provide alternative usage.

PART TWO – PRODUCTS (Not Used)

PART THREE – EXECUTION (Not Used)

END OF SECTION

SECTION 01 02 70 APPLICATIONS FOR PAYMENT

1.1 GENERAL

A. In addition to requirements of AIA Document A201-2007 General Conditions and other Contract Conditions, this section includes the following administrative and procedural requirements for applications for payment, including:

1. Schedule of Values
2. Payment Application Times
3. Payment Application Forms
4. Preparation of Application
5. Transmittal
6. Waivers of Mechanics Lien
7. Application for Payment at Substantial Completion
8. Final Payment Application

1.2 SCHEDULE OF VALUES

A. Before the first Application for Payment, submit to the Architect a Schedule of Values allocated to the various portions of the work.

B. Coordinate the preparation of Schedule of Values with preparation of Contractor's Construction Schedule. Correlate line items in Schedule of Values with other required administrative schedules and forms, including:

1. Contractor's construction schedule.
2. Application for Payment form.
3. List of subcontractors.
4. Schedules of allowances and alternates, where applicable.
5. List of products.
6. List of principal suppliers and fabricators.
7. Schedule of submittals.

C. Submit the Schedule of Values to Architect at the earliest feasible date, but not later than 7 days before the date scheduled for submittal of the first Application for Payment, which shall be organized in the Table of Contents format.

D. Format and Content:

1. Use the Table of Contents in the Project Manual as a guide to establish format for the -Schedule of Values.

2. Include the following Project identification on Schedule of Values:
   a. Project name and location.
   b. Architect's name and address.
   c. Architect's project number.
   d. Contractor's name and address.
   e. Date of submittal.

3. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
   a. Generic name.
   b. Related specification section.
   c. Name of Subcontractor.
   d. Name of manufacturer or fabricator.

e. Name of supplier.
f. Change Orders (numbers) that have affected value.
g. Dollar value.
h. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100%.

4. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Breakdown principal subcontract amounts into several line items.
5. Roundoff amounts to the nearest whole dollar; the total shall equal the Contract Sum.
6. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

E. Margins of Cost:
1. Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment.
2. Each item in the Schedule of Values and Applications for Payment shall be complete including the total cost and proportionate share of general overhead and profit margin.
3. At Contractor's option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values or distributed as general overhead expense.

F. Updating of Schedule:
1. Update and resubmit the Schedule of Values when Change Orders or Construction Change Directives result in a change in Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

A. At least 10 days before the date established for each progress payment, submit to the Architect an itemized Application for Payment for operations completed in accordance with the Schedule of Values.

B. Payment Application Times: Monthly.

C. Payment Application Forms:
1. Use latest edition of AIA Document G702-Application and Certificate for Payment and G703- Continuation Sheet.

D. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
1. The Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.

E. First Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:
1. List of Subcontractors.

2. List of principal suppliers and fabricators.
3. Schedule of Values.
4. Contractor's Construction Schedule (preliminary if not final).
5. Schedule of principal products.
6. Submittal Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from governing authorities for performance of the Work.
11. Initial progress report.
12. Report of pre-construction meeting.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds (if required).
15. Data needed to acquire Owner's insurance.
16. Copies of Sub-Contractor's invoices and lien releases.

F. Preparation of Application:

1. Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Owner.
2. Incomplete applications will be returned without action.
3. Entries shall match data on Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
4. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.

G. Transmittal:

1. Submit 3 executed copies of each Application for Payment to the Owner by means ensuring receipt within 24 hours; all copies shall be complete, including waivers of lien and similar attachments, when required.
2. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to Architect.

1.4 WAIVERS OF MECHANICS LIEN

A. With each Application for Payment submit waivers of Mechanics Liens from subcontractors or sub- subcontractors and suppliers for the construction period covered by the previous application.

1. Submit conditional waivers on each item for the amount requested, prior to deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.

B. Waiver Delays:

1. Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.
2. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.

C. Waiver Forms:

1. Submit waivers of lien on forms, and executed in a manner, as required by law and acceptable to Owner.

1.5 APPLICATION FOR PAYMENT AT SUBSTANTIAL COMPLETION

A. Following issuance of the Certificate of Substantial Completion, submit an Application for Payment. This application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

1. Coordinate with requirements of the General Conditions.

B. Administrative actions and submittals that shall proceed or coincide with this application include:

1. Occupancy permits and similar
2. Warranties (guarantees) and maintenance agreements.
3. Test, adjust, balance records.
4. Maintenance instructions.
5. Meter readings.
6. Start-up performance reports.
7. Change-over information related to Owner's occupancy, use, operation and maintenance.
8. Final cleaning.
9. Application for reduction of retainage, and consent of surety.
10. Advice on shifting insurance coverages.
11. Final progress photographs.
12. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

1.6 FINAL PAYMENT APPLICATION

A. Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:

1. Completion of Project closeout requirements.
2. Completion of items specified for completion after Substantial Completion.
3. Assurance that unsettled claims will be settled.
4. Assurance that Work not complete and accepted will be completed without undue delay.
5. Transmittal of required Project construction records to Owner.
6. Certified property survey.

7. Proof that taxes, fees and similar obligations have been paid.
8. Removal of temporary facilities and services.
9. Removal of surplus materials, rubbish and similar elements.
10. Change of door locks to Owner's access.

B. Coordinate these requirements with the General Conditions.

END OF SECTION

SECTION 01 05 00 – FIELD ENGINEERING AND LAYOUT

PART 1 - GENERAL

1.1 GENERAL

A. Layout work shall be supervised by a licensed Land Surveyor employed by the General Contractor.

1. Surveyor shall make or review surveys as required to establish property and building lines.

2. Surveyor shall fix and locate column centers, levels of each story construction and benchmarks.

3. At completion of layout work, Surveyor shall submit a signed report certifying that he is satisfied with the work and its accuracy and indicating the off-site benchmarks on which the survey is based.

4. Contractor shall verify that all benchmarks and property corners on the survey supplied by the Owner are correct.

B. Related Documents: Drawings and general provisions of Contract, including AIA Document A201-2017 General Conditions, Supplementary Conditions and Division 1 Sections, apply to this Section.

1.2 EXAMINATION

A. Verification of Layout Information:

1. Verify grades, lines, levels and dimensions shown on Drawings before commencing work.

2. Submit prompt notification of any errors or inconsistencies for resolution before the work is started.

B. Benchmarks:

1. Establish working benchmarks at a minimum of 2 widely separated places and as work progresses, at each level of construction, referenced to datum established by survey control points.

2. Promptly replace lost or destroyed project control points.

C. Existing Utilities and Improvements:

1. The existence and location of underground and other utilities and construction indicated as existing are not guaranteed.

2. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.

3. Prior to construction, verify location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.

1.3 PERFORMANCE

A. Lines and Levels:

1. Working from lines and levels established by the property survey, establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to properly locate each element of the project.

2. Calculate and measure required dimensions within indicated or recognized tolerances.
3. Do not scale Drawings to determine dimensions.
4. Advise entities engaged in construction activities, of marked lines and levels provided for their use.
5. As construction proceeds, check every major element for line, level and plumb.

B. Surveyor's Log:

1. As the work progresses, maintain a complete and accurate surveyor's log of all control and other survey work.
2. Make this log available by reference.
3. Record deviations from required lines and levels and advise the Architect when deviations that exceed indicated or recognized tolerances are detected.
4. Maintain "As-Built" Drawings in accordance with Section 01 78 00 Closeout Procedures - Project Record Documents. Record any deviations that are accepted and not corrected.

C. Site Improvements:

1. Locate and layout site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.

D. Building Lines and Levels:

1. Locate and layout batter boards for structures, building foundations, column grids and locations, floor levels and control lines, and levels required for mechanical and electrical work.
2. Erect substantial and well-braced batter boards at corners of structures, set their location to proper working clearance, and verify that the batter boards are level and at the proper grade.
3. Reset batter boards whenever disturbed.

E. Partitions:

1. As work progresses, clearly layout partitions and openings on rough floor in exact locations as a guide to all trades.
2. Coordinate blocking required for items mounted in or on partitions.

PART TWO – PRODUCTS (Not Used)

PART THREE – EXECUTION (Not Used)

END OF SECTION

SECTION 01 12 00 – ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work specified in this Section.

1.2 GENERAL DESCRIPTION OF WORK OF THIS SECTION:

A. Work, in general, includes procedures pertaining to remodeling, alteration, minor demolition, cutting, patching, removal, refinishing, relocation, and disposal work required throughout the Project and becomes a part of each Section and Division where remodeling, alteration, minor demolition, cutting, patching, removal, refinishing, relocation, and disposal work is required, with the same force and effect as if written in full therein.

B. Visit the Project Site to determine by inspection all existing conditions, including access to the Site, the nature of structures, objects, and materials to be encountered, and all other facts concerning or affecting the Work. Information on the Drawings showing existing conditions does not constitute a guarantee that other items may not be found or encountered.

C. Obvious existing conditions, installations, and obstructions affecting work of this Section shall be taken into consideration as necessary work and included as part of work of this Section, the same as though completely shown or described.

D. Employ a licensed exterminator and treat the entire building in accordance with governing health regulations.

1.3 RELATED WORK OF OTHER SECTIONS:

A. Coordinate work of this Section with work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the work of other Sections.

1.4 QUALITY ASSURANCE:

A. Perform remodeling, alteration, minor demolition, cutting, patching, removal, refinishing, relocation, and disposal work in accordance with Federal, State, and local health and safety standards, codes and ordinances. Where conflicts occur, comply with the more restrictive requirements.

B. Perform remodeling, alteration, minor demolition, cutting, patching, removal, refinishing, and relocation work in such a manner as to preserve the aesthetic and structural integrity of materials and construction.

1.5 JOB CONDITIONS:

A. Protections: Provide temporary protections and conduct operations to prevent injury to persons, buildings, including adjacent facilities and structures.

1. Erect temporary covered passageways, as required by authorities having jurisdiction, to ensure safe passage around demolition and removal work areas.
2. Provide temporary closures and covers to prevent entry of water and weather into existing facilities.
3. Provide interior and exterior shoring, bracing, and support as necessary to prevent movement, settlement, or collapse of structures to be demolished or removed and adjacent facilities to remain.

B. Traffic: Conduct demolition and removal operations and the removal of debris to ensure

minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

C. Noise: Work with noise-producing equipment is subject, at all times, to Owner's approval of entire procedure.

1.6 SEQUENCING/SCHEDULING:

A. Schedule work so as to impose a minimum of hardship on the present operation of the facilities and the performance of the work of other trades.

B. Maintain existing utilities indicated to remain; keep in service and protect against damage during demolition and removal operations.

1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction and the Owner. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities and the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Matching Existing Work: Except where otherwise specifically indicated or specified as a definite change, the finish materials and appearance of the new work shall match the existing contiguous materials and finishes in all respects. Repairs and/or continuations of existing work shall be relatively imperceptible in the finished work when viewed under finished lighting conditions from a distance of 6'.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Check Drawings carefully and thoroughly investigate existing building construction.

3.2 PREPARATION:

A. Seal off areas in which work is in progress from the occupied portions of the building. Take all necessary measures to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level and prevent entry of dust and noise into occupied portions of the building.

1. If temporary closures block required exits, provide closures with acceptable openings equipped with gasketed self-closing doors openable in the direction of exit as approved by authorities having jurisdiction.

B. Furnish and maintain temporary types of protection as necessary to adequately protect and prevent accidental injury to the public, Owner's personnel and personnel employed at the work. Take all necessary precautions to keep trespassers out of work areas. Properly secure work areas from entry when work is not in progress.

C. Protect work to remain from damage. Use barricades, tarpaulins, temporary walls, plywood, planking, masking, and other suitable means and methods as accepted.

1. Restore accidental or careless damage to work to remain in place to a condition as good as or better than existed before work was commenced and at no additional cost to the Owner.

D. Provide all shoring and bracing necessary to positively protect existing elements of the building. Use material adequate to support anticipated loads with a properly calculated margin of safety. Provide for transfer of stresses to successively lower construction.

E. Carefully remove and replace items of existing construction indicated to remain upon completion of the Contract, but which require removal to complete the work. Match condition of construction prior to the start of the Work unless otherwise required. Carefully remove items indicated for relocations in new Work, or to be retained by Owner, to avoid damage, thoroughly clean, and reinstall as indicated or store as directed.

F. Items of salvable value to the Contractor may be removed from the structure as the work progresses. Salvaged items must be transported from the Project Site as they are removed. Storage or sale of removed items on the Project Site will not be permitted.

G. At Concrete Areas to Receive New Flooring Finishes:

1. Prior to installation of nonbreathing floor finishes on floor substrate which can transmit moisture in the form of vapor (concrete slabs on grade being one example), perform the following:

a. Existing Construction (where under side of floor is inaccessible):

(1) Test the substrate at frequencies and using means as recommended by the floor finish manufacturer to determine amount of moisture being emitted.

(2) If moisture is non-acceptable, notify Architect prior to proceeding.

(3) Once an acceptable moisture transmission rate is confirmed, or is brought within acceptable tolerances, submit a written certification, jointly signed by the floor finish manufacturer and installer, attesting that the substrate is acceptable.

3.3 PERFORMANCE:

A. Minor Demolition and Removals:

1. Carefully remove and store all items indicated or required to be reused.

2. Perform minor demolition and removal work completely and remove debris from the Site. Use such methods as required to complete the work within the limitations of governing regulations.

a. Proceed with demolition and removal work in a systematic manner, from the top to the bottom in areas indicated.
b. Remove debris and lower to ground by means of hoists, derricks, or other suitable methods as approved by Owner.
c. Locate demolition equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.

B. Cutting:

1. Structural Elements: If not specifically shown, but removal or alteration is required, perform such removal or alteration only upon written approval of the Structural Engineer. Do not damage or alter any structural element of the existing building. Where drilling or fastening to post-tensioned reinforced concrete construction is required, X-ray existing structure to determine tendon locations and potential for tendon tension release before proceeding. Notify Architect/Structural Engineer in each instance when

conflict occurs. Architect/Structural Engineer will determine corrective action required. Do not proceed until corrective action has been received.

2. Concrete: Saw cut where exposed to view. Jack hammering with electric or pneumatic equipment is acceptable only with scheduled approval of Owner.
3. Masonry: Cut back masonry to joint lines and remove old mortar allowing space for repairs.
4. Ceramic, Structural Clay Tile, and Quarry Tile: Saw cut to natural joint lines; remove so that repairs or continuations of new work will be relatively imperceptible.
5. Resilient Tiles: Remove resilient floor coverings and adhesive according to recommendations of the Resilient Floor Covering Institute's (RFCI) "Recommended Work Practices for the Removal of Resilient Floor Coverings" and Addendum.

    a. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

6. Plaster: Cut back to sound plaster on straight lines, and back bevel edges of remaining plaster. Trim and prepare existing lath for tying of new lath.
7. Woodwork: Cut back to a joint or panel line.
8. Existing Doors, Frames, and Sash: Remove in such manner as to facilitate filling in of openings or installation of new work, as required by the Drawings.
9. Cutting for Access to Mechanical and Electrical Systems: The removal of existing ceilings and the removal, cutting, and patching and/or replacement of existing walls, partitions, and floors as may be necessary for access to valves, piping, conduit, and tubing by mechanical and electrical trades shall be included and performed as an obligation of, and as directed by the Contractor and accepted by Architect.

C. Patching, Repairing, and Finishing of Existing Work:

1. Perform in compliance with the applicable requirements of the Specification technical Section covering the work to be performed and the requirements of this Section.

    a. All holes and damaged areas exposed to view in ceilings, walls, and floors of all finished spaces shall be repaired. Repaired construction shall match existing adjacent construction and finish, unless otherwise indicated or specified.
    b. Minor surface abrasions, small nail holes, cracks, aged checked natural wood finish and other similar deterioration not visible, when viewed under finished lighting conditions, from a distance of 6'-0” will not be required to be repaired if the base material is sound and suitable to receive the scheduled finishes, if any.
    c. Interior penetration holes in walls, ceilings, and floors of unfinished spaces and spaces not exposed to view shall be grouted and sealed with accepted materials as required for sound sealing and firestops where required.
    d. Penetration holes through exterior walls above grade shall be grouted and sealed as required to produce a weathertight seal.
    e. Penetration holes through exterior walls below grade shall be grouted and sealed as required to produce a watertight seal.

2. Concrete: Edges of existing concrete shall be kept damp for 24 hours and scrubbed with neat portland cement grout just before new concrete is placed; in lieu thereof, an accepted epoxy concrete adhesive may be used. Finish shall match existing adjoining work. Unless otherwise specified, all concrete for patching shall be 3,000 psi concrete. Reinforcing bars and dowels shall be provided where required. Where installation of

concrete is impracticable, the openings shall be filled with dry packed non-shrink grout as directed.

3. Concrete Floor Leveling: Where existing concrete floors do not meet the following requirements, provide specified floor leveling compounds which provide the following tolerances in accordance with ASTM E 1155:

   a. Sub-floors for thin coverings (VCT, epoxy toppings, paint, carpeting) - FF = 30, FL = 25.
   b. Floor Leveling Compound: Equal to Ardex, Inc. "Ardex K-15 Self-Leveling Underlayment", complete with all accessories required and recommended by manufacturer; install in accordance with manufacturer's recommendations.

4. Masonry: Patch with sound whole units to match existing. Joints shall match adjoining surfaces.

5. Lath: Lath areas to be patched as required, install as required for new lath, and wire-tie to existing lath at edges at 6" intervals. Lap lath 3" minimum.

6. Plaster: Dampen edges of existing plaster. Plaster patching shall be 3 coat work of type, thickness, and finish to match the existing work.

7. Damages: Promptly repair damages to adjacent facilities caused by demolition and removal operations at no additional cost to the Owner.

8. Cleaning Existing Tectum Panels: Normal surface dust and dirt can be removed from panels by sweeping them with a nylon bristled broom or by vacuuming them. Then all panels shall be painted (See Painting Sections in Division 09).

9. Painting and Finishing:

   a. Preparation: Prepare patched areas as required for new work. Wash areas to be repainted with neutral soap or detergent, thoroughly rinse, and sand when dry. Feather remaining paint edges smooth with sandpaper.

   b. Painting and Finishing: Conform to the applicable provisions of Painting Section. Prepare and build up bare areas and patches in existing painted surfaces with proper primer and intermediate coats, sand smooth and flush with adjoining surfaces. Paint all areas scheduled to be painted and/or repainted as specified in Painting Section of the Specifications, except the first or primer coat may be omitted on existing painted surfaces.

D. Disposal of Debris: Clean up all material, debris, and rubbish resulting from remodeling work, remove from the building and Site, and legally dispose of. Leave all areas of work in "broom clean" condition.

END OF SECTION

SECTION 01 20 10 – PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. In addition to requirements of AIA Document A201-2007 General Conditions and other Contract Conditions, this section includes administrative and procedural requirements for the following meetings:
   1. Pre-Construction Meeting
   2. Pre-Installation Meetings
   3. Progress Meetings
   4. Project Coordination Meetings

B. Attendance: Attendance by persons qualified to speak for their organizations on the subjects of specified or called meetings will be required for the parties noted.

C. Arrangement: The Contractor shall provide a suitable space for project site meetings in temporary project quarters.

D. Records: Each party attending shall be responsible for their own record of the proceedings and compliance therewith. The Architect will document significant items in his written observation report and shall forward one copy of observation report to Owner and General Contractor.

E. Special Meetings: Meetings other than those listed below may be requested by any of the parties for specific purposes, if agreed to be best accomplished by such meetings.

1.2 PRE-CONSTRUCTION MEETING

A. A pre-construction meeting and organizational meeting shall be scheduled at Project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities.
   1. Meeting notes shall include significant discussions and agenda items.
   2. Promptly distribute one copy each to all attendees and other parties affected by this meeting.

B. Attendees: The meeting will be presided over jointly by the General Contractor and Architect. The following persons will be expected to attend:
   1. Owner's Representative, Architect's Construction Administrator, and Engineer.
   2. Contractor, Contractor's Project Manager and Superintendent.
   3. Major Subcontractors including Masonry and Drywall, Mechanical, Plumbing, and Electrical.
   4. A/E's Consultants for Civil, Mechanical, Electrical and Structural Engineering.
   5. Manufacturers, suppliers and other concerned parties familiar with and authorized to conclude matters relating to the work.

C. Agenda: Discuss items of significance which could affect progress including but not limited to such topics as:
   1. Responsibilities and personnel assignments.
   2. Tentative construction schedule.
   3. Sequence of critical work.

4. Procedures for processing field decisions and change orders.
5. Procedures for processing Applications for Payment as specified in Section 01 02 70.
6. Distribution of Contract Documents.
7. Distribution of submittals such as shop drawings, product data, samples as specified in Section 01 33 00.
8. Procedure for preparing and maintaining "as built" drawings as specified in Section 01 72 50 – Project Record Documents.
9. Access to site and use of premises.
10. Office, work and storage areas.
11. Equipment deliveries and priorities.
12. Safety procedures.
13. First aid.
14. Security.
15. Housekeeping procedures.
16. Working hours.
17. Handling of materials.
18. Additional subjects as may be requested by the Owner, A/E or Contractor.

1.3 PRE-INSTALLATION MEETINGS

A. General: Pre-installation meetings shall be scheduled at Project site (concurrent with the Progress meeting whenever possible) before each construction activity that requires coordination with other construction, including: Concrete placement, Steel erection, Masonry, Roofing, Door hardware, Millwork, Carpet, Mechanical airside, Mechanical equipment start-up, Plumbing and Electrical.

1. Meeting notes for each meeting shall include significant discussions, agenda items, agreements and disagreements.
2. Promptly distribute one copy each to all attendees and other parties affected by this meeting, including Architect and Owner's Representative.

B. Attendance: The following persons will be expected to attend:

1. Architect's Construction Administrator or appropriate Consultant.
2. General Contractor's Superintendent.
3. Subcontractor's Foreman.
4. Installer and representatives of manufacturers and fabricators involved in or affected by its coordination or integration with other materials and installations that have preceded or will follow.
5. Notify Architect four days in advance of scheduled meetings.

C. Agenda: At each pre-installation meeting, review progress of other work and preparations for the particular work under consideration, including specific requirements for the following:

1. Contract Documents.
2. Options.
3. Related change orders.
4. Purchases.
5. Deliveries.
6. Shop drawings, product data and quality control samples.
7. Possible conflicts and compatibility problems.

8. Time schedules.
9. Weather limitations.
10. Manufacturer's recommendations.
11. Compatibility of materials.
12. Acceptability of substrates.
13. Temporary facilities.
14. Space and access limitations.
15. Governing regulations.
16. Safety.
17. Inspection and testing requirements.
18. Required performance results.
19. Recording requirements.
20. Protection.

D. Do not proceed with the work if the pre-installation meeting cannot be successfully concluded.
1. Initiate whatever actions are necessary to resolve impediments to performance of the work.
2. Schedule a follow-up pre-installation meeting at the earliest feasible date.

1.4 PROGRESS MEETINGS

A. General: Progress meetings will be presided over by the Contractor's Project Superintendent or Project Manager and will be called on a monthly basis (minimum), concurrent with the submittal of review draft of current Request for Payment.
1. Contractor shall be responsible for general meeting notes and shall forward one copy of same meeting notes to all principal meeting attendees within three days of meetings.
2. Contractor will provide the Owner and Architect copies of the Contractor's Daily Report (Job Log) on a monthly basis, indicating crews on the job, work completed and manpower.
3. Construction Schedule will be reviewed and updated for Progress Meetings.
4. Meeting notes for each meeting shall include significant discussions, agenda items, agreements and disagreements.
5. Promptly distribute one copy each to all attendees and other parties affected by this meeting, including Architect and Owner's Representative.

B. Attendance: The following persons will be expected to attend:
1. Owner's Representative.
2. Architect's Construction Administrator.
Architect's Consultants for Civil, Structural, Mechanical and Electrical Engineering until excused from attendance.
3. Subcontractors who have work in progress.
4. Subcontractors who will start work within the next month.
5. Project superintendent, major Subcontractors and suppliers, as appropriate to agenda topics for each
6. meeting.
7. Others as requested by the Owner's Representative, the A/E or the Contractor.

C. Agenda: The subjects may include, but are not limited to:
1. Review minutes of previous meetings.
2. Review progress of work since last meeting.
3. Field observations, problems, and decisions.

4. Identification of problems which affect the scheduled progress.
5. Review of submittals schedule and expediting of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures and procedures to regain / maintain projected schedules.
9. Construction schedule revisions.
10. Progress planned during the next work period.
11. Coordination of progress with subcontractor.
12. Quality and work standards.
13. Effect' of proposed changes on progress schedule and coordination.
14. Security.
15. Other business relating to the Work.

1.5 PROJECT COORDINATION MEETINGS

A. Coordinate scheduling, submittals, and work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities.

1 Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirement and installation of mechanical and electrical work which are indicated diagrammatically on Drawings.

1 Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building.
2 Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean-up of work of separate Sections in preparation for Substantial Completion and as required by Contract Documents.

F. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

END OF SECTION

SECTION 01 28 00 - CHANGE ORDER PROCEDURES

1.1 GENERAL

A. In addition to requirements of AIA Document A201-2007 General Conditions and other Contract Conditions, this section includes procedural requirements for considering and processing Change Orders, including:
1. Preliminary Procedures (Proposal Request)
2. Construction Change Directives
3. Documentation of Proposal and Claims
4. Preparation of Change Orders
5. Lump-Sum/Fixed Price Change Order
6. Unit Price Change Order
7. Time and Material Change Order
8. Correlation with Contractor's Submittals

1.2 SUBMITTALS

A. Provide full written data required to evaluate changes.
1. Maintain detailed records of work performed on a time-and-material/force account basis.
2. Provide full documentation to Architect upon request.

B. Designate in writing the member of Contractor's organization:
1. Who is authorized to accept changes in the Work.
2. Who is responsible for informing others in the Contractor's organization of the authorization of changes in the Work.

C. Owner will designate in writing the person who is authorized to execute Change Orders.

1.3 PRELIMINARY PROCEDURES

A. A change may be initiated by the Owner, Architect or Contractor.

B. Owner or Architect may initiate a potential change by submitting the latest edition of AIA Document G709-Proposal Request to the Contractor's proposal. Proposal Request will include the following:

1. Detailed description of the change, products, and location of the change in the Project.
2. Supplementary or revised drawings and specifications.
3. The projected time span for making the change, and a specific statement as to whether overtime work is, or is not, authorized.
4. A specific period of time during which the requested price will be considered valid.
5. Such request is for information only, and is not an instruction to execute the changes, nor to stop the Work in progress.

C. Contractor may initiate a request for changes by submitting a written notice to Architect, containing the following:
1. Description of the proposed changes.
2. Reason for making changes.
3. Statement of the effect on Contract Sum and Contract Time.
4. Statement of the effect on the work of separate Contractors.
5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.

1.4 CONSTRUCTION CHANGE DIRECTIVES

A. Coordinate these procedures with requirements of General Conditions.

B. In absence of total agreement on the terms of a Change Order, the Architect may prepare and issue a Construction Change Directive directing a change in the Work, for subsequent inclusion of a Change Order.

1. Construction Change Directive will describe changes in the Work and describe the method of determining any change in the Contract Sum or Contract Time, or both.
2. Construction Change Directive will be signed by Owner and Architect.
3. Form Used: AIA Document G714 Construction Change Directive, latest edition.

C. Upon receipt of a Construction Change Directive, Contractor shall do the following:

1. Promptly proceed with the change in the Work involved.
2. Promptly advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

D. A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them.

1. Such agreement shall be effective immediately and shall be recorded as a Change Order.
2. If Contractor does not respond promptly or disagrees with the Construction Change Directive, he shall comply with General Conditions.

E. A Construction Change Directive shall be processed in compliance with requirements of the General Conditions.

1.5 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Coordinate these procedures with requirements General Conditions.

B. Document each quotation for a lump-sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data to allow Architect to evaluate the quotation.

C. Provide the following additional data to support time and cost computations:

1. Labor and equipment required.
2. Quantities of products and materials required, including source of purchase and unit cost.
3. Taxes, insurance and bonds.
4. Credit for work deleted from Contract, similarly documented.
5. Overhead and profit, for subcontractor and General Contractor separately.
6. Justification for any change in Contract Time.

D. Support each claim for additional costs, and for work done on a time-and-material basis, with documentation as required for a lump-sum proposal, plus the following additional information:

1. Name of the Owner's authorized agent who ordered the Work, and date of the order.
2. Dates and hours work was performed, and by whom.
3. Time record of hours worked, and hourly rates paid.
4. Receipts and invoices for equipment used, listing dates and times of use.
5. Receipts and invoices for products used, listing of quantities.
6. Receipts and invoices for subcontracts.
7. Receipts and invoices for overhead and profit, taxes, insurance.

1.6 PREPARATION OF CHANGE ORDERS

A. Coordinate these procedures with requirements of General Conditions.

B. Contractor will prepare each Change Order, using form AIA Document G701 Change Order.

C. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.

D. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.7 LUMP-SUM/FIXED PRICE CHANGE ORDER

A. Coordinate these procedures with requirements of General Conditions.

B. Content of the Lump-Sum/Fixed Price Change Order will be based on either of the following:

1. Architect's Proposal Request and Contractor's responsive Proposal as mutually agreed between Owner and Contractor.
2. Owner and Architect will sig n and date the Change Order as authorized for the Contractor to proceed with the changes, after the Contractor has signed the Change Order.

1.8 UNIT PRICE CHANGE ORDER

A. Coordinate these procedures with requirements of General Conditions.

B. Content of Change Orders will be based on either:

1. Architect's definition of the scope of the required changes.
2. Contractor's Proposal for a change, as recommended by Architect.
3. Survey of completed work.

C. The amounts of the unit prices are to be:

1. Unit prices stated in the Agreement.
2. Unit prices mutually agreed upon between Owner and Contractor.

D. When quantities of each of the items affected by the Change Order can be determined prior to start of the work.

1. When quantities of each of the items affected by the Change Order as authorization for Contractor to proceed with the changes, after the Contractor has signed the Change Order.

E. When quantities of the items cannot be determined prior to start of the work:

1. Architect or Owner will issue a Construction Change Directive directing Contractor to proceed with the change on the basis of unit prices and will cite the applicable unit prices.
2. At completion of the change, Architect will determine the cost of such work based on the unit prices and quantities used. a) Contractor shall submit documentation to establish the number of units of each item and any claims for a change in Contract Time.
3. Architect will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.
4. Owner and Contractor will sign and date the Change Order to indicate their agreement with the terms therein.

1.9 TIME AND MATERIAL CHANGE ORDER

A. Coordinate these procedures with requirements of General Conditions.

B. Architect will issue a Construction Change Directive directing Contractor to proceed with changes in time and materials.

C. At completion of the change, Contractor shall submit itemized accounting and supporting data as provided in this section under "Documentation of Proposals and Claims".

D. Architect will determine the allowable cost of such work, as provided in General Conditions and Supplementary Conditions, and based on Contractor's submitted data.

E. Architect will sign and date the Time and Material Change Order to establish the change in Contract Sum and Contract Time.

F. Owner and Contractor will sign and date the Change Order to indicate their agreement.

1.10 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Coordinate these procedures with requirements of General Conditions.

B. Promptly revise the Schedule of Values and Request for Payment forms to record each change as a separate item of Work and the adjusted Contract Sum.

C. Promptly revise the Construction Schedule to reflect each change in Contract Time.

1. Revise sub-schedules to show changes for other items of work affected by the changes.

D. Upon completion of the Work under a Change Order, promptly enter pertinent changes in Project Record Documents - Section 01 78 00 Closeout Procedures.

END OF SECTION

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART ONE - GENERAL

1.1. GENERAL

A. Drawings and General provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2. SECTION INCLUDES

A. Submittal procedures for:

1. Schedule of Values
2. Construction Schedules
3. Shop Drawings, Product Data and Samples
4. Operations and Maintenance Data
5. Manufacturer's Certificates
6. Project Record Documents
7. Design Mixes

1.3. SUBMITTAL PROCEDURES

A. Scheduling and Handling:

1. Schedule submittals well in advance of the need for the material or equipment for construction. Allow time to make delivery of material or equipment after submittal is approved.
2. Develop a submittal schedule that allows sufficient time for initial review, correction, resubmission and final review of all submittals. The Architect will review and return submittals to the Contractor as expeditiously as possible but the amount of time required for review will vary depending on the complexity and quantity of data submitted. In no case will a submittal schedule be acceptable which allows less than 30 days for initial review by the Architect. This time for review shall in no way be justification for delays or additional compensation to the Contractor.
3. The Architect review of submittals covers only general conformity to the Drawings, Specifications and dimensions which affect the layout. The Contractor is responsible for quantity determination. No quantities will be checked for omissions or deviations from the Contract requirements; review of submittals in no way relieves the Contractor from an obligation to furnish required items according to the Drawings and Specifications.
4. Submit 5 copies of documents unless otherwise specified in the following paragraphs or in the Specification sections.
5. Revise and resubmit submittals as required. Identify all changes made since previous submittal.
6. The Contractor shall assume the risk for material or equipment which is fabricated or delivered prior to approval. No material or equipment shall be incorporated into the work or included in periodic progress payments until approval has been obtained in the specified manner.

B. Transmittal Form and Numbering:

1. Transmit each submittal to the Architect with a Transmittal Form.
2. Sequentially number each transmittal form beginning with the number 1. Resubmittals shall use the original number with an alphabetic suffix (i.e. 2A for first resubmittal of Submittal 2 or 15C for third resubmittal of Submittal 15). Each submittal shall only contain one type of work, material, or equipment. Mixed submittals will not be accepted.
3. Identify variations from requirements of Contract Documents and identify product or system limitations.

C. Contractor's Stamp:

1. Apply Contractor's stamp, certifying that the items have been reviewed in detail and are correct and in accordance with Contract Documents, except as noted by any requested variance.
2. As a minimum, contractor's Stamp shall include:
   a. Contractor's name
   b. Job number
   c. Submittal number
   d. Certification statement that the contractor has reviewed the submittal and it is in compliance with the Contract Documents.
   e. Signature line for Contractor.

1.4. SCHEDULE OF VALUES

A. Submit a Schedule of Values in accordance with requirements of General and Supplementary Conditions.

1.5. CONSTRUCTION SCHEDULES

A. Contractor shall prepare a construction progress schedule and submit to the Owner within 10 days after award of Contract. Show date for beginning, completion of each major operation and the dollar value of each operation to be completed each month.

B. The schedule shall show a sequence of operations based on final completion of all work on or before the completion date stated in the contract. Revise schedule weekly to indicate current status and schedule sequence adjustments necessary to maintain completion date.

1.6. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Submit shop drawings in accordance with requirements of General and Supplementary Conditions.

B. The Contractor shall submit complete Shop Drawings, Product Data, Samples and similar submittals required by the Contact Documents to the Architect at least 30 days prior to the date the Contractor needs the reviewed submittals returned. Where colors are to be selected by the Architect, submit all Samples in adequate time to allow the Architect to prepare a complete selection schedule. In general, all submittals requiring color selection shall be submitted to the Architect within four weeks of the date of the contact for construction.

C. The Contractor shall submit the number of copies (and/or electronic copies, except for samples) of Shop Drawings, Product Data, Samples and similar submittals which the Contractor and his subcontractors need for their use plus two additional sets for the Architect and one additional set for each of the Architect's consultants involved with the particular section of work. Where shop drawings are involved, submit one high quality reproducible transparency and one opaque print of the shop drawing for the Architect plus one additional opaque print for each of the Architect's consultants involved with the particular section of work. The reproducible transparency will be marked by the Architect and/or his consultants and returned to the Contractor for his use, distribution, correction or resubmittal as required. The marked up prints will be retained by the Architect, and one to the Architect's Consultants involved with the particular section of work.

D. The Architect will notify the Contractor when the shop drawings are ready for distribution, and the Contractor shall be responsible for collection and distribution.

E. Submittal data and shop drawings to be reviewed by the Architect's consultants (Structural, Mechanical, Electrical, Food Service, etc.), shall be delivered directly to the consultants by the Contractor after the Contractor's review (with copy of transmittal sent to Architect). Architect's consultant will forward shop drawings to the Architect after review.

F. If requested, submittals may be reviewed by the Owner concurrently with the review by the Architect and the Architect's consultants. It shall be the responsibility of the Contractor to deliver one copy of each such submittal directly to the Owner concurrently with delivery of submittals to the Architect and his consultants

1.7. OPERATIONS AND MAINTENANCE DATA

A. Submit Operations and Maintenance data in accordance with Section 01 78 00 Project Closeout.

1.8. MANUFACTURER'S CERTIFICATES

A. When specified in Specification sections, submit manufacturer's certificate of compliance for review by Architect.

B. Contractor's Stamp, as described in paragraph 1.2.C, shall be placed on front page of the certification.

C. Submit supporting reference data, affidavits, and certifications as appropriate.

D. Certificates may be recent or previous test results on material or product but must be acceptable to Architect.

1.9. PROJECT RECORD DOCUMENTS

A. Submit Project Record Documents in accordance with General and Supplementary Conditions and Section 01 78 00 - Closeout Procedures.

1.10. DESIGN MIXES

A. When specified in Specifications, submit concrete design mixes for review.

B. Contractor's Stamp, as described in paragraph 1.2.C, shall be placed on front page of each design mix.

C. Mark each design mix to identify proportions, gradations, and additives for each class and type of design mix submitted. Include applicable test results on samples for each mix.

D. Maintain a copy of approved design mixes at mixing plant.

PART TWO - PRODUCTS - not used.

PART THREE - EXECUTION - not used.

END OF SECTION

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.

2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a

recent report on the inspection of the testing agency by a recognized authority.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.6 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
   d. When testing is complete, remove test specimens, assemblies, do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, if directed by Owner through Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect[or Construction Manager].
2. Notify Architect and Construction Manager seven days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's and Construction Manager's approval of mockups before starting work, fabrication, or construction.

   a. Allow seven days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed unless otherwise indicated.

K. Room Mockups: Construct room mockups incorporating required materials and assemblies, finished according to requirements. Provide required lighting and additional lighting where required to enable Architect to evaluate quality of the Work. Provide room mockups of the rooms indicated.

L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings, or as indicated on Drawings. Coordinate installation of exterior envelope materials

and products for which mockups are required in individual Specification Sections, along with supporting materials.

1.8 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect, Construction Manager, and

Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality- assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.9 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.

2. Notifying Architect, Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality- control service to Architect, through Construction Manager, with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and Construction Manager's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 41 00 - TESTING LABORATORY SERVICES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. The owner will furnish testing required by this Section. The Contractor shall cooperate with the independent testing laboratories (ITL) described herein to facilitate testing services. The ITL shall furnish all testing specified in this section. Separate testing shall be subject to the Engineer's approval.

B. Testing shall be for compliance with the specification requirements of the Contract Documents. Testing lab personnel will perform such other specialized technical services as may be required by the Engineer.

C. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract.

1.2 RELATED WORK:

A. Division 1: General Conditions and all sections applying to or affecting Work of this Section.

B. Specification Sections: All Sections applying to or affecting Work of this Section.

1.3 CONTRACTOR DUTIES:

A. Secure and deliver to the ITL, without cost, preliminary representative samples of the materials he proposed to use and which are required to be tested.

B. Furnish such casual labor and all facilities which are necessary to obtain and handle samples at the project and to facilitate the specified inspections.

C. Assure the ITL access to the structural steel during fabrication so that the required shop inspections and tests can be made.

D. Cooperate with ITL personnel in the securing of samples, for testing purposes, of material used.

E. Advise the ITL and the Architect at least 72 hours in advance of operations to allow for completion of tests and for the assignment of personnel.

F. Provide and maintain, for the sole use of the ITL, adequate facilities for safe storage and proper curing of such test specimens which must remain on the project site prior to testing. Concrete specimens should cure 24 hours as specified under ASTM C-31.

G. Pay the ITL for such tests or inspections as are performed exclusively for the contractor's convenience, for such retests as may be occasioned by initial nonconformance of the materials with the Contract Documents and for cylinders and testing of concrete when early strength concrete is desired for form removal.

H. The Contractor shall retain the services of Testing Laboratory other than ITL to prepare mix designs for each type of concrete on the Project. The mix designs and the cylinder tests of

each type of concrete will be submitted to the ITL and the Structural Engineer for review and approval prior to commencement of the Project.

1.4 REQUIREMENTS INCLUDED:

A. Inspections and tests required to establish compliance with the Contract Documents, as provided for in the Contract Documents, shall be made by a prequalified, independent testing laboratory (ITL) approved by the Engineer. The cost of the services of such agency will be paid by the Owner.

B. When the initial tests indicate noncompliance with the contract documents, any subsequent retesting, occasioned by noncompliance shall be performed by the same agency and the cost thereof shall be borne by the Contractor. Any costs incurred by the Architect and Engineers due to such noncompliance shall be paid by the Contractor.

C. Representative of the testing agency shall have access to the Work at all times. The contractor shall provide facilities for such access in order that the agency may properly perform its function.

D. Special Inspection:

1. If after the commencement of the Work, the Architect determines that any part of the Work requires special inspection, testing or approval, he will instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice in accordance with paragraph 1.03E above. If such special inspection or testing reveals a failure of the work to comply with the requirements of the work, the laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; the Contractor shall bear all costs thereof, including Structural Engineer's and Architect's additional services made necessary by such failure.

2. Inspection or testing performed exclusively for the contractor's convenience shall be sole responsibility of the Contractor.

3. Periodic tests will be carried out by the ITL. Criteria for acceptance of concrete mixes and strengths shall be as established in the technical specifications.

E. If the Architect wishes to observe the inspection, tests or approvals, he may do so at the source of supply.

F. Neither the observations and directives of the Architect, nor inspections, tests, or approvals by persons other than the Architect shall relieve the Contractor from his obligations to perform the work in accordance with the Contract Documents.

1.5 QUALIFICATIONS OF LABORATORY:

A. The independent testing laboratory selected shall meet the basic requirements of ASTM E-329, "Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials in Construction", and must submit to the Architect a current copy of an established Quality Assurance Manual meeting criteria of the American National Standards Institute (ANSI) N45.2 (1971) assuring that tests or inspections performed will be in accordance with established and accepted procedures and criteria.

The ITL must also submit to the Architect, an established Calibration Manual (Metrology) complying with ANSI N45.2 (1971) criteria; an inventory list of acceptable, documented reference standards; and records or personnel qualifications pertaining to all on-site personnel.

Equipment and staff referred to herein, shall be maintained exclusively for service on the subject project, except with the prior written approval of the Engineer.

B. As a minimum, all ITL on-site supervisory personnel shall be a graduate of an accredited high school; have a minimum of five years documented experience in a like supervisory capacity in laboratory testing; and be qualified and certified in the fields of testing required for the Project, as well as metrology, as set forth in appropriate Quality Assurance and Calibration Manuals.

C. Job site Technicians shall be experienced in the work they are performing and all testing personnel shall be satisfactory to the Engineer.

D. All testing machines and measuring devices which require calibration shall be calibrated initially and at intervals not exceeding six months (except as authorized in writing); using reference standards readily traceable to the National Bureau of Standards or other standards specifically approved in writing; to accuracy limits and criteria approved by the Engineer.

E. All calibration shall be performed by or under the direct supervision on the ITL manager, using in-house Qualified or Certified Metrology Personnel; in strict accordance with established Quality Assurance Procedures.

F. All required calibration equipment and reference standards shall be the property of the Home Office of the ITL and shall be verified for accuracy and traceability prior to subsequent to calibration service period. Should any calibration equipment experience damage in transit, or for any reason fail to conform to specified accuracy requirements during verification of accuracy checks subsequent to on-site testing, any and all such equipment shall be repaired or replaced, as necessary so as to comply with effective Quality Assurance requirements and all affected on-site equipment shall be recalibrated immediately.

G. In the event on-site testing apparatus fails to reflect compliance with acceptable limits of accuracy during any calibration period, such equipment shall be repaired or replaced; such nonconformance of equipment shall be brought to the immediate attention of the Architect, in writing; and the resolution of such nonconformances, if any, will be resolved on a case-by-case basis.

H. Any deviation from established and accepted Quality Assurance criteria must be authorized and approved in writing by the Architect.

1.6 AUTHORITIES AND DUTIES OF THE ITL:

A. The ITL is not authorized to revoke, alter, relax, enlarge or release any requirement of the specifications, nor to approve or accept any portion of the Work. When it appears that the material furnished or work performed by the Contractor fails to fulfill specification requirements, the ITL shall promptly direct the attention of the Owner, Architect and the Contractor to such deficiencies.

B. Copies of all laboratory tests and inspection reports shall be issued promptly and directly to the Owner, Architect, the Structural Engineer, the Contractor and to such other persons as may be specified by the Structural Engineer. Test reports shall be indicated by notation (*) alongside all tests that fall below norms with an explanation as to why the failure. The Contractor shall use these reported at his own risk.

1.7 PAYMENT FOR TESTING:

A. Initial Services: The Owner will pay for initial testing services.

B. Retesting: When initial tests indicate noncompliance with the Contract Documents, all subsequent retesting occasioned by the noncompliance shall be performed by the same testing agency and the costs thereof will be deducted by the Owner from the Contract Sum.

C. Code Compliance Testing: Inspections required by codes or ordinances, or by a plan approval authority, and which are made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

D. Contractor's Convenience Testing: Inspecting and testing shall be performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

E. Inspection by Owner's Personnel: From time to time, personnel in the employ of the Owner may inspect the work where the work is in progress but shall have no authority to direct the Contractor or request changes in the work except through the Engineer.

F. Revising the Schedule: When changes of construction schedule are necessary during construction, the contractor shall coordinate such changes of schedule with the testing laboratory as required.

G. Adherence to Schedule: When the testing laboratory is ready to do testing according to the established schedule but is prevented from testing or taking specimens due to incompleteness of the work, all extra charges for testing attributable to the delay may be back-charged to the Contractor and shall not be borne by the Owner.

H. Alternative Inspection Procedure: The Engineer shall have the right to require alternative inspection procedure other than as specified when, in the Architect's judgment, other inspections are required to demonstrate compliance with the Contract requirements. Costs of such alternative inspections will be borne by the Owner if products are found to comply; otherwise, costs shall be borne by the Contractor.

I. Testing and Inspection Requirements:

1. Unless otherwise noted herein, all testing and inspection shall be of sufficient thoroughness to establish that materials and methods conform to the requirements and intent of the Contract Documents and to all applicable codes, ordinances and regulations.

2. Additional requirements for tests, inspections and certification to be provided by the Contractor will be found within the appropriate specification sections.

1.8 EARTHWORK AND BACKFILLING:

A. General: ITL shall perform inspection and testing of earthwork in accordance with this section and as required to certify that materials and installation are in compliance with Contract Documents and the following:

1. Earthwork and backfilling for building and utilities specified in Division 2.

B. Samples: Secure 60 lbs. of each type of fill material for ITL to perform compaction testing in laboratory.

C. Backfilling and Compaction:

1. Before placement, type and quality of fill material shall be selected and tested for compliance with requirements of Soils Report.

2. Compaction Testing: Prior to placement of fill, perform one compaction test of each type of fill material in accordance with ASTM D698.

D. Density Testing:

1. Perform density testing of in-place fill in accordance with ASTM D2922, D2937, D3464, D2167 or D3017.

2. General Fill Areas Below Footing Bearing: One density test per lift per 2,500 sq. ft., if required by not less than three tests at each footing location.

3. Trench Excavations for Foundations: One density test per lift at 50 feet on center maximum, but not less than three tests.

4. Under Paved Areas and Building Slab: In each compacted fill layer, one field density test required for every 2500 sq. ft., but not less than three tests.

5. Foundation Wall Backfill: One field density test per lift at 50 feet on center, but not less than two tests per lift in any one area.

E. Retesting: Test failures shall be retested at Contractor's expense.

ITL Reports: Shall be complete as specified elsewhere in this section and include the following information:

1. Exact location and elevation of test.

2. Type of backfill.

3. Reference compaction curve.

4. Type of compaction equipment used.

5. When compaction was performed.

6. Moisture content, dry density, percent of maximum dry density.

7. Weather conditions, number of passes required by compaction equipment.

8. Statement certifying that materials and installation comply with Soils Report, Contract Documents and applicable specification sections.

1.9 CAISSONS:

A. Perform all tests and inspections, as specified herein, evaluate test results and state compliance of installed work with contract documents.

1. Review the Contractor's proposed caisson installation methods, sequences, procedures and equipment including deep well dewatering systems.

2. On a full-time basis visually inspect the installation of each caisson including visual inspection of the bottom of each caisson.

3. Verify the specified bearing capacity of each caisson with the following tests.

Caissons Bearing on Rock:

a. The bottom elevation of every rock caisson shall be established by pre-coring at each caisson location. Pre-coring shall be extended to a depth sufficient to ensure that solid (unweathered) rock is present for a minimum of 8'-0" below the bearing level of the caisson.

b. Prepare continuous core logs describing seams and joints. Take undisturbed rock core samples from selected caisson bottoms. Conduct compression test for each sample and report results and core logs to Engineer.

c. The maximum acceptable accumulated thickness of seams within this 8 foot depth shall be:

Distance Below Rock Socket	Total Accumulated Seams
0 - 1R	1/4 inch
0 - 2R	1/2 inch
0 - 3R (8'-0" maximum)	1 inch

R is equal to the radius of the rock socket.

d. The seam criteria above may be doubled if the rock socket extends 3R into the rock.

Caissons Bearing on Hardpan:

Conduct tests as follows:

a. Take undisturbed samples, suitable for the tests required, from the elevation at the bottom of the caisson.

b. Conduct the following tests on each sample, and report results and elevations to the Architect.

(1) Unconfined Compression Test (ASTM D 2166).

(2) Moisture Content (ASTM D 2216).

(3) Density.

4. Provide direction to Contractor as to specific final bearing elevation at each caisson location and/or necessity for additional shaft excavation.

5. Visually inspect and test samples of water being pumped from caisson as to solids content.

B. Concrete Placement:

1. Submit a "Drilling Log" for each drilled pier to Owner, Structural Engineer, and Contractor giving the following information. Contractor's surveyor shall provide items marked with an asterisk (*) to the ITL for inclusion in the log.

a. Design shaft diameter.

b. Actual shaft diameters.*

c. Design elevation at bottom and top.*

d. Actual elevation at bottom and top.*

e. Design location of centerlines at top.*

f. Actual location of centerline at top.*

g. Variation of shaft from plumb.*

h. Elevation at bottom and top of any casing left in place.*

i. Dates of excavation, inspection, testing and concrete placement.

j. Volume of concrete placed.

k. Any unusual conditions encountered.

1.10 CONCRETE:

A. Procedure Reference Standards:

1. Sampling: ASTM C-172

2. Slump Test: ASTM C-143

3. Air Content: ASTM C-231

4. Cylinder Specimens: ASTM C-31 (6" x 12" heavy steel molds)

5. Compression Tests: ASTM C-39

6. Unit Weight Test: ASTM C-138

7. Obtaining and Testing Drilled Cores and Sawed Beams of Concrete: ASTM C-42

B. Concrete Tests and Inspections:

1. Secure samples of concrete materials proposed for use in ample quantities to perform all testing required. Review and approve mix designs submitted by the General Contractor.

2. In addition to work specified herein, inspect and test all concrete materials and concrete in accord with the requirements of Chapter 17 using ultimate strength type concrete and of paragraph 1602 of Chapter 16 of ACI 301 "Specifications for Structural Concrete for Buildings".

3. Check the batch weights of concrete and coarse and fine aggregates.

4. Check quantity and type of admixture for compliance with design requirements and secure Engineer's written approval for the use of any admixture in any concrete exposed to view in the building and weather.

5. Check surface and absorption water content of the aggregates and the amount of water added to each batch.

6. Check the scales at intervals necessary to ensure accurate weighing of materials used in concrete work.

7. Check cement being used for compliance with mix designs and mill test reports. If more than one brand, the mix design of each type.

8. Perform sieve analysis in accord with ASTM C-136 to assure that gradation of aggregate entering the mix conform to design requirements.

9. Sample and test all concrete placed at the job site in accord with ASTM C-172. For concrete strengths of 6000 psi or less, samples shall consist of three cylinders; one for 7-day testing and two for 28-day testing. For concrete strengths greater than 6000 psi, samples shall consist of five cylinders; one for 7-day testing, two for 28-day testing, one for 56-day testing and one for 90-day testing.

    a. Take samples from first two placements of each class or type of concrete regardless of amount placed.

    b. Take at least one sample of each class or type of concrete from each placing operation each day in accord with ASTM C-31, Section 7.3e.

    c. Take at least one sample from each 75 cubic yards placed in continuous placements.

    d. Sample shall be prepared at the Project site and taken at the point of deposition of the concrete.

    e. Obtain cement mill test reports for each test cylinder and indicate the mill test on compression test reports.

    f. Perform slump tests at same frequency as sampling, and more often as necessary to control consistency of concrete in accord with ASTM C-143.

    g. Take air content test in accord with ASTM C-231 at least once a day.

    h. Verify that concrete is discharged from mixers before mix begins to set and within limit of 1-1/2 hours maximum from time of mixing except for drilled piers.

    i. The concrete temperature is not at time of deposition to exceed 85 degrees F or be below 50 degrees F.

    j. The test cylinders shall be in the field no longer than 24 hours.

    k. Initial field Curing: Cover the cylinder immediately with a plastic cap or beg sufficiently to seal from free moisture and place the molds in a lime saturated bath within 30 minutes of sampling per ASTM C-31.

    l. Strip cylinders between 24-48 hours from the time of casing.

    m. Cylinder Delivery: Cylinders shall be picked up within 2 to 6 days following casting, provided "set" has occurred and been verified by the resident inspector. The resident inspector shall check cast cylinders daily and mark the caps of only those cylinders which are ready to be transported. The technician picking up

cylinders shall pick up only the cylinders whose caps have been marked for transport. Cylinders shall be transported vertically in cushioned carrying racks directly to the laboratory and/or end preparation facility. Cylinders shall be kept moist during transportation.

n. Laboratory Curing (also applies to end preparation facility): Cylinders shall be cured in saturated lime water at 73.4 +/- 3 degrees F immediately upon arrival and for at least 28 days from the date of casting. Cylinders may be alternately cured in a thermostatically controlled fog room maintained at 95-100% R.H. and 73.4 +/- 3 degrees F. after 28 days from casting date. Lime baths will be thermostatically controlled for temperature maintenance. Fog room shall be continuously monitored for compliance with humidity and temperature conditions. If any cylinders exhibit surface drying while in the moist room, all subsequent test cylinders shall be maintained only in a lime saturated bath until the time of testing. No further curing of these cylinders in the moist will be permitted.

o. End Preparation: All compressive strength test specimens shall have their ends ground and polished prior to testing.

10. For concrete strengths greater than 6000 psi perform batch plant inspections as follows:

a. Provide continuous batch plant supervision using a qualified batch plant inspector. All details of the batching sequence shall be recorded. These details include, but are not limited to the following.

b. Verify and record that drums on mixing trucks are reversed, to remove and wash water or residual material prior to loading.

c. Verify and record that specified ingredients by amount and type are utilized. Record scale weights and admixture quantities for each batch. Batch plant inspector shall send with each ready mix truck, a concrete batch ticket showing the mix design, batch weights, and the actual proportions batched at the plant. This concrete ticket shall be signed by the batch plant inspector.

d. The inspector shall receive cement samples and certificates for each load of cement delivered to the batch plant. The inspector shall verify the silo in which the cement is placed upon delivery and verify that this silo is being used for concrete batching.

e. Verify and record results of all moisture content tests performed on the fine aggregate. Minimum testing required will be at least once for every 50 cubic yards produced.

11. Drilling and testing of cores, in accord with ASTM C-42, may be required by the Architect in the event 28-day compression tests fall below those specified. Contractor shall pay for all drilling and testing of cores so taken. If core tests fall 10 percent below specified strength, the work in question shall be removed and replaced by the Contractor at no additional cost to the Owner.

12. Installation and location of reinforcing steel shall be observed by ITL prior to placing concrete.

C. If reinforcing steel is purchased direct from a United States mill, manufacturer's approved test sheets will suffice. If steel is from dealer's stock, perform tension and bending tests on three separate samples for each size of bar in every 5 tons of each type of steel as specified in the

appropriate ASTM Specification. Contractor shall furnish all material for testing and pay for all such tests. Steel supplier shall furnish mill certificate reports. Tie-back cables shall be tested same as reinforcing steel.

D. Mix Design:

1. Check Contractor mix design and maintain control of concrete mix designs in accordance with the Design and Control of Concrete Mixtures engineering bulletin published by the Portland Cement Association for each specified strength shown.

2. The Contractor shall immediately notify the ITL and the Engineer if, at any time during construction the concrete resulting from the approved mix design proves to be unsatisfactory for any reason, such as, too much water, lack of sufficient plasticity to prevent segregation, honeycomb, or other defects; or insufficient strength. The Contractor shall modify the design, subject to approval, until a satisfactory concrete is obtained.

E. If, in the opinion of the Engineer based on cylinder strengths below specification requirements or visual defects, concrete of poor quality or workmanship has been placed, additional tests shall be made as directed by the Engineer and at the expense of the Contractor. Tests may be compression test on core cylinders ASTM C-42 and load tests as outlined in ACI-318, Section 202, or as directed.

F. Criteria for acceptance of strength tests to be in accordance with ASTM C-94, which is partly explained as follows:

1. Average of all tests representing each class to be equal or greater than the specified strength.

2. Average of any five consecutive tests shall be equal or greater than the specified strength.

3. Not more than one test in ten shall be less than 90% of the specified strength.

4. When two or more cylinders are broken at the same time representing a set, the figure used is to be the average strength of the set.

1.11 FORMWORK INSPECTION:

A. Description of Work: Provide all labor, materials, equipment, apparatus and services necessary to perform formwork inspection. Without restricting the generality of the foregoing, formwork inspection shall include the following:

1. Check evaluation of formwork for all slabs, floors and ramped surfaces.
2. Check and monitor camber as floors are formed, as they are poured and after they are stripped.

3. Verify location of edge forms for all floors and monitor the plumbness of the structure as it is erected.

4. Verify location of items located in cast-in-place concrete for attaching precast concrete panels.

B. Rejections:

1. Notify the Contractor of any deviations from dimensions, locations, elevations, or camber shown on Contract Documents prior to pouring concrete so that proper adjustments in the formwork can be made.

2. Notify the Engineer of any deviations in line or grade which were not correctly adjusted by the Contractor prior to pouring concrete.

C. Reports: Submit written notice of uncorrected deviations to the following: one (1) copy to the Architect's home office, one (1) copy to the Structural Engineer, one (1) copy to the Architect's Field Representative, one (1) copy to the Structural Engineer's Field Representative, one (1) copy to the Owner, and two (2) copies to the Contractor.

1.12 REINFORCING INSPECTION:

A. Description of Work: Provide all labor, materials, equipment, apparatus and services necessary to perform reinforcing inspection. Without restricting the generality of the foregoing, reinforcing inspection shall include the following:

1. Check number, size, spacing and location of all reinforcing steel, using the Contract Documents, prior to pouring concrete. Verify that all bars are properly supported and tied in place.

2. Verify grade of steel.

3. Check location of all reinforcing with respect to formwork to assure proper clearance and concrete cover.

4. Check splices and embedment lengths as required.

B. Rejections: Notify the Contractor of any discrepancies or deviations from the Contract Documents so that correction can be made prior to pouring concrete. A handwritten memo shall be left with the Contractor listing additions or corrections in the Work.

C. Reports: Submit written report of required corrections to the following: one (1) copy to the Architect, one (1) copy to the Structural Engineer, one (1) copy to the Owner, and two (2) copies to the Contractor.

1.13 MORTAR:

A. Procedure Reference Standards:

1. Quicklime for Structural Purposes: ASTM C-5

2. Masonry Cement: ASTM C-91

3. Aggregate for Masonry Mortar: ASTM C-144

4. Portland Cement: ASTM C-150

5. Hydrated Lime for Masonry Purposes: ASTM C-207

6. Mortar for Unit Masonry: ASTM C-270

7. Packaged, Dry, Combined Materials for Mortar and Concrete: ASTM C-387

8. Grout for Reinforced and Nonreinforced Masonry: ASTM C-476

1.14 STRUCTURAL STEEL WORK:

A. Secure samples of structural steel (that is not identified by mill shipping statements and certified mill reports of heat and melt numbers) in sample quantities to perform structural tests on 5 percent of all such unidentified steel. Contractor shall furnish all such material for testing and pay for all such tests.

B. Shop Inspection and Testing: The ITL certify all welders and conduct shop inspections and tests as required during the fabrication of structural steel. Reports shall include shop welder's certifications, types and locations of all defects found during inspection, and the measurers required and performed to correct such defects, statements of final approval of all welding of shop connections, and other shop fabrication data and information pertinent to the safe and proper welding of shop connections.

C. The ITL will certify all welders and conduct field inspection and tests as required during inspections, and the measures required and performed to correct such defects, high strength bolted connection procedures, statements of final approval of all welding and bolting of field connections, and other field erection data and information pertinent to the safe and proper welding and bolting of field connections.

1. In addition: 100 percent of all field spliced girders shall be tested.

2. Defects resulting in rejection of complete welds shall be brought to the attention of the Architect immediately.

D. For welded studs, visual inspection shall indicate complete fusion and weld flush or fillet for a minimum of 90 percent of the circumference. There will be no indication of lack of fusion or undercut weld. In addition to visual inspection, six members per floor shall be selected at random on which five studs shall be hammered toward the center of the member as per stud manufacturer's recommendations. If more than one stud fails, all the studs on the member shall be hammered and all that fail shall be replaced. For each beam with any defective studs, an additional beam shall be tested.

E. A total of 50 bolts shall be tested at random with a calibrated torque wrench. The procedure shall consist of loosening and retightening a minimum of two bolts per connection. The procedures shall be such as to establish that when the nut is retorqued to its original position, the tension is at least equal to that required. If any bolt is found to have lower than specified tension, all the bolts at that joint shall be tested.

F. Verify that the metal deck is attached to the structural steel in accord with manufacturer's recommendation.

1.15 NON-SHRINK GROUT: Test in accordance with CRD - C621-81 (Corps of Engineers, Specification for Nonshrink Grout) except achieve minimum 7 and 28-day compressive strength as shown on Structural Drawings.

1.16 SPRAYED FIREPROOFING:

A. Procedure Reference Standards:

1. Conducting Strength tests of Panels for Building Construction: ASTM E-72

2. Test for Surface Burning Characteristics of Building Materials: ASTM E-84

3. Fire Tests of Building Construction and Materials: ASTM E-84

4. UL Fire Hazard Classification

B. Sprayed Fireproofing Tests and Inspections:

1. Secure samples of fireproofing materials proposed for use in ample quantities to perform all testing required.

2. Test bond strength of fireproofing in accordance with ASTM E-72. Test to provide minimum bond strength twenty times the weight of fireproofing materials. Test shall be on uncoated, coated, and galvanized steel.

3. Test for fire resistance in accordance with ASTM E-84 on substrate materials similar to conditions expected on Project.

4. Test for resistance to high velocity air movement.

1.17 WATERPROOFING: Waterproofing of various types specified shall be observed for proper installation in accordance with specified requirements.

1.18 FLOOR LEVEL MONITORING: Floor level readings shall be taken on all floors at the following locations 3 days after floor placement and 2 months after floor placement:

1. Perimeter Locations: 12 locations.

2. Core Locations: 6 locations.

3. Floor Beams: 8 locations.

END OF SECTION

SECTION 01 43 00 - FIELD CONSTRUCTED MOCK-UPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections apply to work specified in this Section.

1.2 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION:

A. Work of this Section, in general, includes the furnishing and installing of certain building materials and components required to build mock-ups for review by the Architect and the Owner. Refer to schedule of required mock-ups in Part 2 of this Section for specific requirements.

B. The extent of the Building Component mock-ups to be constructed is indicated on the Drawings. Construct the mock-ups of building components outside the building line, on-Site at location directed by the Architect. Construct the mock-ups of interior finishes "in place" on properly prepared substrates.

1. Contractor is responsible for all costs associated with the construction, and reconstruction if required to achieve an acceptable approved mock-up, demolition and removal from the Site at completion of the Work, and all other related expenses.
2. If the mock-up is constructed "in-place", after review and acceptance by the Architect and the Owner, it may be incorporated into the final work.
3. Provide all methods and materials necessary to protect the accepted mock-up from damage and deterioration during the course of the Work and until its removal is authorized.

C. The accepted mock-ups will be viewed as representative of completed work of the various components with respect to qualities of appearance, materials, construction, and workmanship.

1.3 RELATED WORK OF OTHER SECTIONS:

A. Coordinate work of this Section with work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the work of other Sections.

1.4 QUALITY ASSURANCE:

A. Except as otherwise indicated, comply with all requirements of Quality Assurance Articles in each related Section.

1.5 SUBMITTALS:

A. Submit product data, shop drawings, samples, and other documents required by the individual Sections.

1. Schedule early submission of required data for components of work needed to construct the mock-ups.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Provide all materials required in the construction of the mock-ups in compliance with all requirements of the various Sections involved in the mock-up work.

1. Do not purchase materials for the total Project until after acceptance of mock-up work. The Owner will not be responsible for restocking and other costs due to Contractor's premature ordering and purchase of rejected materials.

B. Verify that sufficient quantities of specified materials will be available, in advance of normal installation sequence, to perform mock-up work without causing delay in the Project Schedule.

1. Additional costs due to delays made necessary by non-availability of materials will not be reimbursed by the Owner.

2.2 SCHEDULE OF BUILDING COMPONENT MOCK-UPS:

A. Exterior Wall: Construct a mock-up of typical exterior wall construction in size and location indicated, consisting of, but not limited to the following components:

1. Masonry Units
2. Mortar
3. Joint reinforcing and ties
4. Cod formed metal framing
5. Thru-wall flashing and weeps
6. Cavity wall insulation
7. Loose steel lintels
8. Finished aluminum window with glass
9. Sealant and backer rod

2.3 SCHEDULE OF INTERIOR FINISHES MOCK-UPS:

A. Class Room Area Mock-Up: Install and finish a typical area of a class room area. Install mock-up at location directed by the Architect consisting of, but not limited to the following:

1. Electrical fixtures
2. Gypsum drywall, studs, acoustical insulation
3. Rough carpentry
4. Sealants
5. Flooring and base
6. Painting
7. Hollow metal frames
8. Door hardware
9. Wood doors
10. Ceilings.

B. Painted Finishes: Apply complete specified painting system of approximately 100 sq. ft. each in four locations as directed by the Architect. Include all surface preparation, substrate sealer, primer, and finish coat(s) appropriate for the substrates and the specified finish.

Each mock-up area may consist of, but not necessarily be limited to the following:

1. 100 sq. ft. of wall area from floor to ceiling
2. One door frame
3. Four colors of paint

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Comply with all specified requirements for fabrication, installation, and finishing of all materials and components used in mock-ups.

B. Provide all materials necessary to construct complete mock-ups with materials indicated and specified.

1. For mock-ups of building components to be constructed outside the building line, interior finishes such as gypsum drywall, interior plaster, and paint, are not required unless otherwise indicated.
2. Provide a concrete slab to support the mock-up of building components.

C. For interior finishes mock-ups, provide full coat finish samples as scheduled until sheen, color, and texture is acceptable. Include in the cost of the interior finishes mock-ups all expenses associated with a complete second installation if directed by the Architect.

1. Simulate finish lighting conditions in each location for review of in-place work.

3.2 TESTING:

A. Where field testing is specified as part of the work of a Section included in the mock-up assembly (except glazed wall system and sloped glazing system, if any), perform specified tests on the finished mock-up.

1. If test results indicate non-conformance, make necessary adjustments and re- placements, and retest until results are acceptable.

3.3 PROTECTION:

A. Immediately after acceptance of the completed mock-up construction, initiate and maintain all protection and other precautions required to ensure that the mock-up will be without damage or deterioration throughout the course of the Work.

END OF SECTION

SECTION 01 50 00 -TEMPORARY FACILITIES

PART ONE - GENERAL

1.1 COORDINATION

A. Drawings and General provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

B. Cooperation by Contractor for work of this Section of the specifications with all other trades is mandatory, so that all phases of work may be properly coordinated, without delays or damage to any parts of anywork.

C. The Contractor shall provide all items, articles, materials, operations or methods listed, mentioned, or scheduled on the drawings and/or herein, including all labor, materials, equipment, and incidentals necessary and required for their completion.

1.2 SUMMARY

A. All labor, materials, equipment and services necessary to furnish, erect and maintain temporary facilities and perform temporary work required in the performance of the Contract.

1.3 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities in a proper, safe and sanitary condition for the duration of the Contract. Upon completion of the Contract, remove all temporary facilities from the premises.

1.4 FIELD OFFICE

A. The Contractor will Provide and maintain at the site a weather-tight office for the use of the Architect and Owner. Office shall be painted, provided with windows, doors with locks, tables, benches, racks for drawings, electric light, heat and air conditioning.

1.5 TEMPORARY UTILITIES

A. Temporary Telephone Services
   1. Telephone shall be readily available for the use of the Owner, subcontractors, Architect/Engineers, and trades employed on the work. Toll and long distance calls shall be made only under arrangements with the Contractor, who shall be responsible for the collection of all charges in connection therewith.
   2. Telephone service shall be paid for by the Contractor.

B. Temporary Water
   1. Temporary potable water required in the performance of Contract will be furnished by the Plumbing Contractor. This Contractor shall make his own tap and be responsible for same. Contractor will pay for monthly water charges.
   2. The Plumbing Contractor shall furnish and install all main, laterals, branch lines, and service piping's and fittings to supply temporary water in sufficient quantity at required locations of the building and shall bear costs of making the service connections at approved location. Temporary connections and piping shall be removed and all openings closed in an acceptable manner at the end of the work.

C. Temporary electric service

1. Temporary power required in the performance of the Contract will be furnished by the Electrical Contractor will be furnished by the Electrical Contractor. He shall maintain all temporary poles and overhead construction, transformers, meter drops, and other wiring and fittings for both light and power at locations required in the work.
2. Cost of service shall be paid for by the Contractor. Adequate lighting and convenience shall be furnished and installed safely in the temporary structures and elsewhere as may be necessary for proper performance and inspection of the work.
3. If Operations are carried on during hours of darkness, adequate floodlight, clusters, and spot illumination shall be furnished and maintained during all hours that natural illumination is deemed by the Owner as being insufficient for the work being performed. All artificial lighting shall be so placed and distributed that these specifications may be easily read at any time, and in any place where work under the Contract is in progress.

D. Temporary Heat

1. When required for proper installation or protection of any portion of the work, the Contractor shall furnish and install approved temporary heating units, operate and maintain same, and remove them or relocate them as directed.

1.6 TEMPORARY BARRICADES

A. Within the building shall be dustproof and in location as might be needed and directed by the Contractor.

B. They shall be constructed of 2 x 4's and plywood, adequately braced to be self- supporting without any fastening to existing finishes. Between barricades and existing finish provide a gasket of neoprene or use strips of fiberglass insulation or felt.

C. Temporary doors shall be installed with lock sets to provide exists at end of corridors. Such doors shall not be used by the workmen except with special permission by the Contractor. The barricades shall be painted on the “public side” and Emergency Exits labeled.

1.7 SCAFFOLDS AND RUNWAYS

A. Subcontractors shall furnish, erect and maintain for the duration of work as required, all scaffolds, runways, guard rails, platforms and similar temporary construction, as may be necessary for the performance of his Contract. Such facilities shall be of type and arrangement as required for their specific use; shall be substantially constructed throughout, strongly supported, and well secured, and shall comply with all applicable rules and regulations of applicable State, National and local codes.

B. The several levels of the structure shall be connected by means of suitable ladders, ramps, and temporary stairs; provided, however, that permanent stairway may be used for such purposes if adequately protected against damage.

C. Open wells and shafts shall be enclosed as required by ordinances, rules, regulations and lawful orders of public authorities.

1.8 TEMPORARY BUILDINGS

A. All prime subcontractors shall provide temporary facilities as necessary for their work. All temporary buildings shall be weather and watertight and shall be painted and maintained, (repainted as necessary), in a neat, orderly appearance for the duration of the work and shall be provided with raised wood floors, adequately screened windows for light and ventilation, and substantial wood doors with provisions for locking.

1.9 REMOVAL OF TEMPORARY CONSTRUCTION

A. Temporary office facilities, toilets, storage sheds, and the construction of temporary nature shall be removed from the site as soon as, in the opinion of the Owner, the progress of the work will permit, and the portions of the site occupied by same shall be properly reconditioned and restored to a condition acceptable to the Owner.

1.10 RESTRICTED AREAS

A. Contractor shall use, and maintain in clean condition, site access route as directed.

B. Contractor and all other persons connected to this project shall only use designated parking areas.

1.11 TEMPORARY TOILET

A. The Contractor will furnish a temporary toilet for use of the workmen during construction.

1.12 WASTE REMOVAL AND DISPOSAL

A. Collection and Disposal of Waste: Collect waste from construction and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste materials and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg. F (27dec C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly.

B. Remove waste from site and dispose of materials lawfully.

1.13 WATER CONTROL

A. Comply with EPA storm water pollution elimination program.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site and construction areas from puddling or running water. Provide and maintain pumping equipment and power to keep the site, excavations and building areas free from accumulation of water at all times, whether from rainfall, seepage, drainage or damaged water and drain lines.

PART TWO - PRODUCTS - Not Used

PART THREE - EXECUTION - Not Used

END OF SECTION

SECTION 01 56 00 - TRENCH SAFETY SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Trench safety system for the construction of trench excavation.

B. Trench safety system for structural excavations which fall under provisions of State and Federal trench safety laws.

1.2 DEFINITION

A. A trench shall be defined as a narrow excavation (in relation to its depth) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet.

B. The trench safety system requirements will apply to larger open excavation if the erection of structures or other installations limits the space between the excavation slope and these installations to dimensions equivalent of a trench as defined.

C. Trench Safety Systems include but are not limited to sloping, sheeting, trench boxes or trench shield, sheet piling, cribbing, bracing, shoring, dewatering or diversion of water to provide adequate drainage.

1.3 SUBMITTALS

A. Submit a safety program specifically for the construction of trench excavation. Design the trench safety program to be in accordance with OSHA 29 CFR standards governing the presence and activities of individuals working in and around trench excavation.

B. Construction and shop drawings containing deviations from OSHA standards or special designs shall be sealed by a licensed Engineer retained and paid by Contractor.

C. Review of the safety program by the Architect and/or Owner’s representative, will only be in regard to compliance with this specification and will not constitute approval by the Architect and/or the Owner nor relieve Contractor of obligations under State and Federal trench safety laws.

1.4 REGULATORY REQUIREMENTS

A. Install and maintain trench safety systems in accordance with the detail specifications set out in the provision of Excavations, Trenching, and Shoring, Federal Occupation Safety and Health Administration (OSHA) Standards, 29CFR, Part 1926, Subpart P, as amended, including final Rule, published in the Federal Register Vol. 54, No. 209 on Tuesday, October 31, 1989. The sections that are incorporated into these specifications by referenced include Sections 1926-650 through 1926-652. The Contractor is responsible for obtaining a copy of this section of the Federal Register.

B. Legislation that has been enacted by the Texas Legislature with regard to Trench Safety Systems is hereby incorporated, by reference, into these specifications. Refer to Texas Health and Safety Code Ann., Sect. 756.021 (Vernon 1991).

1.5 INDEMNIFICATION

A. Contractor shall indemnify and hold harmless the Owner, its employees and agents, from any and all damages, costs (including, without limitation, legal fees, court costs, and the cost of investigation), judgments or claims by anyone for injury or death of persons resulting from the collapse or failure of trenches constructed under this Contract.

B. Contractor acknowledges and agrees that this indemnity provision provides indemnity for the Owner in case the Owner is negligent either by act or omission in providing for trench safety, including, but not limited to safety program and design reviews, inspections, failures to issue stop work orders, and the hiring of the Contractor.

PART 2 – PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install and maintain trench safety systems in accordance with provisions of OSHA 29CFR.

B. Install specially designed trench safety systems in accordance with the Contractor's trench excavation safety program for the locations and conditions identified in the program.

C. A competent person, as identified in the Contractor's Trench Safety Program, shall verify that trench boxes and other pre-manufactured systems are certified for the actual installation conditions.

3.2 INSPECTION

A. Contractor, or Contractor's independently retained consultant, shall make daily inspections of the trench safety systems to ensure that the installed systems and operations meet OSHA 29CFR and other personnel protection regulations requirements.

B. If evidence of possible cave-ins or slides is apparent, Contractor shall immediately stop work in the trench and move personnel to safe locations until the necessary precautions have been taken by Contractor to safeguard personnel entering the trench.

C. Maintain a permanent record of daily inspections.

3.3 FIELD QUALITY CONTROL

A. Contractor shall verify specific applicability of the selected or specially designed trench safety systems to each field condition encountered on the project.

END OF SECTION

SECTION 01 57 20 - SOURCE CONTROLS FOR EROSION AND SEDIMENTATION

PART ONE - GENERAL

1.1 COORDINATION

A. Drawings and General provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

B. Cooperation by Contractor for work of this Section of the specifications with all other trades is mandatory, so that all phases of work may be properly coordinated, without delays or damage to any parts of any work.

1.2 SECTION INCLUDES

A. Description of erosion and sediment control and other control-related practices which shall be utilized during construction activities.

PART TWO – PRODUCTS - Not Used

PART THREE - EXECUTION

3.1 PREPARATION AND INSTALLATION

A. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than site work specifically directed by the Owner to allow soil testing and surveying.

B. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately by the Contractor.

C. The Contractor shall be responsible for collecting, storing, hauling, and disposing of spoil, silt, and waste materials as specified in this or other Specifications and in compliance with applicable federal, state and local rules and regulations.

D. Contractor shall conduct all construction operations under this Contract in conformance with the erosion control practices described in this Specification.

E. The Contractor shall install, maintain, and inspect erosion and sediment control measures and practices as specified in this or other Specifications.

3.2 TOPSOIL PLACEMENT FOR EROSION AND SEDIMENT CONTROL SYSTEMS

A. When topsoil is specified as a component of another Specification, the Contractor shall conduct erosion control practices described in this Specification during topsoil placement operations.

1. When placing topsoil, maintain erosion and sediment control systems, such as swales, grade stabilization structures, beams, dikes, waterways, and sediment

basins.
2. Maintain grades which have been previously established on areas to receive topsoil.
3. After the areas to receive topsoil have been brought to grade, and immediately prior to dumping and spreading the topsoil, loosen the subgrade by discing or by scarifying to a depth of at least 2 inches to permit bonding of the topsoil to the subsoil.
4. No sod or seed shall be placed on soil which has been treated with soil sterilants until sufficient time has elapsed to permit dissipation of toxic materials.

3.3 DUST CONTROL

A. Implement dust control methods to control dust creation and movement on construction sites and roads and to prevent airborne sediment from reaching receiving streams or storm water conveyance systems, to reduce on-site and off-site damage, to prevent health hazards, and to improve traffic safety.

B. Control blowing dust by using one or more of the following methods:
1. Mulches bound with chemical binders.
2. Temporary vegetative cover.
3. Spray-on adhesives on mineral soils when not used bytraffic.
4. Tillage to roughen surface and bring clods to the surface.
5. Irrigation by water sprinkling.
6. Barriers using solid board fences, snow fences, burlap fences, crate walls, bales of hay, or similar materials.

C. Implement dust control methods immediately whenever dust can be observed blowing on the project site.

3.4 KEEPING STREETS CLEAN

A. Keep streets clean of construction debris and mud carried byconstruction vehicles and equipment. If necessary to keep streets clean, install stabilized construction exits at construction, staging, storage, and disposal areas. A vehicle/equipment wash area (stabilized with coarse aggregate) may be installed adjacent to the stabilized construction exit, as needed. Release wash water into a drainage swale or inlet protected by erosion and sediment control measures. Construction exist and wash areas are specified in Section 01 57 50 - Stabilized Construction Exit.

B. In lieu of or in addition to stabilized construction exits, shovel or sweep the pavement to the extent necessary to keep the street clean. Water hosing or sweeping of debris and mud off of the street into adjacent areas is not allowed.

3.5 EQUIPMENT MAINTENANCE AND REPAIR

A. Confine maintenance and repair of construction machinery and equipment to areas specifically designated for that purpose. Locate such areas so that oils, gasoline, grease, solvents, and other potential pollutants cannot be washed directly into receiving streams or storm water conveyance systems. Provide these areas with adequate waste disposal

receptacles for liquid as well as solid waste. Clean and inspect maintenance areas daily.

B. On a construction site where designated equipment maintenance areas are not feasible, take precautions during each individual repair or maintenance operation to prevent potential pollutants from washing into streams or conveyance systems. Provide temporary waste disposal receptacles.

3.6 WASTE COLLECTION AND DISPOSAL

A. Contractor shall formulate and implement a plan for the collection and disposal of waste materials on the construction site. In plan, designate locations for trash and waste receptacles and establish a collection schedule. Methods for ultimate disposal of waste shall be specified and carried out in accordance with applicable local, state, and federal health and safety regulations. Make special provisions for the collection and disposal of liquid wastes and toxic or hazardous materials.

B.

C. Keep receptacles and waste collection areas neat and orderly to the extent possible. Waste shall not be allowed to overflow its container or accumulate from day-to-day. Locate trash collection points where they will least likely be affected by concentrated storm water runoff.

3.7 WASHING AREAS

A. Vehicles such as concrete delivery trucks or dump trucks and other construction equipment shall not be washed at locations where the runoff will flow directly into a watercourse or storm water conveyance system. Designate special areas for washing vehicles. Locate these areas where the wash water will spread out and evaporate or infiltrate directly into the ground, or where the runoff can be collected in a temporary holding or seepage basin. Beneath wash areas construct a gravel or rock base to minimize mud production.

3.8 STORAGE OF CONSTRUCTION MATERIALS AND CHEMICALS

A. Isolate sites where chemicals, cements, solvents, paints, or other potential water pollutants are stored in areas where they will not cause runoff pollution.

B. Store toxic chemicals and materials, such as pesticides, paints, and acids in accordance with manufacturers' guidelines. Protect groundwater resources from leaching by placing a plastic mat, packed clay, tar paper, or other impervious materials on any areas where toxic liquids are to be opened and stored.

3.9 DEMOLITION AREAS

A. Demolition activities which create large amounts of dust with significant concentrations of heavy metals or other toxic pollutants shall use dust control techniques to limit transport of airborne pollutants. However, water or slurry used to control dust contaminated with heavy metals or toxic pollutants shall be retained on the site and shall not be allowed to run directly into watercourses or storm water conveyance systems. Methods of ultimate disposal of these materials shall be carried out in accordance with applicable local, state, and federal health and safety regulations.

3.10 SANITARY FACILITIES

A. Provide the construction sites with adequate portable toilets for workers in accordance with Section 01 50 00 - Temporary Facilities and applicable health regulations.

3.11 PESTICIDES

A. Use and store pesticides during construction in accordance with manufacturers' guidelines and with local, state, and federal regulations. Avoid overuse of pesticides which could produce contaminated runoff. Take great care to prevent accidental spillage. Never wash pesticide containers in or near flowing streams or storm water conveyance systems.

END OF SECTION

SECTION 01 57 30 - FILTER FABRIC FENCE

PART ONE - GENERAL

1.1 SECTION INCLUDES

A. Installation of erosion and sediment control filter fabric fences used during construction and until final development of the site. The purpose of filter fabric fences is to contain pollutants from overland flow. Filter fabric fences are not for use in channelized flow areas.

1.2 SUBMITTALS

A. Manufacturer's catalog sheets and other product data on geotextile fabric.

B. Drawing to show details and location(s) of filter fabric fence.

1.3 REFERENCES

A. ASTM D3786 - Standard Test method for Hydraulic Bursting Strength for Knitted Goods and Nonwoven Fabrics.

B. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

PART TWO - PRODUCTS

2.1 FILTER FABRIC

A. Provide woven or nonwoven geotextile filter fabric made of polypropylene, polyethylene, ethylene, or polyamide material.

B. Geotextile fabric shall have grab strength of 100 psi in any principal direction (ASTM D-4632), Mullen burst strength exceeding 200 psi (ASTM D-3786), and the equivalent opening size between 50 and 140.

C. Filter fabric material shall contain ultraviolet inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 degrees F to 120 degrees F.

D. Representative Manufacturers: Mirafi, Inc., or equal.

PART THREE - EXECUTION

3.1 PREPARATION AND INSTALLATION

A. Provide erosion and sediment control systems at the locations shown on Drawings. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on the Drawings and specified in this Section.

B. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than site work specifically directed by the Owner to allow soil testing and surveying.

C. Maintain existing erosion and sediment control systems located within the project site until acceptance of the project or until directed by the Owner to remove and discard the existing system.

D. Regularly inspect and repair or replace damaged components of filter fabric fences as specified in this Section. Unless otherwise directed, maintain the erosion and sediment control systems until the project area stabilization is accepted by the City. Remove erosion and sediment control systems promptly when directed by the Owner. Discard removed materials off site.

E. Remove sediment deposits and dispose of them at the designated spoil site for the project. If a project spoil site is not designated on the Drawings, dispose of sediment off site at a location not in or adjacent to a stream or floodplain. Off-site disposal is the responsibility of the Contractor. Sediment to be placed at the project site should be spread evenly throughout the site, compacted and stabilized. Sediment shall not be allowed to flush into a stream or drainage way. If sediment has been contaminated, it shall be disposed of in accordance with existing federal, state, and local rules and regulations.

F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately.

G. Conduct all construction operations under this Contract in conformance with the erosion control practices described in Section 01 57 20 - Source Controls for Erosion and Sedimentation.

3.2 CONSTRUCTION METHODS

A. Provide filter fabric fence systems in accordance with the Drawing detail for Filter Fabric Fences. Filter fabric fences shall be installed in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated.

B. Attach the filter fabric to 1-inch by 2-inch wooded stakes spaced a maximum of 3 feet apart and embedded a minimum of 8 inches. If filter fabric is factory preassembled with support netting, then maximum spacing allowable is 8 feet. Install wooden stakes at a slight angle toward the source of anticipated runoff.

C. Trench in the toe of the filter fabric fence with a spade or mechanical trencher so that the downward face of the trench is flat and perpendicular to the direction of flow. The v-trench configuration as shown on the Drawings may also be used. Lay filter fabric along the edges of the trench. Backfill and compact trench.

D. Filter fabric fence shall have a minimum height of 18 inches and a maximum height of 36 inches above natural ground.

E. Provide the filter fabric in continuous rolls and cut to the length of the fence to minimize the use of joints. When joints are necessary, splice the fabric together only at a support post with a minimum 6-inch overlap and seal securely.

F. Inspect sediment filter barrier systems after each rainfall, daily during periods of prolonged rainfall, and at a minimum once each week. Repair or replace damaged sections immediately. Remove sediment deposits when silt reaches a depth one-third the height of the fence or 6 inches, whichever is less.

END OF SECTION

SECTION 01 57 50 - STABILIZED CONSTRUCTION EXIT

PART ONE – GENERAL

1.1 SECTION INCLUDES

A. Installation of erosion and sediment control for stabilized construction exits used during construction and until final development of thesite.

1.2 SUBMITTALS

A. Manufacturer's catalog sheet and other product data on geotextile fabric.

B. Sieve analysis of aggregates conforming to requirements of these Specifications.

C. Drawing to show details and location(s) of stabilized exit.

1.3 REFERENCES

A. ASTM Df4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

PART TWO – PRODUCTS

2.1 GEOTEXTILE FABRIC

A. Provide woven or nonwoven geotextile fabric made of either polypropylene, polyethylene, ethylene, or polyamide material.

B. Geotextile fabric shall have a minimum grab strength of 270 psi in any principal direction (ASTM D-4632), and the equivalent opening size between 50 and 140.

C. Both the geotextile and threads shall be resistant to chemical attack, mildew, and rot and shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable life at a temperature range of 0 degree F to 120 degree F.

D. Representative Manufacturers: Mirafi, Inc., or equal.

2.2 COARSE AGGREGATES

A. Coarse aggregate shall consist of crushed stone, gravel, crushed blast furnace slag, or a combination of these materials. Aggregate shall be composed of clean, hard, durable materials free from adherent coatings, salt, alkali, dirt, clay, loam, shale, soft or flaky materials, or organic and injurious matter.

B. Coarse aggregates shall conform to the following gradation requirements.

Sieve Size (Square Mesh)	Percent Retained (By Weight)
2-1/2"	0
2"	0 - 20
1-1/2"	15-50
3/4"	60 - 80
No. 4	95 - 100

PART THREE - EXECUTION

3.1 PREPARATION AND INSTALLATION

A. Provide erosion and sediment control systems at the locations shown on the approved submittal. Such systems shall be of the type indicted and shall be constructed in accordance with the requirements shown on the approved submittal and specified in this Section.

B. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than as specifically directed by the Owner to allow soil testing and surveying.

C. Maintain existing erosion and sediment control systems located within the project site until acceptance of the project or until directed by the Owner to remove and discard the existing system.

D. Regularly inspect and repair or replace components of stabilized construction exits. Unless otherwise directed, maintain the stabilized construction roads and exits until the project is accepted by the City. Remove stabilized construction roads and exits promptly when directed by the Owner. Discard removed materials off site.

E. Remove sediment deposits and dispose of them at the designated spoil site for the project. If a project spoil site is not designated on the Drawings, dispose of sediment off site at location not in or adjacent to a stream or flood plain. Off-site disposal is the responsibility of the Contractor. Sediment to be placed at the project site should be spread evenly throughout the site, compacted and stabilized. Sediment shall not be allowed to flush into a stream or drainage way. If sediment has been contaminated, it shall be disposed of in accordance with existing federal, state and local rules and regulations.

F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights of way and easements for construction. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately.

G. Conduct all Construction operation under this Contract in conformance with the erosion control practices described in the Specification 01 56 60 – Source Controls for Erosion and Sedimentation.

3.2 CONSTRUCTION METHODS

A. Provide stabilized access roads, subdivision roads, parking areas, and other on-site vehicle transportation routes where shown on Drawings.

B. Provide stabilized construction exits, and truck washing areas when approved by City Engineer, of the sizes and locations where shown on Drawings or as specified in this Section.

C. Vehicles leaving construction areas shall have their tires cleaned to remove sediment prior to entrance onto public right-of-way. When washing is needed to remove sediment, Contractor shall construct a truck washing area. Truck washing shall be done on stabilized areas which drain into a drainage system protected by erosion and sediment control measures.

D. Details for stabilized construction exit shall comply with these specifications and approved submittal drawing. Construction of all other stabilized areas shall be to the same requirements. Roadway width shall be at least 14 feet for one-way traffic and 20 feet for two-way traffic and shall be sufficient for all ingress and egress. Furnish and place geotextile fabric as a permeable separator to prevent mixing of coarse aggregate with under laying soil. Exposure of geotextile fabric to the elements between lay down and cover shall be a maximum of 14 days to minimize damage potential.

E. Roads and parking areas shall be graded to provide sufficient drainage away from stabilized areas. Use sandbags, gravel, boards, or similar methods to prevent sediment from entering public right-of-way, receiving stream or storm water conveyance system.

F. The stabilized areas shall be inspected and maintained daily. Provide periodic top dressing with additional coarse aggregates too maintain the required depth. Repair and clean out damaged control measures used to trap sediment. All sediment spilled, dropped, washed, or tracked onto public right-of-way shall be removed immediately.

G. The length of the stabilized area shall be as shown on the Drawings, but not less than 50 feet. The thickness shall not be less than 8 inches. The width shall not be less than full width of all points of ingress or egress.

H. Stabilization for other areas shall have the same course aggregate, thickness, and width requirements as the stabilized construction exit, except where shown otherwise on the Drawings.

I. Stabilized area may be widened or lengthened to accommodate truck washing area when required.

J. Alternative methods of construction may be utilized when shown on Drawings, or when approved by the Owner. These methods include the following:

1. Cement-Stabilized Soil - Compacted cement-stabilized soil or other fill material in an application thickness of at least 8 inches.
2. Wood Mats/Mud Mats - Oak or other hardwood timbers placed edge-to- edge and across support wooden beams which are placed on top of existing soil in an application thickness of at least 6 inches.
3. Steel Mats - Perforated mats placed across perpendicular support members.

END OF SECTION

SECTION 01 60 00 - MATERIALS AND EQUIPMENT

PART ONE - GENERAL

1.1 COORDINATION

A. Drawings and General provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 RELATED SECTIONS

A. Document 01 63 30: Substitution of Products.

1.3 PRODUCTS

A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

B. Provide interchangeable components of the same manufacturer, for components being replaced.

C. Products include material, equipment and systems.

D. Comply with Specifications and referenced standards as minimum requirements.

E. All products shall be new and suited to the use intended except where noted otherwise.

F. All products shall be free of all logos on surfaces exposed to view in the finished work.

G. The use of products containing asbestos will not be acceptable.

1.4 VERIFICATION OF NON-CONTAMINATION

A. For all of the materials provided, submit a copy of certification completed by the Contractor and installing Subcontractor, and a letter form the manufacturer indicating that products are totally free of asbestos.

1.5 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer’s instructions.

B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement or damage.

1.6 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers’ instruction, with seals and labels intact and legible.

B. Store sensitive Products in weather tight, climate controlled enclosures.

C. For exterior storage of fabricated Products, place on sloped supports, above ground.

D. Provide bonded off-site storage and protection when site does not permit on-site storage or protection with prior approval of the owner and Architect.

E. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of Product.

F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement or damage.

H. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.7 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers. Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.8 SUBSTITUTIONS

A. Document 01 63 30 specifies time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this section.

B. Architect will not consider requests for Substitutions after date of Owner- Contractor Agreement unless a Product becomes unavailable through no fault of the Contractor.

C. Contractor must document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Contractor:
   1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
   2. Will provide the same warranty for the Substitution as for the specified Product.
   3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse Owner for review or redesign services associated with re- approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:
   1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.

2. Submit shop drawings, product data and certified test results attesting to the proposed Product equivalence. Burden of proof is on Proposer.
3. The Architect will notify Contractor in writing of decision to accept or reject request.

PART TWO - PRODUCTS - Not Used

PART THREE - EXECUTION - Not Used

END OF SECTION

SECTION 01 63 30 – SUBSTITUTIONS

1.1 GENERAL

A. In addition to requirements of AIA Document A201-2007 General Conditions and other Contract Conditions, this section includes administrative and procedural requirements for processing Substitutions.

1.2 RELATED SECTIONS

A. Document 01 60 00 – Materials and Equipment

1.3 SUBSTITUTION REQUEST AND PROCEDURES

A. A reproduction of "Substitution Request Form" specified in Section 01 63 31 must be used and completely filled in for each request for substitution.
   1. A substitution will not be considered with incomplete request forms.
   2. Requirements of this section form a part of the Contractor's request.
   3. The burden of proof of the merit of the proposed substitution is upon the proposer.
   4. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

B. If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum.
   1. Bidders shall not rely upon approvals made in any other manner.

C. Review Time: In scheduling, allow a minimum of 10 working days for Architect's review.
   1. Will issue a modification to Contract Documents indicating his decision to accept or reject the requested substitutions.

D. For approved substitutions, submit shop drawings, product data, and samples in accordance with Section 01 33 00.

E. Substitutions will not be considered:
   1. Unless there is a cost advantage to Owner. (Without cost advantages, substitutions are not acceptable).
   2. When indicated on shop drawings or product data submittals without separate formal request complying with "submittal procedures" specified in this section.
   3. When requested directly by Sub-Contractor or supplier.

F. Substitute products shall not be ordered or installed without written acceptance.

END OF SECTION

Advancement of Construction Technology

SUBSTITUTION REQUEST
(During the Bidding Phase)

Project: Ft. Bend County - South Post Oak Sportsplex
Baseball Fields Upgrades - Phase II

Substitution Request Number: _____

From: _____

To: IDG+ Architects

Date: _____

A/E Project Number: 6001-02

Re: _____

Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____ ***Signature required .***

Firm: _____

Address: _____

_____

Telephone: _____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SECTION 01 71 00 - CLEANING

1.1 GENERAL

A. In addition to requirements of AIA Document A201-2007 General Conditions and other Contract Conditions, this section includes procedures for the following:

1. Cleaning during construction operations.
2. Final cleaning prior to building occupancy.

B. For Contract Closeout: Coordinate with requirements specified in Division 01.

1.2 DURING CONSTRUCTION

A. General: Comply safety standards, antipollution laws and other regulatory agencies, including but not limited to requirements of this section and Contract Documents.

1. Prior to painting and other finish work, broom clean areas where work is performed.
2. Legally dispose of rubbish, debris, waste and excess materials; do not burn or bury on Project site.
3. Do not discharge volatile, harmful or dangerous materials into drainage systems.
4. Do not dispose of volatile waste such as mineral spirits, oil and paint thinner in storm drains or sanitary sewer.
5. Minimize handling of materials. Do not drop or throw materials from heights.
6. Maintain all cleaning operations until Final Completion.

B. Trash Containers: Provide on-site containers for collection of waste materials, debris and rubbish. Type, quantity and capacity of containers shall be as required to accommodate anticipated needs.

C. Premises, Public Properties, Streets: Maintain free from accumulations of waste, debris, rubbish and other trash caused by construction operations.

1. Keep public streets clean from mud, debris and other materials removed from Project site.
2. Promptly remove mud, dirt, trash, etc., from public streets which has been tracked by vehicles.
3. Exterior Paved Areas on Project Site: Sweep clean; remove stains, spills and foreign Substances.

D. Hazard Control: Prevent accumulation of waste which might cause hazardous conditions.

1. Store volatile wastes in covered metal containers and remove from premises daily.
2. Provide adequate ventilation during use of volatile and noxious substances.

1.3 FINAL CLEANING

A. Cleaning operations shall be complete before requesting inspection for Certification of Substantial Completion.

1. Employ experienced workers or professional cleaners for final cleaning.
2. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, new painted surfaces.

3. Maintain all cleaning operations until Final Completion.

B. Labels: Remove types which are not scheduled to remain permanent.

C. Floor Finishes: Coordinate with requirements of individual technical specifications sections of this Project Manual.

1. Comply with manufacturer's published instructions and recommended cleaning materials.
2. Concrete Floors: Leave broom clean.
3. Carpet: Vacuum clean.
4. Clean each type of floor finish to a dust-free condition, free of stains, films and similar foreign substances.
5. Continue broom cleaning on an as-needed basis until building is ready for occupancy.
6. Wet down dry materials and rubbish to prevent dust.

D. Glass and Glazing: Coordinate with requirements of individual technical specification sections of this Project Manual.

1. Clean all interior and exterior glass, including glazing compounds and other noticeable substances.
2. Clean mirrors.
3. Replace chipped or broken mirrors, glass and other transparent materials.

E. Interior Walls, Ceilings, Miscellaneous Finishes: Coordinate with requirements of individual technical specifications sections of this Project Manual.

1. Comply with manufacturer's published instructions and recommended cleaning materials.
2. Clean all surfaces to a dust-free conditions, free of stains, films and similar foreign substances.
3. Marred Surfaces: Repair, patch, and touch up to specified finish and to match adjacent surfaces.

F. Equipment, Fixtures, Filters: Coordinate with requirements of individual technical specifications sections of this Project Manual.

1. Clean surfaces of equipment; remove excess lubrication.
2. Plumbing Fixtures: Clean to a sanitary condition.
3. Clean light fixtures and lamps.
4. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction.
5. Clean ducts, blowers, and coils when units have been operated without filters during construction.

G. Debris, Rubbish, Dirt, etc: Remove from all locations including the following:

1. Open concealed spaces, chases and above ceilings.
2. Roofs, gutters, areaways, and drainage systems.

H. Prior to Final Completion, or Owner Occupancy: General Contractor shall conduct an inspection of the Project site, exposed interior and exterior surfaces of building, and all work areas to verify that the entire work is clean.

END OF SECTION

SECTION 01 74 00 – WARRANTIES

1.1 GENERAL

A. In addition to requirements of AIA Document A201-2007 General Conditions and other Contract Conditions, this section includes general administrative and procedural requirements for warranties required by the Contract Documents.

1. Refer to General Conditions for terms of Contractor's warranty of workmanship and materials.
2. General closeout requirements are included in Section 01 78 00 – Closeout Procedures.
3. Specific requirements for warranties for the Work, and products and installations that are specified to be warranted, are included in the individual Sections of Division 2 through 16.
4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

B. Disclaimers & Limitations: Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

C. Warranty Periods: The following are typical warranty periods required for this Project. A warranty with a longer period of time specified in an individual section of Division 2 through 16 shall supersede a typical warranty period:

1. One-year complete workmanship and materials warranty for all phases of work.
2. Two-year watertight warranty.
3. Five-year compressor warranty.

1.2 DEFINITIONS

A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.3 WARRANTY REQUIREMENTS

A. The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the work will be free from defects not inherent in the quality required or permitted, and that the work will conform with the requirements of the Contract Documents.

1. Work not conforming to these requirements, including Substitutions not properly approved and authorized, may be considered defective.
2. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

B. Related Damages & Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

C. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement.

1. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

D. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents.

1. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefitted from use of the Work through a portion of its anticipated useful service life.

E. Owner's Recourse:

1. Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
2. The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
3. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that unites required to countersign such commitments are willing to do so.

1.4 SUBMITTALS

A. Submit written warranties to Architect prior to the date certified for Substantial Completion.

1. If Architect's Certificate of Substantial Completion designates a commencement date for warranties other than date of Substantial Completion for Work, or a designated portion of the Work, submit written warranties upon request of Architect.
2. When a designated portion of the Work is completed and occupied or used by Owner, by separate agreement with the Contractor during construction period, submit properly executed warranties to Architect within 15 days of completion of that designated portion of the Work.

B. When a special warranty is required to be executed by the Contractor, or by the Contractor and a Subcontractor, Supplier or Manufacturer, a written document shall be prepared to contain the appropriate terms and identification, ready for execution by the required parties.

1. Submit a draft to the Owner, through the Architect, for approval prior to final execution.
2. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or the Contractor and subcontractor, supplier or manufacturer.
3. Refer to individual Sections of Division 2 through 16 for specific content requirements, and particular requirements for submittal of special warranties.

C. Form of Submittal: At Final Completion compile two copies of each required warranty properly executed by the Contractor, or by the Contractor, Subcontractor, Supplier, or Manufacturer.

1. Organize the warranty documents into an orderly sequence based on the Table of Contents of this Project Manual.

D. Bind the warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.

1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation, including the name of the product, and the name, address and telephone number of the Installer.
2. Identify each binder on the front and the spine with the typed or printed title "Warranties", the Project title or name, and the name of the Contractor.

E. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

1. Coordinate with Section 01 33 00 -Submittals.

END OF SECTION

SECTION 01 78 00 - CLOSEOUT PROCEDURES

PART ONE - GENERAL

1.1 COORDINATION

A. Drawings and General provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

B. Cooperation by Contractor for work of this Section of the specifications with all other trades is mandatory, so that all phases of work may be properly coordinated, without delays or damage to any parts of any work.

1.2 SUBSTANTIAL COMPLETION

A. When the Project, or specified areas of the Project, has reached Substantial Completion as defined in General Conditions of the Contract for Construction, Document 00700, Article 9.8, send written notice to Architect.

B. Architect and Owner will make a preliminary review of the project to determine the status of completion and prepare a list of items ("Punch List") requiring completion or correction. The list prepared by the Architect and Owner will supplement the list prepared by the Contractor in accordance with subparagraph 9.8.2 of the General Conditions.

C. If the Architect should not concur in the Contractor's claim of Substantial Completion, he will notify Contractor, who shall complete the Work to the point of Substantial Completion and send written notice to the Architect.

D. Architect will make inspection with Owner's Representative once the Work is at the point of Substantial Completion.

E. If the project is Substantially Complete, as determined by the Architect, the Architect will issue a Certificate of Substantial Completion AIA Document G704, for the approval and acceptance of the Owner and Contractor accompanied by a list of items to be completed.

F. All work requiring completion or correction upon Substantial Completion shall be completed and inspected for acceptance prior to final completion.

1.3 WARRANTIES, INSTRUCTIONS AND SCHEDULES

A. Instruct Owner's representative in the operation of mechanical, electrical, and other systems or equipment installed under this contract.

B. Deliver keys to Owner with keying schedule, master, sub-master, special keys. Obtain receipt signed by the Owner.

C. Deliver to Architect written warranties, certificates of inspections and bonds, prepared in triplicate, for review and delivery to Owner.

1.4 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Within building areas affected by construction clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to a sanitary condition.

D. Clean or replace filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces. Patch or repair existing surfaces damaged during construction operations to the satisfaction of the Owner.

G. Remove waste and surplus materials, rubbish, and temporary construction facilities from the site following the final test of utilities and completion of the work.

1.5 REPAIRS

A. Restore areas of the site used for storage, staging and temporary field office to existing condition.
   1. Repair and patch paving, curbs and walks damaged during construction operations; re-stripe parking areas.
   2. Restore landscaped areas to original condition; replace damaged plants and trees and replant lawn areas.

B. Clean or repair exterior surfaces of existing buildings to original conditions id damaged or soiled during construction operations.

1.6 RECORD PRINTS/RECORD DOCUMENTS

A. Contractor shall provide full set of Record Drawings which clearly show all differences between the Contract Work as drawn and as installed, for all work, as well as work added to the Contract which is not indicated on the Contract Drawings.

B. Contractor shall pay special attention to the exact placement, depth, slopes and directional changes of underground and above ceiling piping, ductwork, conduit, etc., and document as installation is made.

C. Contractor shall maintain complete set of black line prints at the jobsite. These Record Prints shall be kept legible and current and shall be available for inspection at all times by the Architect. All changes in the Contract Work, or work added, shall be recorded in the Record Prints in a contrasting color.

D. In showing changes in the Work, or added work, use the same symbols and drafting quality as used in the Contract Drawings. If no change is required on a sheet, a notation will be made in the lower right hand corner of the drawings, "No Changes". The Contractor shall pay the cost of required drafting.

E. Record Drawings shall contain the names, addresses and phone numbers of the Contractor and subcontractors preparing the drawings and shall be signed by the Contractor and sub-contractors.

1.7 DEMONSTRATION AND INSTRUCTIONS

A. Instruct and demonstrate operation and maintenance of products and to systems to the Owner's representative prior to date of Substantial Completion.

B. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with the Owner in detail to explain all aspects of operation and maintenance.

C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.

D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.8 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch text pages, using three ring binders with durable plastic covers.

B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUC-TIONS", title of project, and subject matter of binder when multiple binders are required.

C. Organize and assemble each manual with a title sheet directly following the front cover listing the Project title and address, name of Owner, and date of submittal.

D. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

E. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on white paper, in three parts as follows:
   1. Part 1: Directory listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment manufacturer's identification including model number and serial number.
      c. Spare parts list, a list of recommended stock of parts, and location of local parts and service centers for each component.
      d. Operating instructions.
      e. Complete wiring diagrams.
      f. Valve list and directory.
      g. Performance data and rating tables.
      h. Maintenance instructions for equipment and systems.
      i. Maintenance instructions for finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data of products actually furnished and installed.
      b. Air and water balance reports
      c. Certificates
      d. Photocopies of warranties

4. Reference Specification Sections in Divisions 15 and 16 for additional requirements for mechanical, electrical and plumbing operation and maintenance data and manuals.

1.9 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.10 STORM LINES

A. Upon completion of the project and before Final Acceptance will be made, Contractor shall use an electric sewer router, cleaning machine to ream out all sanitary and storm sewer lines installed under this Contract. Contractor shall use a cleaning head same size as pipe up through 4" pipe size and a 4" cleaning head for sewer lines 4" and larger. Contractor shall demonstrate to Owner's inspector that all lines are free and clear of obstructions for proper sewer operation. If any deficiencies or obstructions are found to exist, they shall be corrected before requesting final inspection.

1.11 FINAL INSPECTION

A. Notify Owner in writing when Project is finally complete, above requirements have been met, and all punch list items have been completed. Architect and Owner will make final inspection and notify the Contractor whether Project is complete.

1.12 RELEASE OF LIENS

A. Deliver to Owner a blanket Release of Liens, AIA Document G706, covering all work under the Contract, including all subcontractors, labor, materials and services, executed by an authorized officer and duly notarized; also, provide one original and two copies of Releases of Liens from all subcontractors and major vendors and materials suppliers.

1.13 CERTIFICATE OF COMPLIANCE

A. The Contractor will furnish with the request for Final Payment a Certificate of Compliance which shall include the following:
   1. All permit numbers.
   2. Utility release dates.
   3. That the building has been duly inspected by governing authorities and found to comply with all code requirements and ordinances.
   4. That the local authority has issued a certificate of occupancy.
   5. That no asbestos containing materials have been installed in the Work.

1.14 WARRANTIES

A. Provide one original and two copies of warranties.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in three ring binders with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal

within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.15 FINAL PAYMENT

A. Submit Final Application for Payment after Architect acknowledges completion of Project; indicating adjustment of accounts including original Contract Sum, additions, and deductions as included on Change Orders, deductions for cash allowance balances, deductions for uncorrected work, deductions for liquidated damages, etc.

B. Submit Consent of Surety Company to Final Payment, AIA, Document G707.

C. Owner will issue final Certificate for Payment upon completion of Project and proper execution of all required documents.

1.16 POST CONSTRUCTION

A. Prior to the expiration of the Contractor's one year period for correction of work, Contractor will make a visual inspection of the Project, accompanied by the Owner to observe any work which may require correction or replacement under the Contractor's guarantee.

B. Contractor shall notify Owner 30 days prior to end of correction period.

C. Execute promptly such corrective measures as required to eliminate deficiencies as may be identified.

PART TWO - PRODUCTS - Not Used

PART THREE - EXECUTION - Not Used

END OF SECTION

SECTION 02 07 00 - DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and provisions of the Construction Contract, including General and Special Conditions and Division 1 Specifications Sections, apply to this Section.

1.2 SUMMARY

A. This Section requires the protection and retention of certain building systems and elements and the removal of others. The Drawings indicate the areas that shall remain and the location of elements and materials to remain. This section describes salvage and protection methods.

1. Work of this section shall be coordinated with the Owner's use of the property and facilities.

1.3 NOT USED

1.4 QUALITY ASSURANCE

A. The work of this section shall be performed by a company which specializes in the type of demolition work required for this Project, with a minimum of 5 years of documented successful experience and shall be performed by skilled workmen thoroughly experienced in the necessary crafts.

1. Work shall be performed in compliance with Owner's insurance underwriters' requirements.

B. This demolition work seeks to clear the site for other uses.

1. Perform all demolition, including that specified elsewhere, so that no damage occurs to elements indicated to remain in place.

1.5 SUBMITTALS

A. Submit the following according to Conditions of the Construction Contract and Division 1 Specification Sections.

B. Schedule: Shall indicate proposed methods, temporary construction procedures, and complete sequence of operations for demolition work, including, but not limited to the following:

1. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.

2. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's tenants on-site 24-hour operations.

3. Coordinate with Owner's continuing occupation of portions of the site and with Owner's partial occupancy of areas where demolition work has been completed.

4. Provide description of proposed measures to protect elements and areas designated to remain in place during demolition and construction.

5. Provide details of interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of elements to remain.

6. Provide description of proposed disposal methods.

C. Permits/Certificates:

1. Authorizing demolition.

2. Authorizing transport and disposal of debris.

3. Authorizing severance of utility service to areas of Project site not scheduled for continuous operation.

D. Photographs: Shall indicate existing conditions of structure, surfaces, and adjacent buildings that might be misconstrued as damage related to demolition. File with Owner prior to start of work.

1. Provide photographs of existing conditions of basement walls and transformer vault prior to demolition. File with Owner.

E. Hazardous Materials Notification: In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by the Owner, a "Material Safety Data Sheet" (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.

F. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB), using format in Article 8 of Special Conditions.

1.6 JOB CONDITIONS

A. Occupancy: Owner will occupy portions of the site immediately adjacent to areas of demolition.

1. Conduct demolition work in manner that will minimize need for disruption of Owner's normal operations.

2. Conduct demolition work in manner that will not disrupt or interrupt the Owner's continuous operations.

3. Provide minimum of 72 hours advance notice to Owner of demolition activities that will affect Owner's normal operations.

B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.

1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable.

C. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses.

1. Storage or sale of removed items on site will not be permitted.

D. Explosives: Use of explosives will not be permitted.

E. Protections: Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from injury due to demolition work.

1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to occupied portions of site.

2. Erect temporary covered passageways as required by authorities having jurisdiction or as indicated on the drawings. Relocate such passages as necessary to facilitate the progression of demolition.

3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.

4. Protect from damage existing walls, vaults and equipment that is to remain in place and becomes exposed during demolition operations.

5. Protect basement floor with suitable coverings when necessary.

6. Construct temporary insulated dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.

7. Remove protections at completion of work unless directed otherwise.

F. Damages: Notify Owner if damage has occurred to adjacent facilities. Promptly repair damages caused to adjacent facilities by demolition work.

G. Traffic: Conduct demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

1. Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without prior written permission from authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if and as required by governing regulations.

H. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials.

1. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations.

2. Provide and maintain portable fire suppression devices during flame-cutting operations.

I. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.

1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and governing authorities.

2. Maintain fire protection services as required by Owner and governing regulations, during demolition operations.

J. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration.

1. Comply with governing regulations pertaining to environmental protection.

2. Do not use water when it may create hazardous or objectionable conditions such as flooding, and pollution, or interruption of services to adjacent owner occupied areas, or could damage existing items and construction to remain or be salvaged.

K. Life Safety: Provide new and maintain existing Life Safety services as required by governing authorities.

L. Noise: Work with noise-producing equipment is subject, at all times, to Owner's approval of entire procedure.

M. Contractor shall acknowledge that roofing materials including built up roofing materials and penthouse flashing may contain asbestos. Contractor shall comply with all OSHA regulations and dispose of as required by specific landfill.

1.7 WARRANTY

A. Comply with General Conditions.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyls (PCBP) or other hazardous materials identified by the Owner.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.

1. Cease operations and notify Owner immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

B. Protect floor to remain with suitable coverings to prevent damage and deterioration during demolition and subsequent construction.

C. Locate, identify, stub off, and disconnect utility services, including but not limited to electricity, water, telephone, gas, steam, hot water and chilled water, that are not indicated to remain.

1. Provide and maintain bypass utility connections as necessary to provide continuity of utility services to remaining areas of building.

2. Provide minimum of 72 hours advance notice to Owner if shutdown of service is necessary.

3.2 DEMOLITION

A. Perform demolition work in a systematic manner. Use such methods as required to complete work indicted on Drawings in accordance with demolition schedule and governing regulations.

1. Sequence demolition work to insure that Owner occupied areas are not disrupted.

2. Remove debris and lower to ground by means of hoists, derricks, or other suitable methods to limit air pollution.

3. Demolish concrete and masonry in small sections. Cut concrete, tile, plaster, metal and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools. Use methods which will terminate surfaces in a straight line at a natural point of division.

4. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing. Refer also to Article 1.06.

5. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

6. Demolish foundation walls to a depth below existing ground surface as shown. Demolish and remove below-grade wood or metal construction. Break up below-grade concrete slabs.

7. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or column. Use power saw where possible.

B. Completely remove down to the existing basement structure the following items from the site:

1. Floor finishes.

2. Ceiling systems.

3. Interior partitions including but not limited to plaster, drywall and hollow clay tile.

4. Mechanical equipment, fixtures and distribution systems.

5. Electrical equipment, fixtures and distribution systems.

6. Plumbing equipment, fixtures and distribution systems.

7. Doors, door frames and hardware.

8. Transoms and hardware.

C. Vermin Control: Employ a certified, licensed exterminator and treat entire area of demolition and removal in accordance with governing health regulations for rodent and insect control at regular intervals as required and approved by Owner.

3.3 SALVAGED MATERIALS

A. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance, remain property of Owner. Immediately notify Owner if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

B. Use the smallest and least powerful tools practical for demolition around elements which are to remain or for removal of elements to be salvaged.

1. Do not damage substrate or structural elements which support materials and elements which are to remain in place.

2. If the removal of substrate or structural material is necessary to assure that an element will remain intact and can be reinstalled in new work, remove substrate or structural material.

3. Handle structural elements to be salvaged with care, using tools and equipment which will not damage them.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.

1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution. Refer also General and Special Conditions.

2. Burying or burning of removed materials is not permitted on Project site.

3.5 CLEANUP AND REPAIR

A. Upon completion of demolition work, remove tools, equipment, and demolished materials from site.

B. Remove protections and leave interior areas broom clean.

C. Repair demolition performed in excess of that required at no cost to Owner.

1. Return elements of construction and surfaces to remain to condition existing prior to start of operations.

2. Repair adjacent construction or surfaces soiled or damaged by demolition work.

3.6 SAFETY PRECAUTIONS

A. At the completion of the Work, the Contractor shall leave in place and in working condition all safety precautions erected or maintained as required by governing regulations or as directed by the Owner.

END OF SECTION

SECTION 02 20 00 - SITE PREPARATION

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Furnishing of all labor, tools, equipment and incidentals required to complete the work.
- B. Layout of work.
- C. Removal of vegetation.
- D. Topsoil stripping.
- E. Clearing and grubbing.
- F. General site excavation.
- G. Removing below-grade improvements.

1.2. RELATED SECTIONS:
- A. Section 31 20 00 - Earthwork

1.3 REFERENCED STANDARDS:

Meet requirements and recommendations of applicable portions of Standards listed.
- A. ASTM D698 - Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 lb/ft;).
- B. ASTM D4972 - pH of Soil
- C. ASTM G57 - Field Measurement of Soil Resistivity Using the Wenner Four Electrode Method.
- D. ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- E. Texas Department of Transportation Standard Specifications of Construction of Highways, Streets, and Bridges, 1993, TxDOT.
- F. North Central Texas Council of Governments Standard Specifications for Public Works Construction, 1991, Edition, NCTCOG.

1.4 SUBMITTALS:
- A. Samples:
  1. Provide adequate samples for determination of moisture density relationships and Plasticity Index (P.I.) Of on-site materials, imported fill material and drainage aggregate.
- B. Tests Reports: Submit complete laboratory analysis of soil material proposed for fill material.
  1. Establish moisture density relationship of in-place sub-grade in accordance with ASTM D-698.
  2. Establish moisture density relationship of proposed select fill(s) material in accordance with ASTM D-698.
  3. Perform PI test on proposed select fill material to confirm conformance with the project specifications in accordance with ASTM D-4318.

1.5 JOB CONDITIONS:
- A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walk, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the Architect.
- B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING:
The designated area shall be cleared of all trees, brush, shrubbery, plants, etc., not indicated on the plans to be preserved.

3.2 GENERAL SITE EXCAVATION
A. The term "building area" shall mean the area generally within a line 5 feet from all exterior building wall lines and includes walks abutting the building or walks within the "building area".
B. The entire building and paving site shall be cleaned of all debris, vegetation, organic matter, concrete and asphalt paving to a depth of 4" minimum before excavation is begun.
C. Perform the necessary cutting of the site to establish the grade indicated on the Grading Plan. Cutting shall be sufficiently deep to allow for fill materials to be placed on top of cut area with the finish top soil or paving material to attain the final finish grades.
D. After acceptance of exposed cut surfaces by the Testing Laboratory, the exposed surface shall be proof-rolled. Soft, loose areas shall be removed to a level of stiff or dense soil. Backfill with acceptable select fill, moisture condition and compact as required by these specifications and the plans.
E. Areas designated for planting or within the limit of construction not covered by building or pavements shall be held down 6" below finish grade for topsoil placement.

F. General Demolition: Shall consist of removal and disposal of obstructions visible at the ground surface. Remove all such excavated materials from site.

G. Unauthorized Excavation: Consists of removal of materials beyond indicated subgrade elevations or dimensions without prior approval by Architect. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering required top elevation. Backfill and compact unauthorized excavations as specified for authorized excavations of same classification.

3.3 BACKFILL AND FILL - GENERAL:
A. Surface Preparation for Fill: Scarify soil to a depth of 6", moisture condition the soil at optimum moisture. Compact to 95% of Standard Proctor at moisture contents at or above the Proctor optimum.
B. Backfill and Fill: Place backfill and Select Fill materials in 8" loose lift. Before compaction, bring soil to optimum moisture. Compact each layer to required percentage of maximum density for each area of classification. Do not place backfill or fill material on surfaces that are muddy or frozen.

3.4 GRADING: Uniformly grade all areas including adjacent transition areas and at all miscellaneous ground structures, curbs and walks, grade surrounding area uniformly to top of curb, walk or structure unless shown otherwise.
A. Finish Grading: Grade area adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces to be free from irregular surface changes.
B. Topsoil: Where areas are designated as planting, hold down subgrade 6". Fill with topsoil to required finish grade or to top of surrounding ground structure. Top soil shall be placed to a depth of 6", spread and hand raked to required finish grades. Top soil shall be placed over all fill areas, areas designated as planting and all areas not covered by building or pavement included in this contract. Coordinate topsoil placement and requirements with landscape work.

3.5 MAINTENANCE:

A. Protect newly graded areas from traffic and erosion and keep free of trash and debris.
B. Repair and re-establish grades in settled, eroded and rutted areas to required finish elevations.
C. When completed, compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape and compact to the required density prior to further construction.

3.6 FIELD QUALITY CONTROL :

A. Perform in-place density tests on each lift of compacted subgrade or fill in accordance with ASTM D-698 at the rate of one test per 2,500 sf.

3.7 DISPOSAL OF SPOILAGE AND CLEANOUT :

A. All materials excavated or scheduled to be removed from the site, including, but not limited to concrete paving, asphalt paving, natural soils, abandoned utilities, rock, etc. shall be legally disposed off the site by the Contractor.
B. During the course of the construction, the site shall be maintained free of excavated materials, spoilage, etc. and shall be kept clean and neat at all times.

END OF SECTION

SECTION 02 37 00 - DRILLED PIERS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS: Work of this section shall conform to the requirements of the General Requirements, General conditions and Supplemental Conditions.

1.2 DESCRIPTION OF WORK:

A. The extent of drilled piers is shown on the Contract drawings, including locations, diameters of shafts, estimated bottom elevations, top elevations, depth of rock/soil strata sockets and details of construction.

B. Work Included: Drilled pier work includes, but is not limited to, the following principal items.

1. Excavation for all drilled piers, including removal of all existing concrete slabs, foundations and other obstructions as required.

2. Steel drilled pier shells.

3. Reinforcing steel, furnishing and installing all drilled pier reinforcing steel including dowels extending above top of drilled pier shaft.

4. Concrete for drilled piers.

5. Disposal of materials excavated from drilled piers.

6. Providing temporary "grout bells" or other methods to stabilize the silt strata, where required, for installing the permanent bells.

7. Embedded plates and concrete accessories.

1.3 STANDARDS:

A. Codes and Standards: Perform drilled pier work in compliance with the applicable requirements of governing authorities having jurisdiction provisions for adequate protection to persons and property.

B. Survey Work: Engage a surveyor to perform all surveys, layouts, and measurements for drilled pier work. The surveyor shall conduct the layout work for each drilled pier to the lines and levels required before excavation, and the actual measurements for each drilled pier's horizontal axial location, shaft diameter, bottom and top elevations, deviations from specified tolerances, and other data as required.

The surveyor shall record and maintain all information pertinent to each drilled pier and cooperate with other testing and inspection personnel to provide data for required reports.

C. The Owner will employ a separate testing laboratory to perform field quality control tests and a geotechnical engineer to check adequacy of drilled pier bearing material and drilled pier installation.

D. Contractor to demonstrate qualifications of not less than three successfully completed contracts with similar soil/rock conditions, shaft and socket sizes, depths, and volumes of work contained in this project. Submit satisfactory proof of compliance to the Architect.

E. American Concrete Institute (ACI): Except as otherwise noted, comply with the requirements of ACI 318 "Building Code Requirements for Reinforced Concrete," and ACI 336.1 "Standard Specification for the Construction of End Bearing Drilled Piers."

1.4 SUBMITTALS:

A. Submittals in accordance with Section 01 33 00.

B. Certification of Examination of Site and Records: Before proceeding with the Work, submit certification in acceptable form signed by the Contractor, stating that careful examination has been made of the site, existing structures, records of utility lines, test boring records, soil samples, subsurface exploration reports by the Subsoil Exploration Consultant, the Drawings and Specifications.

C. Product Data: Submit copies of manufacturers' specifications for the following products, including copies of laboratory test reports and other data as may be required to show compliance with these specifications.

1. Fly ash.
2. Water reducing and plasticizing admixtures.
3. Chemical soil stabilization compounds.

D. Mill Certificates: Submit certified reports for physical and chemical properties of the following materials with respect to compliance with these specifications.

1. Portland cement.

2. Reinforcing steel.

E. Shop Drawings: Submit shop drawings showing locations of all drilled piers and details for all reinforcing steel.

F. Informational Data: Furnish a detailed description of construction procedures, equipment, temporary liners used, and drilling methods, including detailed remedial procedures to be used in the event of soil stability problems for silt drilled piers installation.

G. Contractor's Concrete Testing Laboratory Concrete Design Mix Reports: Submit 3 copies directly to the Architect from the Contractor's Testing Laboratory with copy to Contractor and others as directed by the Architect.

1. Complete list of the design mixes required for the project, together with the design mix test results.

2. Report and certification of aggregate for stone concrete, including ASTM C88 sodium sulfate soundness test and sieve analysis.

H. Owner's Soil Testing Laboratory Reports: Submit 3 copies directly to the Architect from the Owner's Testing Laboratory with copy to Contractor and others as directed by the Architect.

1. Review comments as to Contractor's proposed methods of drilled pier installation.

2. Reports of all full-time drilled pier installation inspections and quality control tests.

I. Owner's Concrete Testing Laboratory Reports: Submit 3 copies directly to Architect from Owner's Testing Laboratory with copy to Contractor and others as directed by the Architect.

Reports of all full-time inspections and quality control tests performed for the installation of all drilled pier concrete and reinforcing.

1.5 QUALITY ASSURANCE: (Refer to Section 01 40 00)

A. Installer: Experienced specialty firm having a minimum of 5 years successful experience installing work of same type required for this project. Employ only skilled tradesmen who are thoroughly experienced with the materials and equipment to be used in the Work.

B. Contractor's Concrete Testing Laboratory: The Contractor shall employ, at his own expense, a testing laboratory to design concrete mixes, conduct tests and submit reports for the design mixes.

C. Contractor's Responsibilities for Quality Control Program:

1. Furnish Owner's Testing Laboratory with a complete set of shop drawings for drilled pier locations and reinforcing and a complete set of procedures/sequences for drilled pier installation.

2. Furnish specific notification, with at least one day's advance notice, for all drilled pier fabrication and installation operations.

3. Furnish materials samples and access as required for testing.

4. Furnish access and proper facilities, including hoisting facilities with protective lift cages and temporary liner shells as required for inspection of all drilled pier operations.

5. Furnish casual labor as required to facilitate testing and inspection of Drilled Pier Work.

6. Furnish storage facilities for concrete test cylinders.

7. Contractor shall be responsible for all additional drilled pier inspection and testing resulting as a consequence of Drilled Pier Work a) not evidencing compliance with this specification, b) performed with improper supervision, c) performed without prior notice, or d) performed contrary to standard construction practice.

D. Owner's Soil's Testing Laboratory: The Owner will retain, at his own expense, a testing laboratory to conduct tests and inspections of all drilled pier operations and submit reports. The Owner's Soils Testing Laboratory shall be responsible for inspections and for conducting and interpreting tests. The inspection shall take the form of full-time inspection of drilled pier operations. In addition, the Laboratory shall review the construction methods, equipment, and other pertinent construction details as furnished by the Contractor. The Owner's Soils Testing Laboratory shall also be responsible for determining if temporary liners are required for drilled pier excavation.

E. Owner's Concrete Testing Laboratory: The Owner will retain, at his own expense, a testing laboratory to perform full-time inspection of all drilled pier concrete and reinforcing installation and to perform quality control testing as specified.

F. Regulatory Requirements: Comply with the applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.

1.6 PROJECT/SITE CONDITIONS:

A. Test Boring Report: Examine the site, the drawings, the record of test borings, soil samples, and the subsurface exploration reports prepared by the geotechnical engineer, which will be made available by the Owner to determine all conditions under which the foundations will be installed. The records of test borings are for information only and are not guaranteed to represent all conditions that will be encountered.

B. Site Survey: Examine the survey of the site, existing utilities and existing construction, and drawings of any adjacent existing buildings, which will be made available by the Owner and represent all conditions known to the Owner. Other construction, of which no records are available, may be encountered. The Contractor shall formulate his own conclusions as to the extent of such construction and shall remove all material of any nature to the design subgrades indicated or hereinafter specified.

C. It is called to the Contractor's attention, that structures if indicated on the plan are plotted from record information and are not guaranteed to be complete or correct as to location, size and depth. The Contractor shall be responsible for obtaining all necessary information on structures by providing sufficient test holes for which there will be no payment.

D. Contractor will be required to call all utilities prior to construction.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS:

A. Portland Cement: ASTM C150, Type I.

B. Fly Ash: ASTM C618 except limit loss of ignition to maximum of 6% with a maximum of 125 lbs./cu. yd. (74.2 kg/cu. m).

C. Water-Reducing Plasticizing Admixture: ASTM C494, Type A, to be used unless noted. Chloride ion content of admixture shall be limited to produce no detrimental effects on other components and shall be verified by manufacturer. Follow the manufacturer's recommendations.

1. "WRDA," W.R. Grace

2. "Plastiment," Sika Chemical Corporation

3. "Pozzolith," Master Builders

4. "Placewel-R," Manville Inc.

D. High Range Water Reducing Admixtures (Super Plasticizers): ASTM C494, Type G may be used. No chloride ion content of admixtures is allowed.

E. Aggregates: ASTM C33, Size 467. Aggregates subjected to 5 cycles of the ASTM C88 sodium sulfate soundness test shall not lose more than 15% by weight. Aggregates for the entire job shall come from the same source unless a change is reviewed by the Architect.

1. Fine Aggregates: Natural or artificial hard, clean sand.

2. Course Aggregates: Gravel or crushed rock with clean, hard uncoated particles.

F. Mixing Water: Clean, fresh and free from deleterious substances which would impair the Work.

G. Steel Reinforcement Bars: ASTM A615, Grade 60.

H. Ready-Mixed Concrete: ASTM C94, strength as noted.

I. Miscellaneous Materials or Accessories: Provide as indicated or as required to complete the Work.

2.2 CONCRETE MIX DESIGN:

A. Contractor's Concrete Testing Laboratory: Design each type of mix required. Allow a minimum of 35 days prior to placing concrete for mix design. Prepare design mixes for each type of concrete. Use an independent testing facility for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.

1. Proportion mixes by either laboratory trial batch or field experience methods, using materials to be employed on project for each class of concrete required, complying with ACI 211.1.

2. Submit written reports to the Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Architect.

B. Laboratory Trial Batches: When laboratory trial batches are used to select concrete proportions, prepare test specimens in accordance with ASTM C39, specified in ACI 301. Establish a curve showing relationship between water-cement ratio (or cement content) and compressive strength, with at least 3 points representing batches which produce strengths above and below that required. Use not less than 3 specimens tested at 28-days, or earlier age when acceptable to the Architect, to establish each point on the curve.

C. Adequacy of Mix Design: Verify each design mix per requirements of ACI 301, Section 3.9.

D. Contractor shall also provide concrete mix designs for concrete placed by tremie methods below water/slurry.

E. Improper Mix: Immediately notify the Owner's Concrete Testing Laboratory and Owners Representative, if at any time during construction, the accepted mix design proves to be unsatisfactory for any reason, such as too much water, lack of sufficient plasticity to prevent segregation, or insufficient strength. The Contractor's Concrete Testing Laboratory shall modify the design, subject to the Owner's Representative's review, until a satisfactory concrete is obtained. Addition of water to the mix will not be permitted.

2.3 TREMIE CONCRETE: Stone concrete for drilled piers constructed by the "tremie method" shall consist of coarse aggregates with a maximum size of 1" conforming to Size 7 of ASTM C33 and shall have a minimum cement content of 9 sacks/cu. yd. (500 kg./cu. m). The slump of concrete shall be between 7" and 9" (15 to 18 cm). The concrete shall be capable of developing the specified design strength.

PART 3 - EXECUTION

3.1 PROTECTION OF EXISTING UTILITIES:

A. Before installing drilled piers adjacent to existing utilities, notify the utility owner to ensure that protective Work will be coordinated and performed by the Contractor in accordance with the requirements of such owner of the utility involved. If any existing service lines, utilities and utility structures to remain in service are uncovered or encountered during these operations, protect from damage and provide support if necessary.

B. Should uncharted or incorrectly charted piping or other utilities be encountered during drilled pier drilling operations, immediately notify the Owner, the Architect, and the utility owner. Cooperate with the Owner and utility owner in keeping their respective services, utilities and facilities in operation. Repair damaged utilities to the entire satisfaction of the Owner and utility owner concerned.

3.2 DRILLED PIER EXCAVATION, GENERAL:

A. The Contractor shall use equipment of adequate capacity and proven methods, as reviewed by the Owner's Soil Testing Laboratory, for all drilled pier construction Work.

B. The drilled pier drilling sequences and procedures shall be such as to produce negligible loss of ground due to pumping water and soil as well as squeezing of the hole. The Contractor shall formulate his construction procedure using the guidelines described herein and will submit such procedure for review by the Owner's Soil Testing Laboratory.

C. Drilled piers shall have a minimum shaft and diameter to that shown on the drawings.

D. The maximum allowable variation of the center of the top of any drilled pier from the required location shall be 4% of the shaft diameter or 2", whichever is less. The shaft shall not be out of plumb by more than 1% of its depth. If these tolerances are exceeded, the Contractor shall design and furnish additional or corrective construction to compensate for the excessive eccentricity, at no extra cost to the Owner. The proposed corrective construction shall be submitted to the Owner's Soil Testing Laboratory for review.

E. All loose materials except for up to 75 cubic inches and all free water except for 2 inches shall be removed from the bottom of drilled piers.

F. Drilled pier excavation closer than 10 feet to a recently concrete drilled pier shall not begin until 24 hours after the concrete has been placed.

G. Excavation Equipment: Provide adequate equipment so work is expedited to the fullest extent possible. Use equipment fully capable of excavating shafts to depths, diameters, and sizes indicated, and within the specified tolerances. Maintain equipment in satisfactory operating condition and provide sufficient quantity of equipment to maintain the projected schedule of the work.

H. Obstructions: If unforseen obstructions are encountered which cannot be removed by standard drilling pier excavation methods, remove such obstruction by hand labor using air-powered tools, or by other safe methods recognized in construction industry. Standard drilled pier excavation methods include the use of core barrels with drilled pier drilling equipment.

I. Dewatering: Provide and maintain pumping equipment to keep the excavations free of water before placing concrete. If excessive water is encountered and drilling operations must be

halted, consult with the Architect before using alternate methods of construction. Conduct water to general site run-off ditches and disposal areas with sufficient discharge lines. Provide additional ditching as required to conduct water to site drainage facilities.

3.3 SLURRY DISPLACEMENT METHOD:

A. The slurry displacement method of construction may be employed if approved by the Geotechnical Engineer. The excavation shall be carried to final depth with the hole stabilized using drilling fluid of a minimum density acceptable to the Geotechnical Engineer. The drilling fluid may be reused, but it shall be treated, if necessary, to remove the granular material that is in suspension. Care shall be taken in the drilling to avoid caving or sloughing. The bottom of the hole shall be cleaned with a clean-out bucket or other appropriate tool. Type and proposed density of drilling fluid shall be submitted for approval to the Owner's Geotechnical Engineer.

1. Definitions:

a. Slurry displacement method (SDM): Drilling, concreting, or drilling and concreting wherein a slurry is used to stabilize the hole. The slurry may be used (a) for the maintenance of the stability of the unlined drilled shaft element; (b) to assist the drilling or insertion of casing as part of the shaft construction; or (c) to allow acceptable concrete placement when water seepage into a drilled shaft is too severe to permit concreting in the "dry."

b. Slurry or drilling fluid: Water or prepared drilling mud properly mixed with water. The drilling fluid shall be treated as necessary to conform to the requirements given in Table 1.

c. Mud: Pulverized solids used as the basic ingredient for making a water-based slurry.

2. General Requirements:

a. Piers shall be installed by drilling and then placing concrete in the excavations. Casings shall not be used, except as approved by the Geotechnical Engineer.

b. Each finished pier shall consist of a continuous column of concrete extending from the required top elevation to the required bearing surface, having firm contact against the vertical and horizontal surface of the earth surrounding it.

c. Pier drilling and concrete placement shall be sequenced to prevent damage to adjacent pier or pier excavations.

3. Disposal of Excavated Materials:

a. All spoil and excavated materials shall be kept away from each open shaft excavation to avoid contamination of the excavation after final clean-out.

b. Excavated materials shall be stockpiled or disposed of in areas designated by the Owner's representative.

c. Excavated materials temporarily placed at other locations for the convenience of the Contractor will be allowed only with written approval of the Owner's representative and shall finally be removed and placed within designated disposal areas.

4. Excavation:

   a. Pier excavation shall be to the elevations shown on the Engineer's drawings. Bottom elevations are minimum depths. Piers may be extended only at the approval of the Geotechnical Engineer. Methods and equipment used for shaft excavation shall leave the side of the hole and bottom free of loose material which would prevent intimate contact of the concrete with firm, undisturbed soil.

   b. Drilling tools shall excavate a hole at least as large as the design diameter.

5. Provisions for Observation:

   a. The Contractor shall cooperate with the Owner and design team to ensure the expeditious and safe observation of the shaft excavations.

   b. If the Geotechnical Engineer determines that the material at the bottom of any excavation is unsatisfactory, additional excavation or other corrective action shall be made as directed by the Geotechnical Engineer.

   c. If additional excavation is required, the pier bottom shall be drilled again and observed as described above. This procedure shall be repeated until a bearing material is reached that is approved by the Geotechnical Engineer.

6. Installation Method:

   a. Where drilled shafts are to be installed below the groundwater level and in caving or sloughing soils, a premixed mud slurry shall be used to stabilize the excavation. The slurry level on the excavation shall be maintained to the ground surface where the drilling rig is located unless approved otherwise by the Geotechnical Engineer. Water without mud may be used if the shaft excavation is properly stabilized and the drill cuttings are removed.

   b. The mud slurry shall be premixed in mud tanks on site or arrive at the site premixed; combining or mixing slurry in the shaft shall not be permitted.

   c. The mud slurry shall consist of a stable colloidal suspension of pulverized solids thoroughly mixed with water so that the properties specified herein are maintained. Attapulgite and bentonite shall meet API Specification 13A, Section 3, "Oil-Well Drilling-Fluid Material" dated March 1981. The type of mud used will depend on the subsurface conditions and mixing water character. A written certificate shall be supplied to the Architect/Engineer by the mud supplier specifying type, origin, quality and yield for each shipment of mud received. A test report from the supplier giving the physical and chemical properties of the mud shall be supplied to the Architect/Engineer at the start of the work.

   d. The mud slurry shall be mixed, stored, and transported using equipment normally used on drilled pier projects. The water used to mix the slurry shall be clean, drinkable fresh water, obtained on site from sources approved by the Owner's representative. Any physical or chemical treatment to the water or slurry that is considered necessary to have the slurry meet the specifications is the responsibility of the drilled shaft contractor.

   e. The slurry shall meet the specifications given in Table 1. Slurry testing by the Contractor shall be performed and recorded for quality control purposes. All field

test equipment shall be provided by the drill shaft contractor. Field conditions and requirements of the drilled shaft contractor and the Geotechnical Engineer may require more frequent testing to assure an acceptable slurry. The drilled shaft contractor shall have available at the site a slurry sampler capable of obtaining slurry samples at any depth within the drilled shaft excavation.

f. The Contractor shall use drilling tools and excavation procedures such that excessive negative pressure in the excavations is prevented. At the completion of excavation, the drilled shaft bottom shall be cleaned with a clean-cut bucket equipped with a one-way flap gate that prevents spoils in the bucket from reentering the shaft. The in-hole slurry shall meet the specifications prior to concreting. If cleaning, recirculating, desanding, or replacing the slurry is necessary, the Contractor shall be prepared to do so.

g. Concreting the drilled pier shall be completed the same day that the excavation is complete. If this is not possible, the excavation will be required to be redrilled, cleaned, and slurry testing before concreting.

h. For piers with endbearing, the mud slurry sand content should be limited to 4%.

i. Slurry shall be samples and tested in the mud tank and from samples recovered within 1 foot from the bottom of each drilled shaft.

j. The bottom of the drilled shaft shall be checked to confirm the drill cuttings and hole sides are not falling to the bottom.

B. Table 1 - Slurry Specifications:

Item to be Measured	Range of Results at 20°	Test Method
Bentonite Type	Premium Natural Wyoming Sodium Bentonite	API 13A Section 4, Table 4.1
Density, lbs./cu.ft.	64 min. 85 max.	API 13B Section 1
Marsh Funnel Viscosity, sec.	30 min. 50 max.	API 13B Section 2
Item to be Measured	**Range of Results at 20**	**Test Method**
pH	8 min. 11 max.	API 13B Section 7
Sand Content	4% max. (with endbearing) 25% max. (without end-bearing)	API 13B Section 5

Reference Test Methods are American Petroleum Institute (API) Spec. 13A and 13B, Eleventh Edition, July 1985 and May 1985, respectively.

The Contractor's bid price shall include installation of all drilled piers as shown on the drawings by whatever method is required to obtain the final result intended. A price shall be given for each method and the minimum number of shafts appropriate for the price submitted.

3.4 SURFACE DRAINAGE

A. Maintain good surface drainage at street level to direct surface runoff away from excavation walls and prevent ponding.

B. Prevent water from entering the cap beam excavation. Street cracks along all four sides of the excavation should be sealed prior to and during excavation.

C. Provide protection against erosion by tarpaulin with hold-downs or other suitable covering material on all surfaces and slopes of temporary earth berms.

3.5 STEEL CASINGS:

A. Provide steel casings of sufficient strength to withstand handling stresses and pressures from surrounding soil and water or concrete inside. Provide casings with inside clear diameter not less than the diameter of the drilled pier shaft.

B. Install steel casing as excavation work progresses and as required to ensure the stability of drilled pier shaft walls during inspection.

C. Casing which is out of round, dented or otherwise damaged as to cause "hanging-up" of concrete in the casing shall not be used, but must be removed from the job site. Thoroughly clean the interiors of the casing to remove all soil, concrete, and foreign materials.

D. Remove temporary casing as concrete is placed in the shaft. The bottom of the casing must extend a minimum of 3'-0" below the top of concrete at all times during the removal process until the shaft is fully concreted. The removal of the temporary casing must be completed before the concrete begins to set.

3.6 ADDITIONAL EXCAVATION:

A. Do not excavate below elevations noted without prior review by the Owner's Soil Testing Laboratory.

B. Where the Owner's Soil Testing Laboratory determines that the soil encountered at the elevations shown on the drawings is not capable of supporting the design load, or where unsuitable material is encountered, the Owner's Soil Testing Laboratory may require the Contractor to perform additional excavation.

C. If existing footings or drilled piers not previously known are encountered which interfere with new construction, the Architect may require the Contractor to remove such existing elements.

3.7 DISPOSAL OF EXCAVATED MATERIAL: Excavated materials shall be disposed of off on site as directed by the Owner.

3.8 BELLED PIERS, MACHINE DUG EXCAVATION WITH PERMANENT CORRUGATED SHELLS AND TEMPORARY STEEL PLATE LINERS: Machine methods shall be used for excavation of shafts and bells of belled piers. Temporary liners at the top of each pier extending down and sealed into a stable, impermeable soil strata will be required. Additional temporary steel liners, below, shall be used to prevent caving of soil and reduce seepage. All temporary liners shall be removed. In addition, permanent corrugated steel shells shall be used for the indicated shaft lengths for all belled piers. The diameter of the bore of the hole shall be such as to reduce the annular space between the wall of the hole and the permanent corrugated steel shell to a minimum. The diameter of the hole shall not be in excess of 2" (50 mm)

beyond the outside diameter of the corrugated shell. The annular space outside the corrugated shell shall be filled with cement grout by insertion of a 1" (25 mm) diameter pipe to the bottom of the annular space and pumping the grout while raising the grout pipe slowly.

3.9 BELLED PIER BOTTOMS: Belled piers shall be founded on the soil strata with the bearing capacity specified on the drawings. Pier bells shall not be excavated until the test results by the Owner's Soil Testing Laboratory have confirmed the allowable bearing values as shown in the soil report but shall be excavated immediately thereafter. In no case shall the bottom of the belled pier be excavated deeper than that which may produce a bottom blow-out due to high underlying hydrostatic pressure. If test results indicate that the soil is incapable of providing the required safe-bearing values, the shaft length may be advanced as directed by the Owner's Soil Testing Agency or the bells may be enlarged as directed by the Owner's Soil Testing Laboratory.

3.10 CORRECTIVE METHODS, BELLED PIERS:

A. If test results indicate that the soil is not capable of providing the required safe bearing value, the shaft length shall be advanced as directed by the Owner's Soil Testing Laboratory until conditions specified under Article, BELLED PIER BOTTOMS are achieved, unless other recommendations are made by the Owner's Soil Testing Laboratory.

B. If water conditions are found which make excavation through sand or silt strata dangerous to personnel or such as to cause the excessive inflow of silt or sand creating voids outside the pier, the Work shall only be continued using an acceptable chemical soil stabilization method including providing bentonite-cement grouting in zone of bells prior to excavating the final bell configuration. Such stabilization methods shall be submitted prior to pier installation work and shall be reviewed by the Owner's Soil Testing Laboratory.

C. If concrete placement is suspended before completion of drilled pier or a construction joint is required for some other reason, it shall be shown on the field record drawings. All laitance materials shall be cleaned from the joint before placing additional concrete.

D. If construction joints are required, dowels of the same size and configuration as the reinforcing cage, suitably tied, shall be used with embedment sufficient to develop 100% of the tensile strength of the bars.

3.11 REINFORCING STEEL AND DOWELS:

A. Reinforcing steel and dowels shall be in compliance with ACI 318 "Building Code Requirements for Reinforced Concrete," and installed in compliance with ACI 315 "Details and Detailing of Concrete Reinforcement" and CRSI "Recommended Practice for Placing Reinforcing Bars."

B. Before placing, clean reinforcing steel and dowels of loose rust, scale, dirt, grease and other material which could reduce or destroy bond.

C. Fabricate and erect reinforcing cages in shafts as one continuous unit using inner ring resteel. Place reinforcement accurately in accordance with the structural drawings and hold securely in position during concrete placement.

D. Use templates to set dowels. Provide blocking and holding devices to maintain required position during concrete placement.

3.12 PLACING CONCRETE IN-THE-DRY:

A. All drilled pier concrete shall be placed in-the-dry conditions unless otherwise specifically requested by the Owner's Soil Testing Laboratory.

B. Do not start placing concrete until the excavation and reinforcing for the whole unit to be poured has been completed, cleaned, and inspected by the Owner's Soil and Concrete Testing Laboratories.

C. Place concrete in drilled piers immediately upon complying with all requirements and receipt of test results confirming that allowable bearing capacities have been attained. Do not leave drilled pier holes open overnight.

D. Provide adequate top hoppers with chutes, for conveying concrete into place.

E. Place concrete immediately after mixing, and in no case more than 90 minutes after water has been added. Continue the depositing of concrete until completion of the drilled pier to top of shaft, and in no case suspend the pouring of a drilled pier more than 30 minutes. Laitance and excess water shall be removed from the top of the completed drilled pier. The top 10'-0" of the concrete in the drilled pier shall be vibrated.

F. Concrete for belled piers shall not be placed in a pier if, the inflow of water is more than 5 gals./min. (20 lit./min.) or is sufficient to be detrimental to the strength of the concrete or endanger the excavation. Every effort shall be made to seal off the flow of water during excavation. Standing water, loose soil and debris shall be removed from the bottom of drilled piers before concrete placement.

G. Cold Weather Placing:

1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

2. When air temperature has fallen to or is expected to fall below 40 deg. F., uniformly heat all water and aggregates before mixing as required to obtain concrete mixture temperature of not less than 50 deg. F., and not more than 80 deg. F. at point of placement.

3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

4. Do not use materials containing antifreeze agents or chemical accelerators without prior written approval of Architect.

H. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. (32 degrees C.). Mixing water may be chilled, or chopped ice may be used to control concrete temperature provided water equivalent of ice is calculated to total amount of mixing water.

3. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required: When air temperature is between 85 degrees F. (30 degrees C.) and 90 degrees F. (32 degrees C.), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F. (32 degrees C.), reduce mixing and delivery time to 60 minutes.

I. Place concrete immediately upon delivery. Keep exposed concrete surfaces and formed shaft extensions moist by fog sprays, wet burlap or other effective means.

J. Do not use retarding admixtures without prior written approval of the Architect.

3.13 FIELD QUALITY CONTROL:

A. Owner's Soil Testing Laboratory: Perform all tests and inspections, as specified herein, evaluate test results and state compliance of installed Work with contract Documents.

1. Review the Contractor's proposed drilled pier installation methods, sequences, procedures and equipment.

2. On a full-time basis visually inspect the installation of each drilled pier.

3. Verify the specified bearing capacity of each drilled pier.

4. Provide direction to Contractor as to specific final bearing elevation at each drilled pier location and/or necessity for additional shaft excavation.

5. Visually inspect and test samples of water being pumped from drilled pier as to solids content.

6. Observe, record, and report the Contractor's locational and plumbness tolerance measurements, and the final elevations of the bottom and top of the completed drilled piers.

B. Owner's Concrete Testing Laboratory: Conduct the following tests and inspections during construction and immediately submit reports to the Owner's Representative.

1. Inspection of Concrete and Reinforcing Placement: Provide continuous visual inspection of all reinforcing site fabrication and installation, and all concrete placement including verification of laitance removal at the top of the drilled piers.

2. Concrete Compression Tests: Perform tests for each 50 cu. yds. (38 cu. m) of concrete, or fraction thereof, 1 truck. Make 6 standard 6" x 12" (15 x 30 cm) cylinders and test in accordance with ASTM C31 and C39. Test 2 cylinders at the age of 7 days and 2 cylinders at the age of 28 days and 1 cylinder at the age of 56 days. Only 1 set of 6 cylinders shall be made from the same batch. Cure 1 of the 28 day cylinders in a pit at the job site to simulate the same curing conditions as the concrete used in the drilled piers. The remaining cylinders shall be cured in the laboratory. Reports of cylinder tests shall state the location of the pour in the drilled pier, laboratory or site curing, compression strength, type of fracture, age at testing, concrete supplier, mix specification strength and any other pertinent information, together with a statement as to whether this concrete complies with the specifications.

3. Slump Tests: ASTM C143. Make 1 test from each truck.

4. Concrete Temperature: Test hourly when air temperature is 40 deg. F. and below, and when 80 deg. F. and above; and each time set of compression test specimens is made.

5. Inspection of Batch Plant: As required to ensure that concrete delivered to job complies with the specifications and the design mix. Batch plant inspection shall be required once at start of job and thereafter if concrete falls below specification strength.

6. Additional Tests: Perform additional testing if, in the opinion of the Architect, based on cylinder strengths below specification requirements or visual defects, concrete of poor quality has been placed. Tests may be compression tests on cored cylinders, ASTM C42, and/or load tests as outlined in ACI 318, or as directed by the Architect. Complete continuous coring of drilled piers will be required, at the Contractor's expense, where time for removal of temporary casings exceeded the limits noted herein or where observation of the pouring operations indicated cause for suspicion of the quality of the concrete, presence of voids, segregation or other possible defects in the drilled pier.

END OF SECTION

SECTION 02 41 00.01 SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Removing trees and other vegetation.
2. Clearing and grubbing.
3. Topsoil stripping.
4. Removing above-grade site improvements.
5. Disconnecting, capping or sealing, and abandoning site utilities in place.
6. Disconnecting, capping or sealing, and removing site utilities.
7. Temporary erosion and sedimentation control measures as specified in Division 1 Sections.

1.3 RELATED WORK

A. Related Work of Other Sections:

1. Temporary Facilities and Controls.
2. NPDES Requirements.
3. Trench Safety System.
4. Earthwork.

1.4 MATERIALS OWNERSHIP

A. Except for materials indicated to be stockpiled or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

1.5 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Herbicide: Ortho “Roundup” or equivalent EPA registered herbicide applied in accordance with manufacturer’s printed instructions.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Control dust and noise; perform work in accordance with requirements of authorities having jurisdiction. No explosives are permitted. No on-site burning is permitted.

C. Locate and clearly flag trees and vegetation to remain or to be relocated.

D. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 UTILITIES

A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

3.3 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Use only hand methods for grubbing within drip line of trees indicated to remain.
4. Within building footprint, grub stumps to their full depth.
5. Under and to 5’ outside of paving and walk areas, remove stumps to 3’ below existing or final grade, whichever is lower.
6. Within top 6” of subgrade, below building, paving and walk areas, remove roots down to ½” in size, and all organic matter.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding 8-inch (200-mm) loose depth, and compact each layer to a density equal to adjacent original ground.

3.5 STRIPPING

A. Sod and Grasses: Remove sod and grass before stripping topsoil.

B. Topsoil Stripping: Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste material.
2. Herbicides: Use herbicide to control and kill annual weeds and grasses within building lines, walks and paving areas prior to preparation of subgrade areas to subsequent construction. Remove dead plant material.
3. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
4. Limit height of topsoil stockpiles to 72 inches (1800 mm).
5. Do not stockpile topsoil within drip line of remaining trees.
6. Dispose of excess topsoil as specified for waste material disposal.

3.6 SITE IMPROVEMENTS

A. Remove existing above-and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw cut faces vertically.

3.7 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner’s property.

1. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION

SECTION 02 76 00 – PAVING SPECIALITIES

PART I - GENERAL

1.1 SECTION INCLUDES:

A. Work included in this Section, while not all inclusive but listed as a guide, shall include:
   1. Furnishing of all labor, tools, equipment and incidentals to complete the work.
   2. Layout all markings
   3. Four inch (4") wide white color striping for parking areas.
   4. Yellow color graphics for handicapped parking stalls. To comply with State and City requirements.

B. Stencil "HANDICAPPED PARKING SPACE" on curb in 4" high white block letters on blue colored background 6" high and of appropriate length for lettering background and provide wheelchair logo in parking stall.

C. Stencil "FIRE LANE" on curb and pavement in 4" high white letters on red colored background, 6" high striping shall be continuous as noted on drawings.

1.2 QUALITY ASSURANCE

A. Subcontractor for work of this section shall be of firm specializing in application of pavement markings.

1.3 JOB CONDITIONS

A. Concrete paving and curbs shall have been in place a minimum of 28 days prior to application of pavement markings.

B. Do not apply marking paint when weather is foggy or rainy, or ambient or pavement temperatures are below 40 degrees F., nor when such conditions are anticipated during eight hours after application.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Alkyd Paint:
   1. Alkyd-resin, highway traffic paint, FS TT-P-115 Type III or AASHTO M248, Type I.
   2. Colors: White, yellow and red, as required.
   3. Acceptable Products:
      a. Alkyd Traffic Marking Paint by Sherwin Williams.
      b. P&L Traffic Paint by Pratt & Lambert.

B. Paint Primer: As recommended by paint manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine surfaces on which pavement markings are to be applied and report any unsatisfactory conditions which will prevent the proper application of markings to the Contractor.

3.2 PREPARATION

A. Thoroughly clean surfaces to receive pavement markings. Layout markings in conformance with drawings. Surfaces to receive markings shall be dry.

B. On Portland cement concrete, apply primer for stripping as recommended by paint manufacturer to act as barrier coat with curing compound.

3.3 APPLICATION OF PAVEMENT MARKINGS

A. Equipment: Hand-operated push-type machines of a type commonly used for application of paint to pavement surfaces. Use hand-operated spray guns in areas where the push-type machines cannot be used.

B. Application: Apply paint in one coat evenly to clean, dry surfaces. Apply marking paint at not less than rate of one gallon per 100 sq. ft. (equivalent to approximately one gallon per 300 lineal feet of 4" wide stripe), to result in uniform complete coverage of surfaces to be painted. Provide guide lines and template necessary to control paint application. Edges of markings shall be sharply outlined.

C. Protection: Protect newly painted surfaces from damage by vehicles during the time required for paint to harden sufficiently to withstand traffic. During periods of high wind, discontinue painting operations.

3.4 CLEANUP

A. Cleanup all debris caused by the work of this section, keeping the premises clean and neat at all times.

END OF SECTION

SECTION 03 10 00 - CONCRETE FORMWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. The Conditions of the Contract and applicable requirements of Division 1 govern this Section.

1.2 DESCRIPTION OF WORK:

A. Work Included:

1. Provide formwork for cast-in-place and precast concrete.

2. Install items supplied by other trades where the items must be placed as forms are erected. Locate these items from information supplied by the trades requiring them.

B. Work of Other Sections:

1. Applicable Sections of Division 3

2. Concrete Curbs, Walks and Paving

C. Applicability to Other Sections: Some requirements within this Section apply to the work of other Sections. The actual performance of the work stays within the Section where it occurs, but subject to the requirements of this Section, to the extent applicable.

1.3 QUALITY ASSURANCE

A. Standards: Except as modified hereinafter, comply with applicable provisions and recommendations of ACI-347, "Guide to Formwork for Concrete" and ACI-301, Chapter 4, "Specification for Structural Concrete for Buildings."

B. Definitions:

1. Exposed Concrete: Concrete exposed-to-view on interior and/or exterior including concrete which will receive finish materials, such as paint and wallcovering, applied directly to its surface. Not included is exposed concrete in mechanical and utility rooms.

2. Concealed Concrete: Concrete covered by structure or with finish material other than that applied directly to its surface. Included is exposed concrete in mechanical and utility rooms.

3. Architectural Concrete: Same as "exposed concrete" except special care is taken to achieve uniform shape, surface, texture and color. Architectural concrete is not to be covered with any other finish.

C. Tolerances for Exposed Concrete:

1. General: Following is a list of the maximum permissible deviations from established lines, grades and dimensions for all exposed concrete.

   a. Variations in the level of elevated concrete as floors and beams are to be measured before removal of supporting shores. The Contractor is responsible for adjusting the formwork to compensate for deflections of formwork including the deflections of the structure supporting the formwork.

2. Variation from Plumb:

   a. In the lines and surfaces of columns, piers, walls and risers:

In 10 ft. (3 m)	- 1/4 in. (6 mm)
In any story of 20 ft.(6 m) max.	- 3/8 in. (9 mm)
In 40 ft. (12 m) or more	- 3/4 in. (19 mm)

   b. For exposed corner columns control-joint grooves and other conspicuous lines:

In any bay or story of 20 ft. (6 m) max.	- 1/4 in. (6 mm)
In any 40 ft. (12 m) or more	- 1/2 in. (12 mm)

3. Variation from the Level or from the Grades Shown:

   a. In floors, ceiling, beam soffits, joints and in treads:

In any 10 ft. (3.048 m)	- 1/4 in. (6 mm)
In any bay or 20 ft. (6.1 m) max.	- 3/8 in. (9 mm)
In 40 ft. (12.2 m) or more	- 3/4 in. (19 mm)

   b. For exposed lintels, joists, sills, parapets, horizontal grooves and other conspicuous lines:

In any bay or 20 ft. (6.1 m) max.	- 1/4 in. (6 mm)
In 40 ft. (12.2 m) or more	- 1/2 in. (12 mm)

4. Variation of the Linear Building Lines from Established Position in Plan and Related Position of Columns, Walls and Partitions:

In any bay or 20 ft. (6.1 m) max.	- 1/2 in. (12 mm)
In 40 ft. (12.2 m) or more	- 1 in. (25 mm)

5. Variation in the Sizes and Locations of Sleeves, Floor Openings and Wall Openings:

   - 1/4 in. (6 mm)

6. Variation in Cross-Sectional Dimensions of Columns, Beams, Joists and in the Thickness of Slabs and Walls:

Minus	- 1/4 in. (6 mm)
Plus	- 1/2 in. (12 mm)

7. Variation in Steps:

a. In a flight of stairs:

Rise	- 1/8 in. (3 mm)
Tread	1/4 in. (6 mm)

b. In consecutive steps:

Rise	- 1/16 in. (1 mm)
Tread	- 1/8 in. (3 mm)

D. Tolerances for Concealed Concrete: Concealed concrete shall meet the following requirements:

1. Sufficiently accurate to accommodate the details of abutting work.

2. Measurably accurate so that the maximum deviation is not over 3/8 in. in 8 ft. (9.5 mm in 2.44 m).

3. Measurably accurate so that the total maximum deviation is not over 1 in. in 40 ft. (25.4 mm in 12.2 m) or more.

E. Mock-Up or Sample Panels: Provide formwork for mock-up or sample panels as required by the Architect for cast-in-place and precast concrete work specified. Construct forms using facing materials required to provide required finishes and textures. Do not proceed with structure formwork until sample units and forms have been accepted by the Architect.

1.4 SUBMITTALS:

A. Manufacturer's Data: Submit manufacturer's product data and installation instructions for proprietary materials including form coatings, manufactured form systems, ties and accessories. Submit written certification by the form coating manufacturer that the form coating will not adversely affect the concrete surfaces as hereinafter specified.

B. Shop Drawings:

1. Submit shop drawings for fabrication and erection of formwork. Show the general construction of forms including jointing, special formed joints or reveals, temporary openings, location and pattern of form tie placement, and other items which affect the exposed concrete visually. Include details of inserts and anchorages. Indicate sequence of removal of forms and shoring, and for placement and removal of reshoring. Engage a professional engineer licensed in the state in which the Work is to be done to design forms and shoring, with shop drawings bearing his seal.

2. The Contractor shall be solely responsible for the structural adequacy of the forms, ties, shoring and bracing. Any requirements given herein are minimum for appearance purposes only, not to be considered as structural design.

PART 2 -PRODUCTS

2.1 FORM MATERIALS:

A. Forms for Exposed Finish Concrete:

1. Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood-faced or other panel type materials acceptable to the Architect, providing continuous, straight, as-cast surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown. Provide form material with sufficient thickness to withstand pressure of placed concrete without bow or deflection beyond allowable tolerances.

2. Use overlaid plywood complying with U.S. Product Standard PS-1, "B-B High Density Overlaid Concrete form," Class I.

3. Use plywood complying with U.S. Product Standards PS-1, "B-B (Concrete Form) Plywood" Class I, Exterior Grade or better mill-oiled and edge-sealed, with each piece bearing the legible trademark of an approved inspection agency.

4. Required Form Features:

   a. True shape and edges.

   b. Sharp, undamaged corners and edges.

   c. Uniformly smooth, clean surfaces without checks or knots.

   d. Free of damage, holes, bumps, warps and bends.

   e. Hard, waterproof surface.

   f. Single-unit forms without lapped joints for columns, beams and joists.

5. Prohibited Forms:

   a. Segmented units for joists.

   b. Boards.

   c. Plywood without high density overlay.

   d. Earth forms.

B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in the finished structure with plywood, lumber, metal, or other acceptable material. Provide lumber that is dressed on at least 2 edges and 1 side for tight fit.

C. Forms for Textured Finish Concrete: For textured finish concrete surfaces, provide size, arrangement, and configuration as shown or as required to meet Architect's control sample. Provide solid backing and form supports to ensure stability of textured form liners.

D. Cylindrical Columns and Supports:

1. Form round-section members with paper or fiber tubes, constructed of laminated piles using water-resistant type adhesive with wax-impregnated exterior for weather and moisture protection.

2. Provide units with sufficient wall thickness to resist loads imposed by uncured concrete without deformation.

3. Provide units having "seamless" interior to minimize spiral gaps or seams.

4. Provide manufacturer's standard plastic-lined-nterior units.

5. Form round-section members of not less than 12 ga. (2.6 mm) galvanized steel sheets. Butt section together, with bolted or keyed and welded joints. Finish interior joints or forms smooth so there is no visible seam on finished concrete surfaces.

E. Pan Forms:

1. Provide forms for concrete pan-type construction complete with covers and end enclosures to form a true, clean, smooth concrete surface. Design units for easy removal without damaging placed concrete. Block adjoining pan units if required to avoid lateral deflection of formwork during concrete placement and consolidation. Provide standard or tapered end forms, as shown on drawings.

2. Factory-fabricate pan form units to required sizes and shapes, of the following:

a. Steel: 16 ga.(1.5 mm) minimum, free of dents, irregularities, sag and rust.

b. Glass-Fiber Reinforced Plastic: Molded under pressure with matched dies, 0.11 in.(2.8 mm) minimum wall thickness.

F. Form Ties:

1. Provide factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent deflection, and to prevent spalling concrete surfaces upon removal.

2. Unless otherwise shown, provide ties so that portion remaining within concrete after removal of exterior parts is at least 1-1/2 in. (38.1 mm) from the outer concrete surface. Unless otherwise indicated, provide form ties which will leave a hole not larger than 1 in. (25.4 mm) diameter in the concrete surface.

3. Form ties fabricated on the project site and wire ties are acceptable.

4. Provide 300 series stainless steel form ties for planned exposed tie hole locations, where shown, and for exposed or concealed architectural concrete. When used, break-back point shall be in 1 in. (25.4 mm) from outer concrete surface.

G. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatment of concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds.

H. Inserts:

1. Provide metal inserts for anchorage of materials or equipment to concrete construction, not supplied by other trades and as required for the work.

2. Provide adjustable wedge inserts of malleable cast iron, complete with bolts, nuts and washers; minimum 3/4 in. (19 mm) bolt size unless otherwise indicated.

3. Provide threaded inserts of malleable cast iron, furnished complete with full-depth bolts; minimum 3/4 in. (19 mm) bolt size unless otherwise indicated.

4. Provide sheet metal reglets formed of the same type and gage as flashing metal to be built into the reglets, unless otherwise indicated. Where elastic sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 26 ga. (0.48 mm) stainless steel sheet. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

I. Chamfer Strips: 3/4 in. x 3/4 in. (19 mm x 19 mm) virgin vinyl with 1/2 in. (12 mm) radius. Provide with 1/2 in. (12 mm) nailing leg at corner. Strip shall be continuous at all exposed concrete columns, beams, walls and floor edges.

2.2 DESIGN OF FORMWORK:

A. Design, erect, support, brace and maintain formwork so that it will safely support vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure. Carry vertical and lateral loads to ground by formwork system and in-place construction that has attained adequate strength for that purpose.

B. Design forms and falsework to include assumed values of live load, dead load, weight of moving equipment operated on formwork, ambient temperature, foundation pressures, stresses, lateral stability, and other factors pertinent to safety of structure during construction.

C. Design formwork to be readily removable without impact, shock or damage to concrete surfaces and adjacent materials.

D. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.

E. Design formwork assemblies to take into account the placing rate, temperature, vibrating and retarding admixtures so all portions of the assembly withstand the concrete pressures without deformation beyond 1/360 of spans.

PART 3 – EXECUTION

3.1 INSPECTION: Examine substrates and adjoining construction, and conditions under which the Work is to be installed. Do not proceed with the Work until unsatisfactory conditions detrimental to the proper and timely completion of the work have been corrected.

3.2 FORM CONSTRUCTION:

A. General:

1. Construct forms complying with ACI 347, to the sizes, shapes, lines and dimensions shown, and as required to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and insets, and other features required. Use selected materials to obtain required finishes.

2. Provide camber in formwork as required for anticipated deflections of formwork system and in-place construction due to weight and pressures during concrete placement and construction loads.

3. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where the slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and assure ease of removal.

4. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Brace temporary closures and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms in as inconspicuous location as possible, consistent with project requirements.

5. Form intersecting planes to provide true, clean-out corners, with edge grain of plywood not exposed as form for concrete.

6. Before concrete placement, check the lines and levels of erected formwork. Make corrections and adjustments to ensure proper size and location of concrete members and stability of forming systems.

7. During concrete placement, check formwork and related supports to ensure that forms are not displaced and that completed work will be within specified tolerances.

8. Engage a licensed surveyor to verify that the work is within specified allowable tolerances. The surveyor shall report in writing to the Architect, with copy to the Contractor, certifying the work as acceptable or indicating deviations from allowable tolerances.

B. Falsework:

1. Erect, support, brace and maintain falsework to safely support vertical, lateral and asymmetrical loads applied until such loads can be supported by in-place concrete structures.

2. Provide shores and struts with positive means of adjustment capable of taking up formwork settlement during concrete placing operations, using wedges or jacks or a combination thereof. Provide trussed supports when adequate foundations for shores and struts cannot be secured.

3. Support form facing materials by structural members spaced sufficiently close to prevent deflection. Fit forms placed in successive units for continuous surfaces to accurately align, free from irregularities and within allowable tolerances.

4. Carefully inspect falsework and formwork during and after concrete placement operations to determine excessive deflection or signs of failure. Make necessary adjustments to produce work of required dimensions.

C. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Size and location of openings, recesses and chases are the responsibility of the trade requiring such items. Accurately place and securely support items to be built into forms.

D. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is to be placed. Retighten forms immediately after concrete placement as required to eliminate mortar leaks.

3.3 FORMS FOR EXPOSED CONCRETE:

A. General:

1. Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Do not splinter forms by driving ties through improperly prepared holes.

2. Do not use metal cover plates for patching holes or defects in forms.

3. Provide sharp, clean corners at intersecting planes, without visible edges or offsets. Back joints with extra studs or girts to maintain true, square intersections.
4. Use extra studs, walers and bracing to prevent bowing of forms between studs.

5. Assemble forms so they may be readily removed without damage to exposed concrete surfaces.

6. Form molding shapes, recesses and projections with smooth-finish materials, and install in forms with sealed joints to prevent displacement.

B. Corner Treatment:

1. Form exposed corners of beams and columns to produce square, smooth, solid, unbroken lines, except as otherwise indicated.

2. Form chamfers with 3/4 in. x 3/4 in. (19 mm x 19 mm) strips, unless otherwise indicated, accurately formed and surfaced to produce uniformly straight lines and tight edge joints. Extend terminal edges to required limit and miter chamfer at changes in direction.

3. Non-exposed corners may be formed either square or chamfered.

C. Joint Locations:

1. Utilize largest available form units for minimum joint spacing of 8 ft. x 4 ft. (2 m x 1 m).

2. Arrange joints in a symmetrical pattern so center of the surface involved is either a joint or the center of a form unit. Use form units of matching size where possible.

3. Arrange forms with continuous support at every joint to keep from offsetting during the placing operation.

4. Exposed construction joints not shown shall be made and located to least impair the strength of the structure.

5. Where a construction joint is to occur, thoroughly clean the surface of the concrete and removal all laitance. In addition, vertical joints shall be thoroughly wetted and slushed with a coat of neat cement grout immediately before placement of new concrete. A delay until the concrete is no longer plastic in columns or walls (minimum of 2 hours) must occur before concrete is placed in the beams or slabs to be supported.

6. At horizontal construction joints, provide 1-1/2 in. (38 mm) continuous blocking at top of first casting. Remove blocking and rebrace forming member tightly against first casting to form a leakproof joint for second placement.

7. There shall be no horizontal construction joints in concrete beams. Construction joints shall be made in the middle third of spans with vertical bulkheads. When a beam intersects a girder at this point, the joints in the girders shall be offset a distance equal to twice the width of the beam. The location of construction joints shall be approved by the Architect. Provide additional reinforcing at construction joints as directed by the Architect.

8. Construction joints in floors shall be located near the middle of the spans of slabs or beams.

3.4 FORMS FOR ARCHITECTURAL CONCRETE:

A. Comply with recommendations of ACI 303 "Guide to Cast-in-place Architectural Concrete Practice." Tolerances shall be the same as for "exposed concrete."

3.5 SHORES AND SUPPORTS:

A. Comply with ACI 347 for shoring and reshoring in multistory construction, and as herein specified.

B. Extend shoring from ground to roof for structures 4 stories or less, unless otherwise permitted.

C. Extend shoring at least 3 floors under floor or roof being placed for structures over 4 stories. Shore floor directly under floor or roof being placed, so that loads from construction above will

transfer directly to these shores. Space out shoring in stories below this level in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members where no reinforcing steel is provided. Extend shores beyond minimum if required to ensure the proper distribution of loads throughout the structure.

D. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support the work without excessive stress or deflection and without increasing cracking or propensity for cracking in the concrete.

E. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until the concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.6 PREPARATION OF FORM SURFACES:

A. All surfaces of forms and embedded materials shall be cleaned of any accumulated mortar or grout from previous concreting and of all other foreign material before concrete is placed in them.

B. Unless otherwise specified or approved, surfaces of forms shall be treated as follows:

1. Before placement of either the reinforcing steel or the concrete, the surfaces of the forms shall be covered with specified coating material. Steel forms shall be free of rust.

2. High density overlay plywood shall receive mill oil of 100 or higher viscosity, in accordance with APA recommendations.

3. Excess form coating material shall not be allowed to stand in puddles in the forms nor shall such coating be allowed to come in contact with hardened concrete against which fresh concrete is to be placed.

3.7 INSTALLATION OF EMBEDDED ITEMS:

A. General: Set and build into the work anchorage devices and other embedded items required for other work that is attached to or supported by concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of the items to be attached thereto.

B. Edge Forms and Screeds Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surface. Provide and secure units to support types of screeds required.

3.8 REMOVAL OF FORMS: General:

A. Formwork not supporting concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F. (10 degrees C.) for 24-hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided that curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs and other structural elements may not be removed in less than 14-days, and not until concrete has attained design minimum 28-day compressive strength. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of the concrete location or members, as specified under Independent Testing Laboratory.

C. Form facing material may be removed 4-days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.9 RE-USE OF FORMS:

A. Clean and repair surfaces of forms to be re-used in the work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to the Architect.

SECTION 03 20 00 – CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 GENERAL: The Conditions of the Contract and applicable requirements of Division 1 govern this Section.

1.2 DESCRIPTION OF WORK:

A. Work Included: Fabrication and placement of reinforcement for cast-in-place concrete, including bars, welded wire fabric, ties and supports.

B. Work of Other Sections:

1. Applicable Sections of Division 3

2. Concrete Curbs, Walks and Paving

C. Applicability to Other Sections: Some requirements within this Section apply to the work of other Sections. The actual performance of the work stays within the section where it occurs, but subject to the requirements of this Section, to the extent applicable.

1.3 SUBMITTALS:

A. Submittals in accordance with Section 01 33 00.

B. Manufacture's Data: Submit manufacturer's product data, specifications, and installation instructions for proprietary materials and reinforcement accessories.

C. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with the ACI 315 "Details and Detailing of Concrete Reinforcement." Details shall include, but not be limited to sizes, grades of steel, bending and splicing details, splice locations, placement drawings for slab steel, minimum cover for steel and accessories, including positioning of reinforcement, and accessories, and how final position of reinforcement for slabs on grade are obtained.

D. Mill Certification of Reinforcing: Provide a certified mill analysis and tensile and bend test report. If the reinforcing cannot be identified, provide one series of tests from each 10 tons (9,072 kg) or fraction thereof. The testing shall be performed by an independent testing laboratory satisfactory to the Architect. The costs shall be borne by the Contractor.

1.4 DELIVERY, HANDLING AND STORAGE:

A. Deliver reinforcement to the project site bundled, tagged and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement drawings.

B. Store concrete reinforcement materials at the site, preventing damage, excessive rusting and accumulation of dirt and other deleterious substances.

PART 2 – PRODUCTS

2.1 MATERIALS:

A. Reinforcing Bars: Provide deformed reinforcing bars conforming to the requirements of ASTM A615 as follows:

1. Grade 60: Use for bar sizes of No. 3 and larger, unless shown otherwise.

2. Grade 40: May be used for No. 3 bars if so stated on the structural drawings.

3. Weldable Grade 40: Use for bars which are shown on the structural drawings as being welded to steel members.

4. Grade 75: Use where indicated on structural drawings.

B. Steel Wire: ASTM A82, minimum 16 ga. (1.6 mm), annealed wire, galvanized.

C. Welded Wire Fabric: ASTM A185.

1. Furnish in flat sheets, not rolls.

D. Supports for Reinforcement:

1. Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place.

a. Use wire bar type supports complying with CRSI recommendations, unless otherwise indicated. Do no use wood, brick, and other unacceptable materials.

b. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

c. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with either hot-dip galvanized or plastic protected or stainless steel protected legs, at Contractor's option.

d. For abrasive-blasted or bush-hammered concrete, provide special stainless bar supports (CRSI, Class E).

2.2 FABRICATION:

A. General: Form to dimensions and bends shown. Use cold forming methods that will not injure the material.

B. Bending and Straightening: Reinforcement shall be carefully formed to the dimensions shown. Metal reinforcements shall not be bent or straightened in a manner that will injure the material. Bars with kinks or bends not shown shall not be used. Heating of reinforcing will not be permitted.

C. Design:

1. Splices: When it is necessary to splice reinforcement other than as shown, the splice shall be determined by the Structural Engineer on the basis of allowable bond and stress in the reinforcement at the splice. Splicing shall not be made at points of maximum stress, nor shall adjacent bars be spliced at the same point. When several bars are spliced, laps shall be staggered.

2. Horizontal wall reinforcement shall be continuous and shall have 90 degree bends and extensions at corners and intersections as shown.

D. Epoxy-Coated Reinforcing

1. General:

a. Epoxy-coated reinforcing bars: When specified by the Engineer/Architect, epoxy-coated reinforcing bars shall conform to ASTM A 775. The reinforcing bars to be epoxy-coated shall conform to Section 2.1.

b. Repair of damaged epoxy-coating: When required, damaged epoxy-coating shall be repaired with patching material conforming to ASTM A 775. Repair shall be done in accordance with the patching material manufacturer's recommendations.

c. Bar mats may be fabricated from epoxy-coated reinforcing bars. Metal clips shall be epoxy-coated. Non-metallic clips may be used. Coating damage at the clipped or welded intersections shall be repaired in accordance with item b. above.

2. Fabrication:

a. All epoxy-coated reinforcement shall be bent cold unless otherwise permitted by the Engineer/Architect.

3. Placing (Field Installation):

a. Epoxy-coated reinforcing bars supported from formwork shall rest on coated wire bar supports, or on bar supports made of dielectric material or other acceptable materials. Wire bar supports shall be coated with dielectric material for a minimum distance of 2 inches from the point of contact with the epoxy-coated reinforcing bars. Reinforcing bars used as support bars shall be epoxy-coated. In walls having epoxy-coated reinforcing bars, spreader bars where specified by the Engineer/Architect, shall be epoxy-coated. Proprietary combination bar clips and spreaders used in walls with epoxy-coated reinforcing bars shall be made of corrosion-resistant material.

b. Epoxy-coated reinforcing bars shall be fastened with nylon-, epoxy-, or plastic-coated tie wire, or other acceptable materials.

c. Splices of reinforcing bars shall be made only as required or permitted by the Contract Documents, or as authorized by the Engineer/Architect.

d. Welded splices: When required or permitted, all welding of reinforcing bars shall conform to AWS D1.4. Unless otherwise permitted, welding of crossing bars (including tack welding) for assembly of reinforcement is prohibited.

e. Suitable ventilation shall be provided when welding epoxy-coated reinforcing bars.

f. After completion of welding on epoxy-coated reinforcing bars, coating damage shall be repaired in accordance with item 1.b. All welds, and all steel splice members when used to splice bars, shall be coated with the same material used for repair of coating damage.

g. Mechanical connections: When required or permitted, mechanical connections shall be installed in accordance with the splice device manufacturer's recommendations.

h. After installing mechanical connections on epoxy-coated reinforcing bars, coating damage shall be repaired in accordance with item 1.6. All parts of mechanical connections used on coated bars, including steel splice sleeves, bolts, and nuts shall be coated with the same material used for repair of coating damage.

i. Reinforcing bars partially embedded in concrete shall not be field bent, except as indicated on the Contract Documents or permitted by the Engineer/Architect. When heat is used to field bend epoxy-coated reinforcing bars, suitable ventilation shall be provided. When epoxy-coated reinforcing bars are field bent, coating damage shall be repaired in accordance with item 1.b.

j. Unless permitted by the Engineer/Architect, reinforcing bars shall not be cut in the field. When epoxy-coated reinforcing bars are cut in the field, the ends of the bars shall be coated with the same material used for repair of coating damage.

k. Epoxy-coated reinforcing bars: Equipment for handling epoxy-coated bars shall have protected contact areas. Bundles of coated bars shall be lifted at multiple pick-up points to minimize bar-to-bar abrasion from sags in the bundles. Coated bars or bundles of coated bars shall not be dropped or dragged. Coated bars shall be stored on protective cribbing. Fading of the color of the coating shall not be cause for rejection of epoxy-coated reinforcing bars. Coating damage due to handling, shipment and placing need not be repaired in cases where the damaged area is 0.1 square inches or smaller. Damaged areas larger than 0.1 square inches shall be repaired in accordance with item 1.b. The maximum amount of damage including repaired and unrepaired areas shall not exceed 2 percent of the surface area of each bar.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Examine substrates and adjoining construction, and conditions under which the Work is to be installed. Do not proceed with the Work until unsatisfactory conditions detrimental to proper and timely completion of the work have been corrected.

3.2 INSTALLATION:

A. General: Comply with the specified codes and standards, and Concrete Reinforcing Steel Institute recommended practice for "Placing Reinforcing Bars" and "Manual of Standard Practice," for details and methods of reinforcement placement and supports, and as herein specified.

B. Cleaning: Reinforcing steel shall be cleaned and free of salts, mill scale and rust. Cleaning shall be by brushing or grit blasting and water just prior to placing. Following cleaning, the reinforcing shall be covered or protected from the elements until immediately prior to placing of concrete. When there is a delay in depositing concrete, reinforcement shall be reinspected and, when necessary, recleaned.

C. Placing Reinforcement:

1. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.

2. Place reinforcement to obtain the minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports together with wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directly away from exposed concrete surfaces.

3. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one and one-half full mesh and lace splices with wire. Do not make end laps midway between supporting beams, or directly over beams of continuous structures. Offset end laps in adjacent widths to prevent continuous laps. Comply with ACI 318 requirements for splicing mesh.

4. Provide sufficient numbers of supports with strength to carry reinforcement. Do not place reinforcement bars more than 2 in. (50.8 mm) beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

D. Splices:

1. Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly wire tying. Comply with requirements of ACI 318 for minimum lap of splicing bars.

2. Mechanical butt splicing, using exothermic welding processes and high-strength steel sleeves which develop the same values of strength may be used. Comply with manufacturer's directions for preparation of bars and installation procedures.

3. End splices in vertical reinforcing for No. 11 bars and larger may be made using a mechanical friction device which provides positive concentric alignment during placement. Comply with manufacturer's directions for bar preparation and installation of clamping devices.

E. Welding: Comply with the requirements of AWS D1.4 for field welding. Prior to field welding, determine the weldability of reinforcing bars by a laboratory chemical analysis of steel. Only steel conforming to the chemical requirements specified in AWS D1.4 may be welded.

END OF SECTION 03 20 00

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS: The Conditions of the Contract and applicable requirements of Division 1 govern this Section.

1.2 DESCRIPTION OF WORK:

A. Work Included: This Section covers concrete materials, accessories, mixing, placing, finishing, curing and protection, and manufacture of concrete roof pavers.

B. Work of Other Sections:

1. Applicable Sections of Divisions 2 and 3.

2. Concrete Curbs, Walks, Paving, Slurry Walls, Caissons, and Drilled Piers.

3. Independent Testing Laboratory.

C. Applicability to Other Sections: Some requirements given within this Section apply to the Work of other sections. The actual performance of the Work stays within the section it occurs, but subject to the requirements of this Section to the extent applicable.

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. Comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.

a. ACI 301 "Specifications for Structural Concrete for Buildings."

b. ACI 311 "Recommended Practice for Concrete Inspection."

c. ACI 318 "Building Code Requirements for Reinforced Concrete."

d. ACI 347 "Guide to Formwork for Concrete."

e. ACI 304 "Guide for Measuring, Mixing, Transporting and Placing Concrete."

f. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".

2. Comply with Building Code requirements which are more stringent than the above.

B. Workmanship: The Contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as directed by the Architect.

1.4 SUBMITTALS:

A. Architect's Samples: Samples of special finishes are available in the Architect's office for review by the Contractor before starting work. Coordinate procurement and selection of materials, design, batching and mixing of exposed concrete, to obtain acceptable color and finish in the completed work.

B. Field Constructed Samples:

1. Fabricate sample sections representative of specified finished surfaces in locations on the site as directed by the Architect. Form, reinforce, mix, cast, cure and finish sample units using selected materials and construction methods proposed for work. Provide sample sections as follows:

a. Wall section of "L"-shaped panels, approximately 4 ft. (1.2 m) high x 3 ft. (0.91 m) each side x 6 in. (0.15 m) thick, unless otherwise shown. Form faces to represent as-cast surface finish. Include not less than 2 form ties, 2 form panel intersections, one vertical construction joint and one horizontal construction joint.

b. Column section, approximately 4 ft. (1.2 m) high and not less than 12 in. (0.3 m) diameter for round sections and not less than 12 in. (0.3 m) in least dimension for rectangular sections, unless otherwise shown. Chamfer exposed edges of rectangular sample columns as required.

c. Slab-on-grade section, approximately 10 x 10 for steel troweled surfaces or 10 x 20 for surfaces receiving a "shake-on" hardener. There should be at least one construction joint and one contraction joint in these sample slabs.

d. Pan-formed section using at least 2 pan form units. Set units to illustrate method of blending exposed pan joints.

2. Do not remove sample sections without written permission from the Architect. When directed, demolish sample sections and remove from the site.

C. Concrete Mix Designs:

1. All mix designs shall be proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318-89. The proposed mix designs shall be accompanied by complete standard deviation analysis or trial mixture test data. Submit mix designs on each class of concrete for review on the Mix Design Submittal Form attached at the end of the specification.

2. These mix designs shall be prepared in accordance with 211.1 for normal weight concrete and report to the Architect the following data:

a. Complete identification of aggregate source of supply.

b. Tests of aggregates for compliance with specified requirements.

c. Scale weight of each aggregate.

d. Absorbed water in each aggregate.

e. Brand, type and composition of cement.

f. Brand, type and amount of each admixture.

g. Water content.

h. Proportions of each material per cu. yd. (per cu. m)

i. Gross weight and yield per cu. yd. (per cu. m) of proposed mix.

j. Measured initial and final slump.

k. Measured air content.

l. Compressive strength developed at 7 days and 28 days, from trial mixture test data or from standard deviation analysis of previous test results.

3. Submit written reports to the Architect for each proposed mix of each type of concrete on the Mix Design Submittal Form at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Architect.

4. Lightweight Concrete: Design the mix to produce the strength (Fct) of not less than 400psi for 4000 psi concrete and 300 psi for 3000 psi concrete. The dry weight shall not be less than 95 lbs. or more than 115 lbs. after 28 days. Limit shrinkage to 0.03% at 28 days. Use lightweight concrete where shown on plans.

D. Laboratory Trial Batches:

1. Prepare test specimens in accordance with ASTM C192 and conduct strength test in accordance with ASTM C39, as specified in ACI 301.

2. Establish a curve showing relationship between water-cement ratio (or cement content) and compressive strength, with at least 3 points representing batches which produce strengths above and below that required. Use not less than 3 specimens tested at 28-days or an earlier age, when acceptable to the Architect, to establish each point on the curve. If trial batches are used, the mix design shall be prepared by an independent testing laboratory and shall achieve an average compressive strength 1200 psi higher than the specified strength. This over-design shall be increased to 1400 psi when concrete strengths over 5000 are used.

E. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to the Owner and as accepted by the Architect. Laboratory tests data for revised mix designs and strength results must be submitted to and accepted by the Architect before using in the Work.

F. Admixtures:

1. Use air-entraining admixture in exterior concrete, unless otherwise indicated. Add air-entraining admixture to concrete at the manufacturer's prescribed rate to result in having air content (at the point of placement) within the following limits:

a. Concrete structures and slabs exposed to freezing and thawing or subjected to hydraulic pressure:

(1) 4% for maximum 2 in. (50.8 mm) aggregate.

(2) 6% for maximum 3/4 in. (19.05 mm) aggregate.

(3) 7% for maximum 1/2 in. (12.7 mm) aggregate.

b. Interior Slabs, subjected to vehicular traffic, shall have a maximum air content of 3%.

2. All concrete must contain the specified water-reducing admixture or the specified high-range water-reducing admixture (superplasticizer).

3. All concrete slabs placed at air temperatures below 50 degrees F shall contain the specified non-corrosive, non-chloride accelerator. All concrete required to be air entrained shall contain an approved air entraining admixture.

4. All pumped concrete, concrete for industrial slabs, synthetic fiber concrete, architectural concrete, concrete required to be watertight or concrete with a water/cement ratio below 0.50 shall contain the specified high-range water-reducing admixture (superplasticizer).

G. Slump:

1. All concrete containing the high-range water-reducing admixture (superplasticizer) shall have a maximum slump of 9" unless otherwise approved by the architect.

2. The concrete shall arrive at the job site at a slump of 2" to 3", (3" to 4" for concrete receiving a "shake-on" hardener or lightweight concrete), be verified, then the high-range water-reducing admixture added to increase the slump to the approved level.

3. All other concrete shall have a maximum slump of 4".

H. Water/Cement Ratio: All concrete subject to freezing and thawing shall have a maximum water/cement ratio of 0.50 (4000 psi at 28 days or more). All concrete subjected to deicers and/or required to be watertight shall have a maximum water/cement ratio of 0.45 (4500 psi at 28 days or more). All reinforced concrete subjected to brackish water, salt spray or deicers shall have a maximum water/cement ratio of 0.40 (5000 psi at 28 days or more).

I. Manufacturer's Data:

1. Submit manufacturer's product data, specifications with application and installation instructions for proprietary materials and items, including admixtures, bonding agents, waterstops, joint systems, curing compounds, and dry shake finish materials.

2. Submit and secure approval of the Architect for the following data, information and procedures:

a. Cement: Source of supply, physical and chemical characteristics, transportation and intermediate terminaling and storage procedures from mill to project and site storage procedures.

b. Aggregate: Physical and chemical properties, procurement, processing and storage facilities.

c. Mixing Water: Source and chemical analysis.

d. Equipment: Description and handling capacities for concrete placement to include buckets, chutes, pump and tremies. Concrete consolidation equipment technical data.

e. Concrete:

(1) Batching and mixing equipment and procedures.

(2) Transport equipment and description of techniques.

(3) Curing procedures.

(4) Mix designs for each type of concrete including trial batch results, ingredients, physical properties.

(5) Hot and Cold Weather Concreting precautions and procedures.

J. Samples: Submit samples of materials as specified and as otherwise may be requested by the Architect, including names, sources and descriptions as required.

K. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test results.

L. Placement Schedule: Prepare a placement schedule and submit to Architect for review prior to start of concrete placement.

M. Delivery Tickets: Furnish copies of delivery tickets for each load of concrete delivered to the site. Provide items of information as specified hereinafter.

1.5 PRODUCT HANDLING: Comply with ACI 301, chapter 2, paragraph 2.5, and ACI 304.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS:

A. Portland Cement:

1. ASTM C150, as follows:

a. Provide Type I cement, except as otherwise indicated. Type III cement may be used in lieu of Type I at Contractor's option, when approved by the Architect.

b. Provide Type III cement for High-Early Strength concrete where shown.

c. Provide white cement where shown.

2. Use only one brand of cement for each required type throughout the project, unless otherwise accepted by the Architect.

B. Normal Weight Aggregates:

1. General:

a. Provide aggregates complying with ASTM C33, from selected sources with acceptable limits of contaminants to meet requirements herein described.

b. Do not use aggregates containing soluble salts or other substances such as iron sulphides, pyrite, marcasite or ochre which can cause stains on exposed concrete surfaces.

c. The total chloride content in the coarse and fine aggregates shall not exceed 0.05 lbs./cu.yd. for concrete subjected to deicers, brackish water, salt spray in service. Air content maximum in other concrete shall be as approved by the Engineer.

2. Fine Aggregate:

a. Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances.

b. Fine aggregates shall contain no greater than 0.05% by weight of chlorides and no greater than 0.4% by weight of sulphates.

3. Coarse Aggregate:

a. Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter, as follows:

(1) Crushed stone, processed from natural rock or stone.

(2) Washed gravel, either natural or crushed. Use of pit or bank run gravel is not permitted.

(3) Blast-furnace slag, crushed and processed from air cooled, iron blast-furnace slag weighing not less than 70 lbs./cu. ft. (1 121.3 kg/cu. m) in the dry, compacted state when determined in compliance with ASTM C29.

b. Coarse aggregate shall not be larger than one-fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs, nor three-fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars.

c. Coarse aggregate shall be 3/4 in. (19 mm) maximum size and 3/8 in. (9.5 mm) minimum size.

d. Coarse aggregate shall contain no greater than 0.025% by weight of chlorides and no greater than 0.4% by weight of sulphate unless otherwise approved by the Engineer.

C. Lightweight Aggregates: ASTM C330.

D. Supply of Aggregates: Provide aggregates from one source of supply to ensure uniformity in color, size and shape.

E. Water: Clean, fresh, potable.

2.2 CONCRETE ADMIXTURES:

A. General: Provide admixtures produced by established reputable manufacturer's and use in compliance with the manufacturer's printed directions. Do not use admixtures which have not been incorporated and tested in accepted mixes, unless otherwise authorized in writing by the Architect.

B. Air-Entraining Admixtures: ASTM C260.

C. Water-Reducing Admixture: The admixture shall conform to ASTM C494, Type A and not contain more chloride ions than are present in municipal drinking water. Provide one of the following:

1. Eucon WR-75 or WR-89; The Euclid Chemical Co.

2. Pozzolith 200N; Master Builders

3. Plastocrete 160; Sika Chemical Corp.

D. Water-Reducing, Retarding Admixture: The admixture shall conform to ASTM C494, Type D and not contain more chloride ions than are present in municipal drinking water. Provide one of the following:

1. Eucon Retarder-75; The Euclid Chemical Co.

2. Pozzolith 100XR; Master Builders

3. Plastiment; Sika Chemical Corp.

E. High Range Water-Reducing Admixture (Superplasticizer): The admixture shall conform to ASTM C494, Type F or G, and not contain more chloride ions than are present in municipal drinking water. Provide one of the following:

1. Eucon 37; The Euclid Chemical Co.

2. Sikament 300; Sika Chemical Corp.

3. Rheobuild 1000; Master Builders

F. Non-Corrosive, Non-Chloride Accelerator: The admixture shall conform to ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Provide one of the following:

1. Accelguard 90; The Euclid Chemical Co.

G. Fly Ash: ASTM C618. Fly ash is not allowed in concrete supporting vehicular traffic.

H. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are not permitted. No admixture shall cause an increase in shrinkage when tested in accordance with ASTM C494 and ASTM C157.

I. Certification: Written conformance to the above mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to mix design review by the Engineer.

2.3 RELATED MATERIALS: Waterstops.

A. Use extruded flat, dumbbell or centerbulb type PVC waterstops complying with CRD C 572 at construction joints and other joints where no movement is expected, unless otherwise shown. Web thickness shall not be less than 3/16 in. (4.8 mm) for units up to 5 in. (0.13 m) wide, and not less than 3/8 in. (9.52 mm) for widths 5 in. (0.13 m) and over.

B. Cross sections shall be dense, homogenous and free from porosity and other imperfections. Waterstops shall have a 1900 psi (1.34 kg/sq. m) tensile strength and a minimum elongation of 200%. Provide shapes and sizes for each condition.

2.4 VAPOR BARRIER: Provide vapor barrier cover over prepared base material where shown. Use only materials which are resistant to decay when tested in accordance with ASTM E154, as follows:

A. Polyethylene sheet not less than 6 mils (0.15 mm) thick.

B. Water resistant barrier paper consisting of heavy Kraft paper, laminated together with glass fiber reinforcement and overcoated with black polyethylene on each side.

2.5 BONDING AND REPAIR MATERIALS:

A. Bonding Agent: Polyvinyl acetate or acrylic base.

1. Provide Polyvinyl Acetate (interior only) as manufactured by one of the following:

a. Euco-Weld; The Euclid Chemical Co.

b. Weld-Crete; Larssen Products Corp.

2. Provide Acrylic or Styrene Butadiene as manufactured by one of the following:

a. SBR Latex or Flex-Con; The Euclid Chemical Co.

b. Daraweld C; W. R. Grace

c. Sonocrete; Sonneborn-Chemrex

B. Epoxy Adhesive: ASTM C881, two component material suitable for use.

1. Provide as manufactured by one of the following:

a. Euco Epoxy No. 452MV or No. 620; The Euclid Chemical Co.

b. Sikadure 32 Hi-Mod; Sika Chemical Corp.

C. Polymer Patching Mortar: Free flowing, polymer modified cementitious mortar.

1. Provide for Horizontal Repairs as manufactured by one of the following:

a. Euco Thin Coat, Concrete Coat; The Euclid Chemical Co.

b. Sikatop 121 or 122; Sika Chemical Corp.

2. Provide for Vertical and Overhead Repairs as manufactured by one of the following:

a. Verticoat; The Euclid Chemical Co.

b. Sikatop 123; Sika Chemical Corp.

D. Underlayment Compound: Free-flowing, self-leveling, pumpable cementitious base compound.

1. Provide as manufactured by one of the following:

a. Flo-Top; The Euclid Chemical Co.

2. The compound shall exhibit the following properties:

Compressive Strength (ASTM C109) -	3600 PSI @ 7 days
	- 5000 PSI @ 28 days
Bond Strength (ASTM C1042)	- 700 PSI @ 7 days
	- 1000 PSI @ 28 days

E. Repair Topping: Self-leveling, polymer modified high strength topping. The topping shall exhibit the following properties:

Chaplin Abrasion Test - 0.20 mm (0.0079") maximum @ 28 days (British Standard 8204)

1. Provide as manufactured by one of the following:

a. Thin Top SL; The Euclid Chemical Co.

2.6 FLOOR FINISH MATERIALS:

A. Non-Oxidizing Metallic Floor Hardener: The specified non-oxidizing metallic floor hardener shall be formulated, processed and packaged under stringent quality control at the manufacturer's owned and controlled factory. The hardener shall be a mixture of specially processed non-rusting aggregate, selected Portland cement and necessary plasticizing agents. Provide hardener as manufactured by one of the following:

1. Diamond-Plate; The Euclid Chemical Co.

B. Aggregate for Non-Slip Finish:

1. Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish, with emery aggregate containing not less than 40% aluminum oxide and not less

than 25% ferric oxide. Use material that is factory-graded, packaged, rust-proof and non-glazing and is unaffected by freezing, moisture and cleaning materials.

2. Provide aluminum oxide abrasive grits as manufactured by one of the following:

a. Non-Slip Aggregate; The Euclid Chemical Co.

b. Griptex; L & M Construction Chemicals.

c. A-H Alox; Anti-Hydro Waterproofing Co.

d. Frictex; Sonneborn-Contech.

e. Toxgrip; Toch Div.-Carboline.

C. Epoxy Joint Filler:

1. The epoxy joint filler shall be a two (2) component, 100% solids compound, with a minimum shore D hardness of 50.

2. Provide joint filler as manufactured by one of the following:

a. Euco 700; The Euclid Chemical Co.

b. Sikadur 51SL; Sika Chemical Corp.

2.7 CONCRETE CURING MATERIALS:

A. Moisture-Retaining Cover: Provide one of the following, complying with ASTM C171:

1. Waterproof paper.

2. Polyethylene film.

3. White burlap-polyethylene sheet.

B. Sealer/Dustproofer (VOC Compliant):

1. The compound shall be a water-based acrylic sealer and shall not yellow under ultra violet light after 500 hours of test in accordance with ASTM C4587.

2. Provide as manufactured by one of the following:

a. Floor Seal VOX; The Euclid Chemical Co.

C. Curing and Sealing Compound:

1. The compound shall be a clear styrene acrylate type, 30% solids content minimum, and have test data from an independent testing laboratory indicating a maximum moisture loss of 0.030 grams per sq. cm. when applied at a coverage rate of 300 sq. ft. per gallon. Manufacturer's certification required. Sodium silicate compounds are not permitted.

2. Provide compound as manufactured by one of the following:

a. Super Rez Seal; The Euclid Chemical Co.

b. Masterkure 30; Master Builders

OR

C. Clear Curing and Sealing Compound (VOC compliant):

1. The compound shall have 30% solids content minimum and will not yellow under ultra violet light after 500 hours of test in accordance with ASTM C4587 and will have test data from an independent testing laboratory indicating a maximum moisture loss of 0.039 grams per sq. cm. when applied at a coverage rate of 300 sq.ft. per gallon.

2. Provide compound as manufactured by one of the following:

a. Super Diamond Clear VOX; The Euclid Chemical Co.

2.8 NON-SHRINK GROUT:

A. The non-shrink grout shall be a factory pre-mixed grout and shall conform to ASTM C1107, "Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)." In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 4' x 4' base plate.

1. Provide as manufactured by one of the following:

a. Euco NS; The Euclid Chemical Co.

b. Masterflow 713; Master Builders

B. Where high fluidity and/or increased placing time is required use high flow grout. In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under an 18" x 36" base plate.

1. Provide as manufactured by one of the following:

a. Euco Hi-Flow Grout; The Euclid Chemical Co.

b. Masterflow 928; Master Builders

2.9 PRE-CONCRETE CONFERENCE:

A. At least 35 days prior to start of the concrete construction schedule, the Contractor shall conduct a meeting to review the proposed mix designs and to discuss the required methods and procedures to achieve the required concrete construction.

B. The Contractor shall require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:

1. Contractor's superintendent.
2. Laboratory responsible for the concrete design mix.
3. Laboratory responsible for field quality control.
4. Concrete subcontractor.
5. Ready-mix concrete producer.
6. Admixture manufacturer(s).
7. Concrete pumping contractor.

C. Minutes of the meeting shall be recorded, typed and printed by the contractor and distributed by him to all parties concerned within 5 days of the meeting. One copy of the minutes shall also be transmitted to the following for information purposes:

1. Owner's representative.
2. Resident Engineer.
3. Consultant Engineer.

D. The minutes shall include a statement by the admixture manufacturer(s) indicating that the proposed mix design and placing techniques can produce the concrete quality required by these specifications.

E. The Consultant Engineer will be present at the conference. The Contractor shall notify the Consultant Engineer at least 10 days prior to the scheduled date of the conference.

PART 3 – EXECUTION

3.1 CONCRETE MIXING:

A. General: Concrete shall be mixed at batch plants, complying with the requirements of ACI 304, with sufficient capacity to produce concrete of the qualities specified in quantities required to meet the construction schedule. All plant facilities are subject to independent testing laboratory inspection and acceptance of the Architect.

B. Ready-Mix Concrete:

1. Comply with the requirements of ASTM C94, and as herein specified, provided the quantity and rate of delivery will permit unrestricted progress of the work in accordance with the placement schedule. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required, as specified below. Proposed changes in mixing procedures, other than herein specified, must be accepted by the Architect before implementation.

2. Plant Equipment and Facilities: Conform to National Ready-Mix Concrete Association "Checklist for Certification of Ready-Mix Concrete Production Facilities."

3. Modifications to ASTM C94 are as follows:

   a. Quality of Concrete: Provide concrete materials, proportions, and properties as herein specified, in lieu of ASTM Section 4.

   b. Tolerances in Slump: Provide slump of not more than the values as herein specified in lieu of ASTM Section 6.1. Comply with other criteria of ASTM Section 6.

   c. Mixing and Delivery: Delete the references for allowing additional water to be added to the batch for material with insufficient slump. Addition of water to the batch will not be permitted as specified in ASTM Section 11.7. In addition to the requirements of ASTM Section 11.7, when the air temperature is between 85 degrees F. (29.4 degrees C.) and 90 degrees F. (32.2 degrees C.), reduce the mixing and delivery time to 60 minutes. When a truck mixer is used for the complete mixing of the concrete, begin the mixing operation within 30 minutes after the cement has been intermingled with the aggregates.

   d. Certification: Furnish delivery tickets with each load of concrete delivered to the site. In addition to the requirements of ASTM Section 16.1 provide the following information on delivery tickets:

      (1) Type and brand of cement.

      (2) Cement content per cu. yd., of concrete.

      (3) Maximum size of aggregate.

      (4) Total water content expressed as water/cement ratio.

   e. Strength: Delete ASTM Section 17; comply with concrete testing requirements as herein specified.

4. Maintain equipment in proper operating condition, with drums cleaned before charging each batch. Schedule rates of delivery in order to prevent delay of placing the concrete after mixing or holding dry-mixed materials too long in the mixer before the addition of water and admixtures.

3.2 INSPECTION: Examine substrates and adjoining construction, and conditions under which work is to be installed. Do not proceed with the work until unsatisfactory conditions detrimental to the proper and timely completion of the work have been corrected.

3.3 PREPARATION:

A. General:

1. Thoroughly wet wood forms immediately before placing concrete, as required where form coatings are not used.

2. Soil at bottom of foundation systems are subject to testing for soil bearing value by the testing laboratory, as directed by the Architect. Place concrete immediately after approval of foundation excavations.

3. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

B. Vapor Barrier: Provide 2 layers of specified material, lapping joints 6 in. (0.15 m) minimum. Seal joints using manufacturer's recommended tape. Stagger laps of each layer. Note area to receive 3 in. of approved damp compactible fill before placing new concrete.

3.4 CONCRETE PLACEMENT:

A. General: Place concrete in compliance with the practice and recommendations of ACI 304, and as herein specified.

1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or plane of weakness within the section.

   If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing. Do not subject concrete to any procedure which will cause segregation.

2. Screed concrete which is to receive other construction to the proper level to avoid excessive skimming or grouting.

3. Do not use concrete which becomes non-plastic and unworkable, or does not meet the required quality control limits, or which has been contaminated by foreign materials. Do not use retempered concrete. Remove rejected concrete from the project site and dispose of in an acceptable location.

4. Redosage: Redosage with the specified high-range water-reducing admixture (superplasticizer) may be done with the prior approval of the Structural Engineer regarding dosage and time periods.

B. Placement Schedule: Place concrete in conformance with the placement schedule to ensure an even distribution of loads throughout the entire structure.

C. Concrete Conveying:

1. Handle concrete from the point of delivery to transfer the concrete by conveying equipment to the locations of final deposit as rapidly as practicable by methods which will prevent segregation and loss of concrete mix materials. Comply with ASTM C94.

2. Provide mechanical equipment for conveying concrete to ensure a continuous flow of concrete at the delivery end. Provide runways for wheeled concrete conveying equipment from the concrete delivery point to the locations of final deposit. Keep interior surfaces of conveying equipment, including chutes, free of hardened concrete, debris, water, snow, ice and other deleterious materials.

D. Placing Concrete into Forms:

1. Deposit concrete in forms in horizontal layers not deeper than 24 in. (0.61 m) and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

2. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing.

3. Remove temporary spreaders in forms when concrete placing has reached the elevation of such spreaders.

4. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate the layer of concrete and at least 6 in (0.15 m) into the preceding layer, except do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit the duration of vibration to the time necessary to consolidate the concrete and complete embedment of reinforcement and other embedded items without causing segregation of the mix.

5. Do not place concrete in supporting elements until the concrete previously placed in columns and walls is no longer plastic.

6. All foundation footings shall be poured monolithic, unless approved by the Architect.

E. Consolidation:

1. Comply with the requirements of ACI 309. Immediately after placing, compact each layer of concrete by internal concrete vibrators supplemented by hand-spading, rodding or tamping. Do not use vibrators to transport concrete inside forms. Maintain internal vibrators during all phases of operation at a frequency of not less than 8,000 vibrations per minute. Vibration of reinforcing will not be permitted. Form vibration may be used if the equipment and procedure is approved by the Architect.

2. Limit duration of vibration to the time necessary to produce satisfactory consolidation without causing segregation of aggregates.

3. Spacing between insertions of that vibrator to be used to consolidate the mix shall not exceed twice the radius of action as shown in table 5.1.5 of ACI 309. Under no circumstances shall the points of insertion during the consolidation phase be more than 18 in. (0.46 m) apart.

F. Placing Concrete Slabs:

1. Deposit and consolidate the concrete slabs in a continuous operation, within the limits of construction joints, until the placing of a panel or section is completed.
2. Consolidate concrete during placing operations using mechanical vibrating equipment, so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

3. Bring slab surfaces to the correct level with a straightedge and strike off. Use highway straightedge, bull floats or darbies to smooth the surface, leaving it free of humps or

hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.

G. Bonding:

1. Roughen surfaces of set concrete at all joints, except where bonding is obtained by the use of concrete bonding agent, and clean surfaces of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner to expose bonded aggregate uniformly and to not leave laitance, loose particles of aggregate, or damaged concrete at the surface.

2. Prepare for bonding of fresh concrete to new concrete that has set but is not fully cured, as follows:

   a. At joints between footings and walls or columns, and between walls or columns and beams or slabs they support, and elsewhere unless otherwise specified herein, dampen, but do not saturate, the roughened and cleaned surface of set concrete immediately before placing fresh concrete.

   b. At joints in exposed work, at vertical joints in walls, at joints in girders, beams, supported slabs and other structural members, and at joints designed to restrict water, apply to the roughened and cleaned surface of set concrete either the specified non-rewettable latex bonding agent or epoxy adhesive.

      (1) Apply latex bonding agent in accordance with printed instructions of manufacturer.

      (2) Apply epoxy adhesive in strict accordance with the directions of the manufacturer.

3. Prepare for bonding of fresh concrete to fully-cured hardened concrete or existing concrete by using an epoxy-resin bonding agent as follows:

   a. Handle and store epoxy-resin adhesive binder in compliance with the manufacturer's printed instructions, including safety precautions.

   b. Mix the epoxy-resin adhesive binder in the proportions recommended by the manufacturer, carefully following directions for safety of personnel.

   c. Before depositing fresh concrete, thoroughly roughen and clean hardened concrete surfaces and coat with epoxy-resin grout not less than 1/16 in. (1.6 mm) thick. Place fresh concrete while the epoxy-resin material is still tacky, without removing the in-place grout coat, and as directed by the epoxy-resin manufacturer.

H. Cold Weather Placing:

1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 306 and as herein specified.

2. When the air temperature has fallen to or is expected to fall below 40 degrees F. (4.44 degrees C.), provide adequate means to maintain the temperature in the area where concrete is being placed at either 70 degrees F. (21.11 degrees C.) for 3 days or 50 degrees F. (10 degrees C.) for 5 days after placing. Provide temporary housings or

coverings including tarpaulins or plastic film. Keep protections in place and intact at least 24 hours after artificial heat is discontinued. Avoid dryout of concrete due to overheating and avoid thermal shock due to sudden cooling or heating.

3. When air temperature has fallen to or is expected to fall below 40 degrees F. (4.44 degrees C.), uniformly heat water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 50 degrees F. (10 degrees C.) and not more than 80 degrees F. (26.67 degrees C.) at point of placement.

4. Do not use frozen materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Ascertain that forms, reinforcing steel, and adjacent concrete surfaces are entirely free of frost, snow and ice before placing concrete.

5. Only the specified non-corrosive non-chloride accelerator shall be used. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are not permitted.

I. Hot Weather Placing:

1. In addition to the procedures below, comply with "Hot Weather Concreting", ACI 305.

2. No concrete placement shall take place in conditions where the ambient outside air temperature exceeds 96 degrees F. (35.6 degrees C.) or wind velocity exceeds 6.2 mph (10km/h) unless additional precautions are taken to protect the concrete during mixing, placement, finishing, and curing as outlined here and/or as approved by the Architect.

3. When hot weather conditions require, the following precautions shall be taken:

a. Dampen subgrade and forms.

b. Dampen aggregates slightly if they are dry and absorptive.

c. Erect wind breaks to reduce the wind's velocity over concrete flat work.

d. Erect sunshades or plan concrete placement on overcast days or in the latter part of the day to reduce the surface temperature of concrete work.

e. Protect concrete with temporary wet coverings during any significant delay between placement and finishing concrete work.

f. The total time between commencement of concrete placement and the start of concrete curing process shall be minimized.

g. Exposed concrete surfaces shall be moistened by a light fog spray after the completion of the finishing operations. Before the start of curing operations, no spraying may be used until after the final steel troweling or until the surface is uniformly hardened past the "thumbprint hard" stage, with no free water at the surface.

h. Evaporation Retarder: When high temperatures, low humidity and dry winds create conditions suitable for plastic cracking, the evaporation retarder "Eucobar" by The

Euclid Chemical Co. or "Confilm" by Master Builders may be required to be applied by spray one or more times during the finishing operation.

4. Materials used in making concrete under hot weather conditions shall be kept as cool as possible by shading or evaporative cooling. To lower the temperature of the concrete mix equal volumes of ice may be used to substitute for portions of the mixing water, as recommended by the ACI and approved by the Architect.

5. When hot weather conditions exist, all concrete shall be placed within 45 minutes of the time of the beginning of mixing.

6. When hot weather conditions exist, it may be found worthwhile to restrict concrete placement to late afternoon or evening to comply with Hot Weather Concreting requirements.

7. Wooden forms shall be sprayed with water while still in place and shall be loosened as soon as possible as not to damage the concrete and prevent curing water from flowing over the exposed surfaces.

8. When high temperatures and/or placing conditions dictate, the engineer may require the use of the water-reducing retarding admixture (Type D) in lieu of the water-reducing admixture (Type A).

3.5 JOINTS:

A. Construction Joints:

1. Locate and install construction joints, which are not shown, so as not to impair strength and appearance of the structure, as acceptable to the Architect. Locate construction joints, if required but not shown, as follows:

a. In walls, at not more than 60 ft. (18.3 m) in any horizontal direction; at top of footings; at top of slabs on ground; at top and bottom of door and window openings or as required to conform to architectural details as directed by the Architect; and at the underside of the deepest beam or girder framing into wall.

b. In columns or piers, at the top of footing; at the top of slabs on ground; and at the underside of the deepest beam or girder framing into the column or pier.

c. Slabs on ground shall be placed in a "strip cast" pattern with construction joints located on column centers. Maximum joint spacing shall be 36 times the slab thickness unless otherwise noted on the drawings. Conform to slab placement diagrams or pattern layout for placement, where shown.

2. Provide keyways at least 1- 1/2 in. (38.1 mm) deep in construction joints in walls, slabs, and between walls and footings.

3. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.

B. Waterstops: Provide waterstops in construction joints as shown. Install waterstops to form a continuous diaphragm in each joint. Make provisions to support and protect waterstops during

the progress of the work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions. Protect waterstop material from damage where it protrudes from any joints.

C. Isolation joints in Slabs on Ground: Provide isolation joints in slabs on ground at all points of contact between slabs on ground and vertical surfaces, such as column pedestals, and elsewhere as indicated.

D. Contraction (Control) Joints in Slabs on Ground:

1. The maximum joint spacing shall be 36 times the slab thickness unless otherwise noted on the drawings. Reinforcement shall not extend across construction joints and the joint detail shall be as noted on the drawings.

2. The Soff-Cut saw shall be used immediately after final finishing and to a depth of 1¼". A conventional saw shall be used as soon as possible without dislodging aggregate and to a depth of 1/4 slab thickness.

3.6 FINISH OF FORMED SURFACES:

A. Rough Form Finish:

1. Provide as-cast rough form finish to formed concrete surfaces that are to be concealed in the finish work or by other construction, unless otherwise indicated. The concrete surface to be plastered shall be turned over to the plastering contractor cleaned of all dust, loose particles, parting and similar compounds and other foreign matter. Dressed (smooth) lumber, metal and plywood forms shall not be used.

2. Standard rough form finish shall be the concrete surface having the texture imparted by the form facing material used, with tie holes and defective areas repaired and patched and all fins and other projections exceeding 1/4 in. (6.35 mm) in height rubbed down or chipped off.

B. Smooth Form Finish:

1. Provide as-cast smooth form finish for formed concrete surfaces that are to be exposed-to-view, or that are to be covered with a coating material applied directly to the concrete, or a covering material bonded to the concrete such as waterproofing, dampproofing, painting, or other similar system.

2. Provide smooth form finish by selecting form material to impart a smooth, hard, uniform texture and arranging the tie holes orderly and symmetrical with a minimum of seams. Repair and patch defective areas with all fins or other projections completely removed and smooth.

C. Smooth Rubbed Finish:

1. Provide smooth rubbed finish to scheduled concrete surfaces which have received form finish treatment, not later than the day after form removal.

2. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

D. Grout Cleaned Finish:

1. Provide grout cleaned finish to scheduled concrete surfaces which have received smooth form finish treatment.

2. Combine one part Portland cement, 1.5 parts fine sand, the specified bonding admixture and water at a 50:50 ratio and mix to achieve the consistency of thick paint. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that the final color of dry grout will closely match adjacent concrete surfaces.

3. Thoroughly wet the concrete surface and apply grout uniformly by brushing or spraying immediately to the wetted surfaces. Scrub with cork float or stone to coat surface and fill surface holes. Remove excess grout by scraping, followed by rubbing with clean burlap and remove any visible grout film. Keep grout damp during setting period by means of fog spray at least 36 hours after final rubbing. Complete any area in the same day it is started, with the limits of any area being natural breaks in the finished surface.

E. Related Unformed Surfaces: At tops of wall, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with textured matching the adjacent formed surfaces. Continue the final surface treatment of formed surfaces uniformly across the adjacent unformed surface, unless otherwise shown.

3.7 MONOLITHIC SLAB FINISHES:

A. Scratch Finish:

1. Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, Portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise shown.

2. After placing slabs, plane the surface to achieve an F_F15/F_L13 tolerance. Slope surfaces uniformly to drains where required. After leveling, roughen the surface before the final set with stiff brushes, brooms or rakes.

B. Float Finish:

1. Apply float finish to monolithic slab surfaces that are to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand bed terrazzo, and as otherwise shown.

2. After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when the surface water has disappeared or when the concrete has stiffened sufficiently to permit the operation of power-driven float, or both. Consolidate the surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check 10 ft. (3 m) when tested with a 10 ft. (3 m) straightedge placed on the surface at not less than 2 different angles. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat the surface to a uniform, smooth, granular texture. Slab shall achieve an F_F20/F_L17 tolerance.

C. Trowel Finish:

1. Apply trowel finish to monolithic slab surfaces that are to be exposed to view, unless otherwise shown, and slab surfaces that are to be covered with resilient flooring, paint, or other thin-film finish coating system.

2. After floating, begin the first trowel finish operation using a power-driven trowel. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface.

3. Consolidate the concrete surface by the final hand troweling operation, free of trowel marks, uniform in texture and appearance and achieve a F_F25/F_L20 (F_L17 for elevated slabs) tolerance. Grind smooth surface defects which would telegraph through applied floor covering system.

D. Non-Slip Broom Finish:

1. Apply non-slip broom finish to exterior concrete platforms, steps, and ramps and elsewhere as shown.

2. Immediately after trowel finishing, slightly roughen the concrete surface by brooming in the direction perpendicular to the main traffic route. Use fiber-bristle broom unless otherwise directed. Coordinate the required final finish with the Architect before application.

E. Non-Oxidizing Metallic Floor Hardener:

1. All slabs, in the loading dock area and other areas so noted on the plans, shall receive an application of the non-oxidizing, metallic floor hardener applied at the rate of 1.5 lbs./sq.ft. The hardener shall be applied in strict accordance with the directions of the manufacturer.

2. Field service shall be provided, upon 5 days notice, by the manufacturer of the hardener to assist the Contractor in obtaining the maximum benefits of the product under the prevailing jobsite conditions. In addition, the representative shall attend the pre-installation conference with the Engineer and the Contractor not later than 10 days prior to the beginning of the installation of the hardener. The Contractor shall furnish an agenda to all attendees 10 days prior to the meeting. Detailed requirements for the hardener including the concrete mix design, equipment, placing and finishing techniques and curing methods shall be discussed and agreed upon.

3. Curing in accordance with sample panel.

F. Non-Slip Aggregate Finish:

1. Apply non-slip aggregate finish to concrete stair treads, platforms, ramps, and elsewhere as shown.

2. After completion of float finishing, and before starting trowel finish, uniformly spread 25 lbs. (11.34 kg) of dampened non-slip aggregate per 100 sq. ft. (9.3 sq. m) of surface.

   Tamp aggregate flush with the surface using a steel trowel, but do not force the non-slip aggregate particles below the surface. After broadcasting and tamping, apply trowel finishing as herein specified.

3. After curing, lightly work the surface with a steel wire brush, or an abrasive stone, and water to expose the non-slip aggregate.

G. Exposed Aggregate Slab Finish:

1. Apply exposed aggregate finish to slab, stairs, and other areas as shown on the drawings or in schedules.

2. Immediately following the first floating operation, apply special aggregate by broadcasting over the floor area and tamping to embed the aggregate. Apply the aggregate at the required rate to match the Architect's sample.

3. After the concrete has taken its initial set, expose the surface aggregates using a water fog-spray and fiber-bristle brooms to remove the surface matrix. Expose the coarse aggregate approximately 1/8 in. (3.2 mm) or more to match the Architect's sample, but not so deep as to displace the bond of the aggregate to the matrix.

4. The use of surface retarders may be permitted if application methods are accepted in writing by the Architect.

5. After the concrete has taken its final set, apply a weak acid wash to clean the exposed aggregate surfaces. Thoroughly neutralize and flush the acid wash from the finish surfaces. Protect all other adjacent construction and finishes from damage due to the acid wash; repair or replace damaged or defaced work as directed by the Architect. Curing procedures shall be as used on the approved sample.

3.8 CONCRETE CURING AND PROTECTION:

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperature and maintain without drying at a relatively constant temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete.

2. Start initial curing as soon as free moisture has disappeared from the concrete surface after placing and finishing. Keep continuously moist for not less than 72 hours.

3. Begin final curing procedures immediately following initial curing and before the concrete has dried. Continue final curing for at least 7 days and in accordance with ACI 301 procedures. Avoid rapid drying at the end of the final curing period.

4. For formed surfaces exposed to sun, maintain the forms wet. After form removal, continue final curing for at least 7 days or as recommended by ACI 301.

B. Curing Methods:

1. Perform curing of concrete by moisture retaining cover curing, membrane curing, or by combinations thereof, as herein specified: For curing, use only water that is free of impurities which could etch or discolor exposed, natural concrete surfaces.

2. Provide moisture-cover curing as follows: Cover the concrete surfaces with the specified moisture-retaining cover for curing concrete, placed in the widest practicable width with

sides and ends lapped at least 3 in. (76.2 mm) and sealed by waterproofing tape or adhesive. Immediately repair any holes or tears during the curing period using cover material and waterproof tape.

3. Provide liquid membrane curing as follows:

a. Apply the specified curing and sealing compound for all exposed interior slabs and troweled slabs receiving mastic applied adhesives or "shake-on" hardeners. Exterior slabs, sidewalks, curbs, and architectural concrete not receiving a penetrating sealer, shall be cured with the specified clear, non-yellowing curing and sealing compound.

b. Do not use membrane curing compounds on surface which are to be covered with a coating material applied directly to the concrete or with a covering material bonded to the concrete, such as other concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials, unless otherwise acceptable to the Architect.

C. Curing Unformed Surfaces:

1. Initially cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by moist curing, or by use of the specified curing compound.

2. Final cure unformed surfaces, unless otherwise indicated, by any of the methods specified above, as applicable.

D. Temperature of Concrete During Curing:

1. When the atmospheric temperature is 40 degrees F. (4.44 degrees C.) and below, maintain the concrete surface temperature between 50 and 70 degrees F. (10 and 21 degrees C.) continuously throughout the curing period. When necessary, make arrangements before concrete placing for heating, covering, insulation or housing as required to maintain the specified temperature and moisture conditions continuously for the concrete curing period. Provide cold weather protections complying with the requirements of ACI 306.

2. When the atmospheric temperature is 94 degrees F. (34.44 degrees C.) and above, or during other climatic conditions which will cause too rapid drying of the concrete, make arrangements before the start of concrete placing for the installation of wind breaks or shading, and for fog spraying, wet sprinkling, or moisture-retaining covering. Protect the concrete continuously for the concrete curing period. Provide hot weather protections complying with the requirements of ACI 305.

3. Maintain concrete temperature as uniformly as possible and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceed 5 degrees in any one hour and 50 degrees in any 24-hour period.

E. Protection from Mechanical Injury: During the curing period, protect concrete from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage caused by rain or flowing water. Protect finished concrete surfaces from damage by subsequent construction operations.

3.9 MISCELLANEOUS CONCRETE ITEMS:

A. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown. Screed, tamp, and finish concrete surfaces as scheduled.

B. Filling-In: Fill-in holes and openings left in concrete structures for the passage of work by other trades, unless otherwise shown or directed, after the work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide all other miscellaneous concrete filling shown or required to complete the work.

C. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

D. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown. Set anchor bolts for machines and equipment with a template at correct elevations, complying with certified diagrams or templates of the manufacturer furnishing the machines and equipment.

E. Non-Shrink Grout: Use the specified non-shrink, non-metallic grout for all column base plates placed at a fluid consistency, shall achieve 95% bearing under a 4'áxá4'ábase plate. The high flow grout shall be used for all equipment bases and base plates larger than 10 sq.ft. In addition, when high temperatures and/or placing conditions dictate, the Engineer may require the use of the high flow grout.

3.10 CONCRETE SURFACE REPAIRS:

A. Patching Defective Areas:

1. Repair and patch defective areas with cement mortar immediately after removal of forms, but only when directed by the Architect. Use an approved epoxy-based mortar for structural repairs, where directed by Architect.

2. Cut out honeycomb, rock pockets, voids over 1/4 in. (6.35 mm) in any dimension, down to solid concrete but, in no case, to a depth of less than 1 in. (25.4 mm). Make edges of cuts perpendicular to the concrete surface. Before placing the cement mortar, thoroughly clean, dampen with water, and brush-coat the area to be patched with neat cement grout. The specified polymer patching mortar may be used when acceptable to the Architect.

3. For exposed-to-view surfaces, blend white Portland cement to standard Portland cement so that, when dry, the patching mortar will match the color of the surrounding concrete. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with the patching. Compact mortar in place and strike off slightly higher than the surrounding surface.

4. Fill holes extending through concrete by means of plunger-type gun or other suitable device from the least exposed face, using a flush stop held at the exposed face to ensure complete filling.

B. Repair of Formed Surfaces:

1. Repair exposed-to-view formed concrete surfaces, where possible, that contain defects which adversely affect the appearance of the finish. Remove and replace the concrete

having defective surfaces if the defects cannot be repaired to the satisfaction of the Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on the surface; and stains and other discolorations that cannot be removed by cleaning.

2. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

3. Repair concealed formed concrete surfaces, where possible, that contain defects that adversely affect the durability of the concrete. If defects cannot be repaired, remove and replace the concrete having defective surfaces. Surface defects, as such, include cracks in excess of 0.01 in. (0.25 mm) wide, cracks of any width and other surface deficiencies which penetrate to the reinforcement or completely through non-reinforced sections, honeycomb, rock pockets, and spalls except minor breakage at corner.

C. Repair of Unformed Surfaces:

1. Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface plane to the tolerances specified for each surface and finish. Correct low and high areas as herein specified.

2. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having the required slope. Correct high and low areas as herein specified.

3. Repair finished unformed surfaces that contain defects which adversely affect the durability of the concrete. Surface defects, as such, include crazing, cracks in excess of 0.01 in. (0.25 mm) wide or which penetrate to the reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.

4. Correct high areas in unformed surfaces by grinding, after the concrete has cured sufficiently so that repairs can be made without damage to adjacent areas.

5. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out the low area and replacing with fresh concrete. The specified underlayment or repair topping shall be used.

6. Repair defective areas, except random cracks and single holes not exceeding 1 in. (25.4 mm) diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts, and expose reinforcing steel with at least 3/4 in. (19.05 mm) clearance all round. Dampen concrete surfaces in contact with patching concrete and brush with a neat cement grout coating or use concrete bonding agent. Place patching concrete before grout takes its initial set. Mix patching concrete of the same materials to provide concrete of the same type or class as the original adjacent concrete. Place, compact and finish as required to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

7. Repair isolated random cracks and single holes not over 1 in. (25.4 mm) in diameter by the dry-pack method. Groove the top of cracks and cut out holes to sound concrete and clean off dust, dirt and loose particles. Dampen cleaned concrete surfaces and brush with a neat cement grout coating. Place dry-pack before the cement grout takes its initial set. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate

passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Compact concrete mixture in place and finish to match adjacent concrete. Keep patched areas continuously moist for not less than 72 hours.

8. All structural repairs shall be made with prior approval of the Engineer, as to method and procedure, using the specified epoxy adhesive and/or epoxy mortar. Where epoxy injection procedures must be used, an approved low viscosity epoxy made by the manufacturers previously specified shall be used.

9. Leveling of floors for subsequent finishes shall be achieved by use of the specified underlayment material.

10. All exposed floors shall be leveled, where required, with the specified self-leveling repair topping.

11. Repair methods not specified above may be used, subject to acceptance of Architect.

D. Epoxy Joint Filler: All contraction or construction joints in areas receiving a metallic or mineral aggregate hardener shall be filled with the specified epoxy joint filler. The epoxy joint filler shall be mixed and installed in strict accordance with the directions of the manufacturer. The joints shall not be filled sooner than 90 days after slab placement.

END OF SECTION

SECTION 05 40 00 - COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Formed steel stud exterior wall framing.

B. Steel framing, bridging and bracing.

1.2 REFERENCES

A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; current edition.

B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; current edition.

C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; current edition.

D. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; current edition.

E. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; current edition.

1.3 SYSTEM DESCRIPTION

A. Size components to withstand design loads in conformance with applicable codes.

1. Refer to structural drawings for design wind loads.

B. Horizontal Deflection: Design to permit maximum deflection of 1/600 of span.

C. Design wall system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

D. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1. Design stud connections to withstand live load deflections of L/240 for primary building structural members.

1.4 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.

C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.

D. Shop Drawings: Indicate component details, including widths and gages of studs and joists, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.

1. Indicate cold formed stud layout.

2. Describe method for securing studs to tracks and for bolted framing connections.

3. Provide design calculations, stamped by a Professional Structural Engineer, licensed in the State of Illinois.

4. Provide details and calculations for factory-made framing connectors, stamped by a Professional Structural Engineer licensed in the State of Texas.
5. Provide keyed plans depicting stud gage and spacing for all walls, stamped by a Professional Structural Engineer licensed in the State of Texas.

D. Product data for thermal insulation strips.

E. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

1.5 QUALITY ASSURANCE

A. Calculate structural properties of framing members in accordance with requirements of American Specification for the Design of Cold-Formed Steel Structural Members.

B. Manufacturer: Company specializing in manufacturing the types of products specified in this section, and with minimum (5) five years of documented experience.

C. Installer: Company specializing in performing the work of this section with minimum (5) five years of experience.

D. Design structural elements, spacing and sizing off all metal studs on exterior of project under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in State of Texas.

1.6 PROJECT CONDITIONS

A. Verify that field measurements are as indicated on the drawings.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Metal Framing, Connectors, and Accessories:

1. Clark Dietrich Building Systems: 9700 New Decade Dr. Pasadena, Texas 77507
Phone No.: 281-383-1617
2. Super Stud Building Products, Co: 53 W.L. Runnels Industrial Dr, Hattiesburg, MS 39401
Phone No. 601-584-7550
3. SCAFCO Steel Stud Co.: 2800 E. Main Ave. Spokane, WA 99200
Phone No.: 509-343-9000

2.2 FRAMING MATERIALS

A. Studs and Track: ASTM C 955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.

1. Gage and depth: As required to meet specified performance levels and design detail compatibility. Do not exceed stud widths indicated on drawings without architect approval.
2. Galvanized in accordance with ASTM A 653/A 653M G90/Z275 coating.

B. Joists and Purlins: Fabricated from ASTM A 653/A 653M steel sheet.

1. Base Metal: As required to meet specified performance levels and design detail compatibility.
2. Gage and depth: As required to meet specified performance levels and design detail

compatibility. Do not exceed joist widths indicated on drawings without architect approval.

3. Provide with rust inhibiting primer and painted finish.

C. Framing Connectors: Factory-made formed steel sheet, ASTM A 653/A 653M SS Grade 50, with G60/Z180 hot dipped galvanized coating and factory punched holes.

1. Structural Performance: Maintain structural and movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold Formed Steel Structural Members; minimum 12 gage, 0.0808-inch thickness.

2. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, screws and anti-friction bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.

3. Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof- to-wall tie-down, hangers, gusset plates, and stiffeners.

D. Studs, Bracing and Runners (Tracks):

1. 2 ½" – 16 gage minimum.

2. 3 5/8" – 16 gage minimum.

3. 6" – 16 gage minimum.

4. Coordinate all noted components with Pre-Engineered metal building framing and installation details.

2.3 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.4 FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A 153/A 153M.

B. Anchorage Devices: Power actuated.

C. Welding: In conformance with AWS D1.1.

2.5 SHOP FABRICATED ASSEMBLIES

A. Shop fabricate metal framing to the greatest extent possible.

B. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.

C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that building framing components are ready to receive work.

3.2 INSTALLATION OF FRAMING AND COMPONENTS

A. Install components in accordance with manufacturers' instructions and ASTM C 1007 requirements.

B. Place studs at 16 inches on center and as indicated on drawings; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.

C. Construct corners using minimum of three studs. Install double studs at wall openings, door jambs.

D. Install studs full length in one piece. Splicing of studs is not permitted.

E. Install studs, brace, and reinforce to develop full strength and achieve design requirements. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

F. Install intermediate studs above and below openings to align with wall stud spacing.

G. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

H. Attach cross studs to studs for attachment of fixtures anchored to walls.

I. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

J. Touch-up field welds and damaged galvanized surfaces with primer.

3.3 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/8 inch.

B. Maximum Variation of any Member from Plane: 1/8 inch.

END OF SECTION

SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 DESCRIPTION:

A. Work Included:

1. Provide unit masonry in accordance with Contract Documents.

B. Work of Other Sections:

1. Section 07 92 00 - Joint Sealers: Joint Sealants.

C. Work Installed but Furnished by Others:

1. Access doors, access panels, frames, struts, hangers, metal lintels, miscellaneous metal and anchors built into masonry work.

1.2 QUALITY ASSURANCE:

A. Design Criteria: Provide concrete masonry walls having compressive strength of 2000 pounds per square inch when tested in accordance with ASTM E447, Method B, unless different strength is indicated on drawings.

B. Requirements of Regulatory Agencies: Requirements for fire-rating, reinforcing and lateral support conditions shall be regulated in compliance with local building codes and are not necessarily fully defined on Drawings. Governing code shall be International Building Code 2012 Edition w/ Local Amendments and all other governing codes as listed in the Code Analysis on the Drawings.

C. Special Requirements of Regulatory Agencies: Where hourly fire ratings are indicated, provide components and assemblies meeting requirements of the National Fire Protection Association, regulatory agencies having jurisdiction and listed by Underwriters Laboratories, Inc.

D. Allowable Tolerances:

1. Plumb and Level: 1/4 inch in 10 feet, non-cumulative.

2. Joint Width: Plus or minus 1/8 inch.

3. Offset Between Units: 1/16 inch.

E. Pre-Installation Conference: Prior to commencement of masonry work, schedule meeting at mutually agreeable time to include Owner, Architect, Contractor, Contractor's field superintendent, masonry subcontractor, and other interested parties to review installation procedures and coordination with other work.

1.3 REFERENCES:

A. Except as modified by governing codes and by Contract Documents, comply with applicable provisions and recommendations of the following:

1. NCMA "Guide Specification for Concrete Masonry".

2. National Fire Protection Association (NFPA), "Fire Resistance Ratings".

3. American National Standards Institute (ANSI), "A41.1, Building Code Requirements for Masonry".

4. American National Standards Institute (ANSI), "A41.2, Building Code Requirements for Reinforced Masonry".

5. "TEK" Information Series, published by National Concrete Masonry Association (NCMA).

6. American Concrete Institute (ACI), "Building Code Requirements for Concrete Masonry Structures", ACI 531-79, Revised 1983.

7. American Concrete Institute (ACI), "Specification for Concrete Masonry Construction", ACI 531.1-76, Revised 1983.

8. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

1.4 SUBMITTALS:

A. General: Submit the following in accordance with Section 01 33 00 - Submittals.

B. Product Data:

1. Anchors and ties.

2. Control joint filler.

3. Portland cement.

4. Hydrated line.

5. Mortar aggregates.

6. Concrete masonry units.

7. Rod reinforcement.

8. Joint reinforcement.

9. Anchors and inserts.

C. Samples:

1. Three of each type of masonry unit.

D. Test Reports: Submit certified Test Reports showing compliance of the following items.

1. Concrete masonry unit samples.

2. Concrete Masonry Unit Strength: Submit advance and field tests specified in part 3.00 - Execution.

3. Mortar and Grout Strength: Submit advance and field test data specified in part 3.00 - Execution.

E. Sample Panel: Construct Sample Panel at Project Site of each type of masonry unit. Construct each panel 2'-8" high by 5'-4" long by full thickness. Use materials, bond, jointing and pattern as specified for Work. Include typical control joint in each panel. Accepted panels will be used as control Samples for judging acceptability of final work.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Delivery of Materials: Deliver materials (except bulk materials) in manufacturer's unopened containers fully identified with manufacturer's name, trade name, type, class, grade, size and color.

B. Storage of Materials: Store materials, in unopened containers. Store off ground and under cover, protected from damage.

1.6 PROJECT CONDITIONS:

A. Environmental Requirements: Do not erect masonry when temperature is below 40 degrees Fahrenheit unless provisions of "Recommended Practices for Cold Weather Masonry Construction" can be complied with. Do not lay masonry units having water or frost on their surfaces.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. ALLSTATE: 2930 Lincoln Dr., Houston, Texas 77038
Phone No.: 281-447-8564

B. AMERICAN BLOCK: 6311 Breen Dr., Houston, Texas 77086
Phone No.: 281-820-5332

C. HOUSTON PRO MASONRY: 2008 North Fry Rd., Houston, Texas 77084
Phone No.:281-845-8580

2.2 MATERIALS:

A. General: Do not change brands or material source during construction.

B. Portland Cement: ASTM C150, Type 1. Non-staining, without air entraining, natural color or white as required to achieve selected mortar color.

C. Mortar: ASTM C270; Type N for interior work; Type S for exterior work. Do not use quicklime for mortar.

1. Fine Grout: ASTM C476 and C404, except limited to the mix materials listed and cement/lime ratios of not more than 1/10 part lime per part Portland cement wherein sand in damp condition equals 2-1/4 to 3 times the volume of cement (1/10:1:3).

2. Coarse Grout: ASTM C476 and C404, except limited to the mix materials listed and cement/lime ratios of not more than 1/10 part lime per part Portland cement wherein sand in damp condition equals 1 to 2 times the volume of cement (1/10:1:2).

3. Ready-Mix Mortar or Grout: Use only with written consent of the Architect. Design mixes, batch testing, including field sampling and other requirements of the Architect shall be satisfied before use. Submit data on set retarder and other additives proposed including name, manufacturer, test reports, and case history of use.

D. Hydrated Lime: ASTM C207, Type S.

E. Sand: Clean, washed, natural sand aggregates. Material and grading to conform to ASTM C144; except for joints less than 1/4 inch use sand graded with 100 percent passing No. 16 sieve.

F. Concrete Masonry Units (CMU): ASTM C90, Grade N-I and ASTM C145, Grade N-I, modified as follows:

1. Lightweight Aggregates: Complying with ASTM C331; Haydite, Norlite, Solite, or Waylite, producing concrete density not exceeding 95 pounds per cubic foot.

2. Normal Weight Aggregates: Complying with ASTM C33, producing concrete density not less than 125 pounds per cubic foot.

3. Face Size: 8 by 16 inches unless otherwise indicated.

4. Curing: Low pressure steam cure at pressure of 10 pounds per square inch. Raise curing temperature uniformly at not more than 1 degree Fahrenheit per minute from 85 to 150 degrees Fahrenheit and allow masonry units to cure for approximately 3-1/2 hours from initial set period. Thereafter keep units moist for period of 7 days by means of fine water spray and then allow to air dry for 14 days. Allow interval of not less than 3 hours between forming of units and curing process.

5. Linear Shrinkage: Not over 0.03 percent at 28 days at 70 F and 40% relative humidity.

6. Moisture Content: Not over 25 percent.

7. Exposed Units: Provide units for exposed construction with fine textured surface, sharp straight edges, and without defects on exposed edges, corners or surfaces which would impair appearance.

G. Water: Potable.

H. Anchors, Ties and Reinforcement: Heavily galvanized steel, free of mill scale and loose rust, complying with the following requirements:

1. Dovetail Slots: Minimum 22 gauge.

2. Anchors for Dovetail Slots: Minimum 16 gauge by 1" wide, corrugated or crimped, of length required.

3. Wire Ties: 10 gauge, looped at both ends.

4. Wire Mesh Ties: 16 gauge, 1/2 inch mesh, 3 inches wide.

5. Joint Reinforcement: Unless shown as reinforcing bars on drawings, truss type, fabricated from minimum 9 gauge cold drawn steel wire complying with ASTM A82; deformed side rods; smooth cross rods; out-to-out spacing of side rods 2 inches less than nominal wall dimension.

6. Anchor Straps: 1-1/4 by 1/8 inch by length required, with ends turned up 2 inches.

7. Bar Reinforcement: ASTM A615, Grade 60, deformed of size shown or to suit condition. Refer to Section 03 20 00.

8. Drilled in Anchors: Hilti Kwik-bolt, galvanized, sized to suit loading condition, or approved equal. Minimum anchor diameter is 1/2".

I. Wall Control Joint Filler: Provide compressible control filler of closed cell PVC, SBR or Neoprene, either solid or tube-type, of proper dimension to serve as back-up for joint sealant at face of masonry. Do not use control joint filler at building expansion joints.

1. Provide solid rubber "key section" in control joint filler (60 to 80 Shore A durometer hardness) designed to maintain lateral stability in masonry wall.

J. Other Materials: Manufacturer's standard for items required or type best suited for intended use.

2.3 MIXES:

A. Use mortar specified. Mix in accordance with manufacturer's directions.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Examination: Examine substrates, adjoining construction and conditions under which Work is to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION:

A. General:

1. Lay masonry plumb, true to line, with level and accurately spaced courses, corners plumb and true, each course breaking joint with course below, except as otherwise indicated. Maintain plumb bond.

2. Anchor, tie, reinforce and bond masonry at corners and intersections in accordance with requirements of governmental authorities.

3. Step back unfinished work for joining with new work; toothing not permitted. Before new work is started, remove loose mortar.

4. No cracked, chipped, broken, discolored, defaced or open celled units permitted on exposed masonry.

5. Perform cutting, patching and repairing as required to accommodate work of other trades.

6. Use motor-driven carborundum saw to cut masonry units with clean sharp corners. Cut units as required to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting wherever possible. Avoid use of less than half-size units at corners, jambs, and at other locations.

7. Tool exposed joints slightly concave unless otherwise indicated. Lay masonry units with uniform joint widths. Tool joints to squeeze mortar back into joints. Tool after mortar has taken its initial set. At inside face of exposed masonry air shafts, parge masonry walls with mortar to form a smooth, airtight surface. Rake exterior joints between concrete masonry unit and concrete; leave ready to receive mastic sealer.

8. Build in frames, struts, hangers, miscellaneous metal and other items of work furnished under other Sections. prepare for, build in and protect flashings, reglets, anchors, and other similar items occurring in connection with Work of this Section. Set and grout loose lintels. Build in anchors, furnishings such as may be required exclusively by reason of Work under this Section.

9. Install access doors, frames, and access panels occurring in masonry construction where indicated and required for access to mechanical and electrical installations and equipment.

10. Form chases, slots, reglets or openings necessary for proper installation of work of other trades. Keep chases and reglets free from mortar or other debris.

B. Concrete Masonry Units:

1. Erect concrete masonry units where indicated. Solidly bed each course in mortar. Butter vertical joints their entire length.

2. Set units with care around frames to not bulge, bow, warp, or change frame position. Break joints in units set around door frame top to minimize danger of loosening units due to door jarring. Set units tightly against metal frames and fill voids completely. Build frame anchors into joints. Cut units accurately to fit around pipes, ducts, openings, etc. and fill voids full. Fill jambs and head of hollow metal frames solid with mortar.

3. Build partitions of thickness indicated. Give sufficient opportunity to various trades to install built-in work before proceeding with partitions, leaving openings where required for testing. Lay first course directly on structural slab or curb with cells vertical and fill cells with mortar to one-half height of unit. Construct masonry partitions full height and terminate 1 inch below underside of structure above unless otherwise indicated. Rake joint at top of walls in exposed locations 3/4 inch and leave ready for sealant.

4. Line up courses of exposed work throughout to obtain uniform appearance. Install units at locations where conduits, pipes, etc. are to be enclosed in manner to produce regular jointing pattern of adjacent surfaces. Provide necessary reinforcement for bonding where block units are used. Neatly drill holes in exposed units for attachment of handrail brackets and similar items. Provide necessary special jambs and similar items. Provide necessary special jamb, irregular and regular angle units where required to obtain smooth, evenly jointed and regular patterns throughout exposed surfaces.

5. Place joint reinforcement in horizontal mortar joints at 16 inches on center unless otherwise indicated. Make reinforcement continuous except at control joints and expansion joints. Provide reinforcement in first and second bed joints about lintels and below sills extending 2 feet beyond jamb openings.

6. Construct continuous control joints to provide unbroken vertical separation through entire thickness of walls, in manner indicated. Provide control joints at the following locations:

   a. Where indicated.

   b. Locate approximately 30 feet on center where not indicated.

   c. Above and below major openings, at one jamb if opening is less than 6'-0" wide and at both jambs if opening is over 6'-0" wide.

   d. Vertical chases, recesses and other points of reduction in wall thickness.

   e. Locations where masonry wall height changes by more than 20 percent.

   f. Above expansion or control joints in supporting structure.

   g. Where end of masonry wall butts against supporting structure.

7. Provide concrete masonry lintels consisting of specially formed units, with reinforcing bars and mortar fill, wherever indicated and wherever openings in concrete masonry of more than 1 foot are indicated without structural steel or other supporting lintels. Precast lintels or form lintels in place with adequate temporary support. Cure precast lintels thoroughly before handling and installing.

3.3 GROUTING REINFORCED UNIT MASONRY WALLS:

A. Placing Reinforcing: Place vertical and horizontal reinforcing before or after laying masonry units, as required by job conditions. Support vertical reinforcing at intervals shown. Where individual vertical bars are placed after laying masonry, place wire loops extending into cells as masonry is laid and loosen before mortar sets. After insertion of reinforcing bar, pull loops and bar to proper position and tie free ends.

B. Clean and Inspect: Prior to grouting, clean and inspect grout spaces and close cleanout holes. Remove dust, dirt, mortar droppings, loose pieces of masonry and other foreign materials from grout spaces. Clean reinforcing and adjust to proper positioning as required. Clean top surface of structural members supporting masonry to ensure bond. After final cleaning and inspection, close cleanout holes and brace closures as required to resist grout pressures.

C. Placing Grout: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. Install shores and bracing, if required, before starting grouting operations.

D. Limit Grout Pours: Limit grout pours to sections which can be completed in one working day with not more than one hour interruption of pouring operation. Place pour in lifts not exceeding 4 feet. Allow not less than 30 minutes and not more than one hour between lift of given pour. Rod or vibrate each grout lift during pouring operation.

E. Multiple Pours: When more than one pour is required to complete given section of masonry, extend reinforcing beyond masonry as required for splicing. Pour grout to within 1-1/2 inches of top course of first pour. After grouted masonry is cured, lay masonry units and place reinforcing for second pour sections before grouting. Repeat sequence if more pours are required.

F. Fine Grout: Use for filling spaces less than 4 inches in both horizontal directions.

G. Coarse Grout: Use for filling spaces 4 inches or larger in both horizontal directions.

H. Low-Lift Grouting: Place vertical reinforcing prior to laying of concrete masonry unit. Extend above elevations of maximum pour height as required to allow for splicing. Support in position. Lay concrete masonry unit to maximum pour height. Rod or vibrate grout during placing. Place grout continuously; do not interrupt pouring of grout for more than one hour. Terminate grout pours 1-1/2 inches below top course of pour.

3.4 FIELD QUALITY CONTROL:

A. Testing: Engage Testing Agency to perform the following tests:

1. Work not evidencing compliance with this specification.

2. Verify adequacy of work done without prior notice, improper supervision, or contrary to standard construction practice.

3. Non-load bearing concrete masonry subject to lateral loads equal to or greater than 20 pounds per square foot.

a. At least one strength test (ASTM E447) of each "class of unit" in advance of beginning operations. Use minimum of 3 prisms for each advance test.

b. At least one field test of concrete masonry strength (ASTM E447) during construction, for each 2000 square feet of wall area which requires testing. Use same materials and workmanship being used on job. Do not place reinforcement in test prisms. Make minimum 3 prisms for each field test.

c. Minimum three compressive strength tests for mortar (3 cubes per ASTM Standards) and for grout (3 cylinders per ASTM C31 and C39) for each type of mortar or grout used including pre-mixed mortar or grout in advance of field operations. Submit mix design including materials and proportions for pre-mixed mortar and grout.

d. Minimum one ASTM Standard strength test of each type of mortar or grout used during construction for each 1000 square feet of wall area. Use same materials and workmanship being used on job.

e. Minimum one test for flexural bond strength (ASTM E518) during construction for each 2000 square feet of wall area which requires testing. Use same materials

and workmanship being used on job. Do not place reinforcement in test specimen. Make minimum 5 specimens for each test.

3.5 ADJUSTING AND CLEANING:

A. Execute work in clean manner. Remove excess materials and mortar droppings daily. Remove mortar droppings on connecting or adjoining work before it sets.

B. Point holes in joints of exposed masonry surfaces by completely filling with mortar. After pointing has hardened, clean masonry surfaces.

C. Clean concrete masonry units which are to remain exposed by use of brushes or other methods which will produce satisfactory surface. Use non-metallic tools in cleaning operations.

D. Remove and replace defective materials. Match adjacent work. Correct defective work. Leave masonry clean.

END OF SECTION

SECTION 04 22 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents: Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.
B. Section Includes:
   1. Concrete Masonry units.
   2. Reinforcement, anchorages, and accessories.

1.2 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00.
B. Submit samples under provisions of Section 01 33 00.

1.3 MOCKUP

A. Construct block to 4 by 6 feet panel size, including mortar, special shapes, bonding, joint work, reinforcement, grouting, corbeling, mortar color, control joints, support framing and accessories specified.
B. Obtain approval prior to proceeding with the work.
C. Remove panel when directed by Architect after completion of work.

1.4 QUALITY ASSURANCE

A. Manufacturer: Minimum five (5) years experience manufacturing specified product.
B. Installer: Minimum five (5) years experience in similar types of work and be able to furnish a list of previous jobs and references if requested by Architect.
C. Control Joints: Provide control joints as shown on the Drawings or if not shown, install at frequency and in accordance with details as recommended by masonry manufacture.

1.5 ENVIRONMENTAL REQUIREMENTS

A. In hot weather, above 99 degrees F with less than 50 percent relative humidity, protect masonry construction from direct exposure to sun and wind.
B. Cold Weather: Recommended Practices and Specifications for Cold Weather Masonry Construction.

1.6 DELIVERY AND STORAGE

A. Deliver and store materials in accordance with the requirements of Section 01 60 00.
B. Store mortar materials on dunnage in a dry place.
C. During freezing weather, protect masonry units with tarpaulins or other suitable material.
D. Protect reinforcement and accessories from elements.
E. Store masonry units above ground on level platforms which allow air circulation under stacked units. Cover stored masonry units with tarps or other means to shed water.
F. Cover and protect masonry units against wetting prior to use.
G. Handle units on pallets or flat bed barrows.
H. Do not permit free discharge from conveyor units or transporting in mortar trays.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNIT MANUFACTURERS:

A. Featherlite: 3024 Acme Brick Plaza, Ft. Worth, Texas 76109
Phone No.: 817-332-4101

B. Texas Building Products: 3261 TX-108, Strawn, Texas 76475
Phone No.: 254-672-5262

C. ACME Block & Brick Co.: 3020 w. Front St., Midland, Texas 79701
Phone No.:432-699-5017

2.2 CONCRETE MASONRY UNITS

A. ASTM C 90, 1900 psi, normal weight, Type I, moisture-controlled units.
B. Sizes: Modular sized to 8-inch high x 8” wide by 16-inch-long; provide special units for 90-degree corners, bond beams.
C. Loose-Fill Masonry Insulation: Provide “PERLITE” expandable loose-fill masonry insulation, placed in each open cell of the specified exterior block walls. Product to comply with ASTM C549, Class A, Class 1 building material with a minimum R-Value of 6.95 and U-Value of 0.14 or approved equal product.

2.3 SPILTFACE BLOCK UNITS – 6” inch wide x 8 “inch high x16” inch long

A. Submit Manufacturer standard forms, patterns and colors for Architects review and selection.
B. ASTM C 216, Type FBS, Grade SW.

2.4 MANUFACTURERS - REINFORCEMENT, ANCHORAGES, AND ACCESSORIES

Refer to Part 2 – Products, 2.1 and 2.5

2.5 REINFORCEMENT AND ANCHORAGES

A. Adjustable Veneer Dove Tail Anchors:
1. Type: Adjustable design dove tail, hot dipped galvanized, 14 gage steel anchor plate with 3/16-inch diameter double legged pintle tie.
2. Size: Tie to extend to within 1 inch of outside face of masonry.
3. Finish: ASTM A153, Class B-2, minimum 1.50 ounce per sq ft zinc coating.
4. Fasteners: Self-drilling, self-tapping, No. 10 screw with cadmium or zinc coated finish; criteria to meet anchor manufacturer's requirements; length to suit Project conditions. Two fasteners minimum per plate.

B. Horizontal Joint Reinforcing:
1. Type: Standard truss design, fabricated from ASTM A82 cold-drawn steel wire.
2. Side rods: Two or more continuous 9 gage deformed side rods butt welded in same plane to continuous diagonal 9 gage plain cross rod at 16 inches on centers maximum.
3. Size: Standard length 10 to 20 feet; side rods spaced approximately 2 inches less than width of partition or wall in which placed.
4. Finish: Exterior walls; ASTM A153, Class B-2, (minimum 1.5 ounce per sq ft zinc coating) hot-dip galvanized.
5. Provide prefabricated tee and corner units.

C. Reinforcing Bars: Deformed steel, ASTM A615, Grade 60.

D. Control Joint Fillers:
1. Closed cell neoprene complying with ASTM D1056, Class RE41.
2. Compatible with sealant.

3. Self adhering on one side; 50 percent minimum compressibility.
4. Size: Thickness to suit joint size; depth to allow sealant application.
5. Locations: Vertical control joints, horizontal joints at head of masonry terminating below bond beams, or lintels; other locations as detailed.

E. Control Joint Strips:
1. Preformed rubber compound to fit standard sash block.
2. ASTM D2000, Designation 2AA-805.
3. Hardness: 80.
4. Neoprene self-sealing edge, sized to fit block width.

2.6 MASONRY FLASHINGS

A. Rubberized Asphalt: 40 mil thick, laminated composition of rubberized asphalt and cross laminated polyethylene.

2.7 ACCESSORIES

A. Control Joints: Preformed rubber material. Width slightly less than wall thickness to allow for sealant material.
B. Joint Sealant: Refer to Section 07 92 00.
C. Asphalt saturated felt, No. 15, ASTM D226, Type I.
D. Weep Holes: Honeycomb cellular type.
E. Rebar Positioners: Size and type required to accurately place reinforcing steel in bond beams.
F. Cleaner: Recommended by masonry manufacturer.

G. Cavity Drainage Material: 1-inch thick, free-draining mesh; made from polyethylene strands and shaped to avoid being clogged by mortar droppings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.
B. Verify items provided by other Sections of work are properly sized and located.
C. Verify that built-in items are in proper location, and ready for roughing into masonry work.
D. Beginning of installation means installer accepts existing conditions.

3.2 PREPARATION

A. Supply metal anchors to Section 03 30 00 for placement in concrete. Direct correct placement.
B. Verify items provided by other Sections of work are properly sized and located.
C. Establish lines, levels, and coursing. Protect from disturbance.
D. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.
E. Scaffolding:
1. Provide, erect, maintain, move, and finally remove scaffolding and staging required for masonry installation.
2. Construct and maintain scaffolding in compliance with applicable ordinances, laws, rules and regulations.

3. Sufficiently substantial to support workmen and necessary materials and equipment.
4. Provide adequate guard rails for protection of property, workmen, and passersby.

F. Do not wet concrete masonry units.

3.3 COURSING

A. Place masonry to lines and levels indicated.
B. Maintain masonry joints to uniform width of 3/8 inches. Make vertical and horizontal joints equal, of uniform thickness, tightly tucked.
C. Lay concrete masonry units in running bond. Course one block unit and one mortar joint to equal 8 inches. Form concave mortar joints on exposed work and flush joints on work to receive subsequent wall coating.

3.4 PLACING AND BONDING

A. Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints and deep or excessive furrowing of mortar joints are not permitted.
B. Fully bond intersections, and external and internal corners.
C. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar and replace.
D. Remove excess mortar on surface and in cavities.
E. Perform job site saw cutting with proper tools to provide straight unchipped edges. Take care to prevent breaking masonry unit corners or edges.
F. Cut mortar joints of block units flush where resilient base is scheduled.
G. Isolate masonry partitions from vertical structural framing members with a control joint.

3.5 TOLERANCES

A. Alignment of Columns: Maximum 1/4 inch from true line.
B. Variation from Unit to Adjacent Unit: 1/32 inch maximum.
C. Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
D. Variation from Plumb: 1/4 inch per story non-cumulative 1/2 inch in two stories or more.
E. Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch maximum.
F. Variation of Joint Thickness: 1/8 inch in 3 feet.
G. Maximum Variation from Cross Sectional Thickness of Walls: Plus, or minus 1/4 inch.

3.6 REINFORCEMENT AND ANCHORAGES

A. Install horizontal joint reinforcement 16 inches on center typically and 8 inches at intersection of walls.
B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend 16 inches minimum each side of opening.
C. Place joint reinforcement continuous in first and second joint below top of walls.
D. Lap joint reinforcement ends minimum 6 inches.
E. Reinforce joint corners and intersections with strap anchors 8 inches on center.

3.7 MASONRY FLASHINGS

A. Lap end joints minimum 6 inches and seal watertight per manufacturer's recommendation.
B. Use flashing manufacturer's recommended adhesive and termination sealant.
C. Create end dams at ends of frame heads, and other vertical elements to channel wat

3.8 LINTELS

A. Install reinforced unit masonry lintels over openings where steel lintels are not scheduled or shown. Construct lintels using grout filled solid bottom “U” shaped block and reinforcing. Maintain minimum 8-inch bearing on each side of opening. Place reinforcing near bottom of beam.
B. Construct lintels using grout fill and reinforcing specified. Place two No. 4 reinforcing bars 1 inch from bottom web, for openings up to 42 inches wide. Place two No. 5 reinforcing bars in same location for openings up to 78 inches wide. Reinforce larger openings as required.
C. Use reinforcing bars of one-piece lengths only.
D. Place and consolidate grout fill without disturbing reinforcing.
E. Allow lintels to reach strength before removing temporary supports.

3.9 GROUTED COMPONENTS

A. Reinforce bond beams as indicated on structural drawings.
B. Lap splices minimum 36 bar diameters.
C. Place and consolidate grout fill without disturbing reinforcing.
D. At bearing points, fill masonry cores with grout minimum 12 inches from opening.
E. Grout hollow metal frames with joint around frame uniform at 1/4-inch width.

3.10 WEEP HOLES

A. Install weep holes in veneer at 32 inches on center for 16-inch-long concrete masonry.
B. After placement of flashing, fill bottom of cavity with cavity drainage material.

3.11 CAVITY WALL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep holes.

3.12 CONTROL JOINTS

A. Do not continue horizontal joint reinforcing across control joints.
B. Install resilient control joint in continuous lengths. Solvent weld butt and corner joints in accordance with manufacturer's instructions.
C. Size control joints in accordance with Section 07 92 00 for sealant performance, but in no case larger than adjacent mortar joints in exposed face brick.
D. Do not lay masonry tight against any steel columns or beams. Provide at least 3/8-inch gap between walls and these elements.

3.13 BUILT-IN WORK

A. As work progresses, build-in metal door frames, fabricated metal frames, anchor bolts, plates, and other items to be built in the work supplied by other Sections.
B. Build-in items plumb and level.
C. Bed anchors of metal door frames in mortar joints. Fill frame voids solid with mortar. Fill masonry cores with grout minimum 12 inches from framed openings.
D. Do not build-in organic materials subject to deterioration.

3.14 CUTTING AND FITTING

A. Cut and fit pipes, conduit, sleeves, and grounds. Cooperate with other Sections of work to provide correct size, shape, and location.
B. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.
C. Sleeve all pipe penetrating masonry walls.

3.15 CLEANING

A. Remove excess mortar and smears.
B. Replace defective mortar. Match adjacent work.
C. Clean soiled surfaces with a non-acidic solution which will not harm masonry or adjacent materials. Consult masonry manufacturer for acceptable cleaners. Leave surfaces thoroughly clean and free of all mortar and other soiling.
D. Use non-metallic tools in cleaning operations.
E. Do not clean exposed masonry in direct sunlight when temperatures are over 90 degrees F.

3.16 PROTECTION

A. Protect finished installation under provisions of Section 01 40 00.
B. Maintain protective boards at exposed external corners which may be damaged by construction activities.
C. Provide protection without damaging completed work.
D. At day's end, or stoppage of work, cover unfinished walls with a strong waterproof membrane that is securely anchored to prevent moisture infiltration.
E. Keep control joint voids clear of mortar.

END OF SECTION

SECTION 05 12 00 - STRUCTURAL STEEL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS: The Conditions of the Contract and applicable requirements of Division 1 govern this Section.

1.2 DESCRIPTION OF WORK:

A. Structural steel required for this Work is indicated on the drawings and includes, but is not necessarily limited to, the following:

1. Beams, girders, bracings, elevator divider beams and weldments.
2. Columns, posts, struts and hangers.
3. Base plates, bearing plates and grillages.
4. Furnishing anchor bolts and wall plates.
5. Seat angles for concrete slabs.
6. Steel support brackets for concrete slabs.
7. Metal deck support members.
8. Shear connectors welded through metal deck to supporting structural steel.
9. Shop painting and field touch-up.
10. Bracing, guying and surveying of erected steel.
11. Protection of work of this Section.
12. Shop drawings and samples.

B. Related work described elsewhere:

1. Testing Laboratory Services - Section 01 41 00.
2. Setting embedded items in concrete - Section 03 10 00.
3. Grouting under setting plates with non-shrink grout - Section 03 30 00.

1.3 SUBMITTALS:

A. Mill Test Reports:

1. Submit certified copies of mill test reports for all steel furnished. Include name and location of mills and shops and analysis of chemical and physical properties of all steel. Comply with all parts of ASTM's specified.

2. In addition to the normal information, all mill orders shall include ASTM Specifications description, marking, and invoicing requirements. The mill shall be instructed to include the following markings: mill order number, heat number, size, type and grade of material, and appropriate color coding. See Article 2.04 herein for color code. Such markings may be of any of the means permitted by ASTM A6.

B. Manufacturer's certification of filler metal for welding.

C. Records: Maintain records of welding procedures, welders employed, date of qualification and identification symbol or mark. Certified copies of records shall be available to the Architect or Owner.

D. When requested, furnish duplicate copies of order sheets and material and shipping bills.

E. Testing by the Fabricator:

1. Results of all tests by the Fabricator shall be submitted to the Architect.

2. Testing laboratory retained by the Fabricator must meet with the approval of the Architect.

F. Shop Drawings:

1. Submit detailed drawings showing grade of steel, identification marks of members, dimension, size, weight, orientation, camber, and location of each member, setting elevation for base plates and bearing plates, location types, sizes and extent of welds, welding sequences; identify and show all connections.

2. Submit erection drawings and index sheets at same time as shop details. The use of design drawings as erection drawings will not be allowed.

3. Show and identify as such any temporary members and connections which may be required for erection.

4. Submit for Engineer's approval structural calculations for connections prepared by a registered professional engineer, for those connections not designed and detailed on structural drawings, and for connections being proposed as alternates to connections detailed on structural drawings.

5. Submit for review proposed erection procedure, including loads, details of erection equipment, and temporary bracing.

6. The details shall be prepared in such a way as to avoid having steel, connections, bracing, etc., interfere with architectural details.

7. Shop Paint: Submit manufacturer's literature and certification that shop paint meets performance standards specified herein.

1.4 CODES AND STANDARDS:

A. Except as modified by requirements specified herein, and/or details on drawings, work included in this Section shall conform to applicable provisions of the following codes and standards:

1. Structural steel work shall strictly conform to all applicable requirements of the International Building Code, 2012 edition with local amendments and all other governing codes listed in the Code Analysis on the drawings.

2. The American Institute of Steel Construction Specification for Structural Steel Buildings Allowable Stress Design and Plastic Design, June 1, 1989.

3. The American Institute of Steel Construction Code of Standard Practice for Steel Buildings and Bridges adopted effective September 1, 1986.

4. The Research Council Specification for Structural Joints Using ASTM A325 or A490 Bolts.

5. The Research Council Specification for Structural Joints using ASTM A307 Unfinished Bolts.

6. The American Welding Society Structural Welding code, including all supplements, addenda, and Special Rulings applicable to building construction.

7. Steel Structures Painting Council, Volume 2 Systems and Specifications.

8. American Society of Testing Materials Specifications referred to for particular materials or tests specified herein.

B. Where requirements indicated on the drawings or specified herein differ from the requirements of governmental authorities having jurisdiction, the one having more stringent requirements shall govern.

C. All work of this Section shall conform to all applicable Federal, State and local laws and regulations.

1.5 FIELD MEASUREMENTS AND TEMPLATES:

A. Contractor shall secure field measurements required for proper, adequate fabrication, and installation of work covered by this Section. Exact measurements are Contractor's responsibility.

B. Furnish templates for exact location of items to be embedded in concrete and masonry, with setting instructions required for installation of embedded items.

1.6 PROVISION FOR OTHER WORK:

A. General: Work under this Section includes required cutting, punching, drilling, tapping, welding for attachment of other work coming in contact with structural steel work where indicated, and/or required for proper subsequent installation of work of other trades, or where directions for same are given prior to or with approval of Shop Drawings. Include furnishing of templates for accurate location of items to be set under other Sections, and/or Contracts.

B. Holes in Structural Steel Members: Wherever noted on drawings or where directed, Contractor shall provide holes in structural steel members for support of other materials, for passage of

pipes or for reasons necessary to construction. Structural steel members shall not have holes unless detailed or approved by Architect. Holes shall be reinforced as required by Architect.

1.7 STORAGE OF MATERIALS: Steel materials, either plain or fabricated, shall be stored above ground on platforms, pallets, skids, or other supports. Material shall be kept free from dirt, grease, and other foreign matter and shall be protected from corrosion.

1.8 QUALIFICATION OF WELDERS: Before assigning any welder to work covered by this Section of the Specifications, the Contractor shall provide the Architect with the names of welders to be employed on the work, together with certification that each of these welders has passed qualification tests using procedures covered in the American Welding Society Standard B3.0, Part II. If required, by the Architect, the Contractor shall submit identifying stenciled test coupons made by any operator whose workmanship is subject to question. The Contractor shall require any welder to retake the test when, in the opinion of the Architect, the work of the welder creates a reasonable doubt as to the proficiency of the welder. Tests, when required, shall be conducted at no additional expense to the Owner. The Architect may require coupons to be cut from any location in any joint for testing. All sections of welds found defective shall be chipped or cut out to base metal and properly re-welded before proceeding with the work. Should any 2 coupons cut from the work of any welder show strengths, under tests, less than that of the base metal, it will be considered evidence of negligence or incompetence and such welder shall be permanently removed from the work. When coupons are removed from any part of a structure, the members cut shall be repaired, at no additional cost to the Owner, in a neat and workmanlike manner with joints of proper type to develop the full strength of the member and joints, with peening as necessary or directed to relieve residual stress.

1.9 TESTING AND INSPECTION:

A. Testing and inspection of structural steel work not specified herein to be performed by the Fabricator will be performed by a testing agency retained and paid for by the Owner in accordance with requirements of the Building Code. Provide the Owner's testing agency with the following:

1. A complete set of approved shop and erection drawings.

2. Cutting lists, order sheets, material bills, shipping bills and mill test reports.

3. Information as to the shipment of material to the shop.

4. Representative sample pieces as requested by the testing agency.

5. Full and ample means and assistance for testing all material.

6. Proper facilities, including scaffolding, temporary work platforms, etc., for inspection of the work in the shop and field.

B. Each person installing connections shall be assigned an identifying symbol or mark and all shop and field connections shall be so identified so that the Owner's Inspector can refer to the person making the connection.

C. Cost of Tests: Cost of tests shall be paid for by Owner, except that when additional tests are required due to failure of material. Costs of such additional tests shall be deducted from contract

price. Furnish free of charge any necessary materials, access to or handling of materials required to perform materials tests.

D. Testing by Owner's Testing Agency shall include, but is not limited to, the following:

1. All high strength bolts shall be continuously visually inspected. At least 10 percent of high-strength bolted connections shall be tested at random for bolt tightness using procedure described in the AISC "Specification For Structural Joints Using ASTM A325 or A490 Bolts" by Research Council on Riveted and Bolted Joints.

2. All shop and field welded connections shall be continuously visually inspected. In addition field and shop testing using ultrasonic and/or magnetic particle method shall be done as specified in general notes on Structural Drawings.

E. Ultrasonic Shop Welding Inspection:

1. Material in the locations designated on the structural drawings shall be tested at the shop for lamination by ultrasonic means prior to fabrication, in accordance with ASTM A435.

2. Detection of Laminations: Rejectable defects discovered by ultrasonic means are defined as follows:

a. Using suitable calibrated ultrasonic equipment, flaw indications must result in 100 percent loss of back reflection over the entire area of the defect. The maximum permissible area of such flaw indication shall be 3 sq. in. (with a maximum permissible length of 4 inches).

b. Should such flaws be detected, they may be repaired by welding, subject to the Engineer's approval.

3. The testing laboratory test reports shall include types and locations of all defects found during inspection, and the measures required and performed to correct such defects, statements of final approval of all welded shop connections, and other shop fabrication data and information pertinent to the safe and proper welding of shop connections.

F. Ultrasonic Field Test Procedures:

1. Ultrasonic testing shall be performed according to AWS D1.1 by a specially trained, qualified technician, who shall operate the equipment, examine the welds and maintain a record of all welds examined, defects found and disposition of each defect. All defective welds shall be repaired and all costs including retesting of defective welds shall be borne by the Contractor.

2. The ultrasonic instrumentation shall be calibrated by the technician to evaluate the quality of the welds in accordance with AWS D1.1.

3. When ultrasonic indications arising from the weld root can be interpreted as either a weld defect or the backing strip, the backing strip shall be removed at the expense of the Contractor and the weld retested. If no root defect is indicated on this retest and no significant amount of the base and weld metal has been removed, no further repair or welding will be required. If a defect is indicated, it shall be repaired and retested as specified.

G. Testing by the Fabricator:

1. When mill reports identifying heat or melt numbers and analysis are not available, tension and bend tests of the materials may be required to be performed by the Contractor's Testing Laboratory.

2. Test specimens shall be taken by the Fabricator under the direction of the Owner's Testing Laboratory and shall be machined by the Contractor's Testing Laboratory to dimensions as required by the related applicable standard ASTM Specifications.

PART 2 - PRODUCTS

2.1 GENERAL: All material shall be new and of the best commercial quality. All material shall meet the requirements of ultrasonic testing in accordance with Section 1.09E, for members required to be so tested on structural drawings. Stock items shall be made by manufacturers specializing in particular articles, subject to approval by Architect.

2.2 STRUCTURAL STEEL MATERIALS:

A. Plates and Rolled Shapes: Refer to structural drawings for designation of types of steel. Steel shall conform to ASTM A572, Grade 50, unless shown otherwise on drawings to be of ASTM A36 type.

B. The steel for ASTM A6 Groups 4 and 5 rolled shapes to which a full penetration weld is made shall be supplied with Charpy V-Notch testing in accordance with ASTM A6, Supplementary Requirement S5. The impact test shall meet a minimum average value of 20 ft.-lbs. absorbed energy at +70 F and shall be conducted in accordance with ASTM A673 with the following exceptions:

1. The center longitudinal axis of the specimens shall be located as near as practical to midway between the inner flange surface and the center of the flange thickness at the intersection with the web mid-thickness.

2. Tests shall be conducted by the producer on material selected from a location representing the top of each ingot or part of an ingot used to produce the product represented by these tests.

C. For plates exceeding 2 inch thick used for built-up members to which a full penetration weld is made, the steel shall be supplied with Charpy V-Notch testing in accordance with ASTM A6, Supplementary Requirement S5. The impact test shall be conducted by the producer in accordance with ASTM A673, Frequency P, and shall meet a minimum average value of 20 ft.-lbs. absorbed energy at +70 F.

D. Cold Formed Steel Pipe: ASTM A500 Grade B, Fy = 42 ksi.

E. Cold Formed Steel Tubing: ASTM A500 Grade B, Fy = 46 ksi.

F. Bolts and Nuts - General: Bolts and nuts shall be the American National coarse-thread series.

G. Unfinished Bolts and Nuts, Anchors and Fastening: ASTM Standard A307.

H. High-Strength Bolts and Nuts: Conform to Specifications for Structural Joints, using ASTM A325 or A490 Bolts.

I. Shear Stud Connectors: Conforming to AWS D1.1 Shear Connectors (indicated as "SC" on the drawings) shall develop a design value of 11.5 KIPS per connector with a minimum safety factor of 1.67. Substitution with shear connectors having a design shear capacity other than given above will be acceptable, provided total horizontal shear capacity in a span of a beam or girder is unaltered. The arrangement and spacing of shear connectors shall be subject to the Engineer's approval.

J. Washers: Round washers, other than those in contact with high-strength bolt heads and nuts, shall conform to American Standard B 27.2, Type B. Beveled washers shall be square, smooth, and sloped so that contact surface of bolt head and nut are parallel. The diameter of hole of square-beveled washer shall be 1/16" greater than the bolt size for bolts larger than 1". Washers in contact with high-strength bolt heads and nuts shall be hardened washers in accordance with Specifications for Structural Joints using ASTM A325 or A490 bolts. Washers shall be installed on nut side of bolt for torquing as required.

K. Filler Metal for Welding: Arc-welding electrodes shall conform to requirements of AWS D1.1. Electrodes shall be as recommended by their manufacturers to suit the position or other conditions of actual use.

1. Shielded Metal Arc-Welding: Use E70 series.

2. Submerged Arc-Welding: Use F7 series.

2.3 MISCELLANEOUS ITEMS:

A. Miscellaneous structural steel items and their related components, which are required to complete work of this Section, shall be furnished and installed in accordance with intent of drawings and specifications. Such items include, but are not limited to, built-in items, leveling plates, anchors, bearing plates, base plates, reinforcing angles, straps, brackets, hangers, etc. Built-in items shall be supplied in ample time for incorporation in work.

B. Paint for Shop Coat Primer (and for field touch-up painting): Provide "10-99", made by Tnemec or approved equal, meeting the following criteria:

1. Abrasion - Method: Fed. Test Method Std. No. 141, method 619 s, CS-17 Wheel, 1,000 g. load Requirement: Not more than 190 mg. loss after 1,000 cycles.

2. Elongation - Method: ASTM D522-60 Conical Mandrel. Coating applied to sandblasted steel panels and cured 30 days at 77 F. Requirement: Passes 1/8" mandrel with no less than 35% elongation.

3. Light and Water Resistance - Method: ASTM D822-60 (Weatherometer). Requirement: No cracking, flaking, blistering or under film rusting in 5,000 hours.

4. Salt Spray (Fog) - Method: ASTM B117-73. Requirement: No blistering, cracking, softening or delamination of film. No rust creepage at scribe and no rusting at edges after 500 hours.

5. Applicable Standards - Meet performance requirements of Fed. Spec. TT-P-86D, Types I and II.

C. Coating for Milled Surfaces: Use magnofilms by Magnus Chemical Co., Varcroft 1711, Blue Lacquer, by Varcroft Paint Co., or M-2658, Blue Lacquer by U.S. Steel Corp.

2.4 COLOR CODING: Steel types shall be color coded in accordance with ASTM A6; all steel shall be coded as follows:

Type of Steel	Color Code
A-36	White
A-572, Grade 50	Green and Yellow
A-588	Blue and Yellow

2.5 FABRICATION:

A. General: Structural steel work shall conform with applicable requirements of herein referenced "Codes and Standards". Workmanship shall be best standard practice of trades and shall be performed by mechanics skilled in type of work required. Structural material shall be fabricated and assembled in the shop to the greatest extent possible. Shearing, flame cutting, and chipping shall be done carefully and accurately. Sole plates of beams and girders shall have full contact with the flanges. Stiffeners shall be fitted neatly between the flanges of girders, and, where tight fits are required to transmit bearing, the ends of stiffeners shall be milled or ground to secure an even bearing against the flanges.

Splice plates and fillers under stiffeners shall fit within 1/8" of the flanges. Assembled pieces shall be taken apart, if necessary, for the removal of burrs and shavings produced by the reaming operation. Parts not completely bolted in the shop shall be secured by temporary bolts, insofar as practicable, to prevent damage in shipment and handling. All exposed members shall be straight, true, shall fit closely together, and be free from bends, twists or open joints.

B. Mill column and compression truss members and bearing stiffeners to give full bearing over the cross section. Plane contact surfaces of grillages and bearing plates. It is not necessary to plane bottom surfaces of plates or grillages on grout beds.

C. CONNECTIONS:

1. Most of the details of connections in main frame are shown on the drawings and design rules for certain details are given. Whether shown on drawings or not, the fabricator shall design all required connections to resist safely shear, axial load, and moment given on drawings or to satisfy design rules given on the drawings in accordance with the current requirements of AISC specifications, including eccentricities.

2. Where moment connections are indicated on drawings, but moment values are not given, the connections shall be designed for full moment capacities of members. Connections of beams with no reaction or axial loads or design rules given on drawings shall be made to conform to AISC specifications for design, fabrication and erection of structural steel for buildings - Part 2. Composite beam reactions shall be modified in accordance with notes on structural drawings.

3. Connections for beams at columns will have symmetrical connections unless it can be shown by calculations that one sided or eccentric type connections will be adequate.

4. Single shear plate type connections, designed in accordance with latest AISC publications, may be permitted as an alternate at beam to beam connections resisting shear only.

5. All bolted connections shall be made with high-strength bolts, unless shown otherwise. Slip-critical connections will be required at lateral load resisting moment and braced frames. Unfinished bolts shall not be used except where indicated. Surface of joints for welded or high-strength bolted connections shall comply with the cleanliness requirements of all joint surfaces and contact surfaces within slip-critical connections.

6. Unless otherwise shown on drawings, grade of connection material shall be same as that of connecting member, unless it can be shown by calculations that lower grade steel is adequate.

7. Where specific details are shown on drawings, the alternate details proposed by the fabricator, shall be approved only at the discretion of the Engineer.

8. Unless shown otherwise on drawings, the splices in columns or beams shall be made with full penetration welds to develop full capacity of member and their locations shall be subject to Engineer's approval.

9. Unless otherwise shown on drawings, welds in built-up members shall be continuous and shall be designed to transfer all stresses caused by forces on members framing into the built-up members.

D. Holes: Holes shall be cut, drilled, or punched at right angles to the surface of the metal and shall not be made or enlarged by burning. Holes in base or bearing plate shall be drilled. Holes shall be provided in members to permit connecting the work of other trades. Holes shall be clean-cut without torn or ragged edges. Outside burrs resulting from drilling or reaming operations shall be removed with a tool making 1/16" bevel.

E. Bolting, except high-strength bolting: Bolts shall be driven accurately into the holes without damaging the thread. Bolt heads shall be protected from damage during driving. Bolt heads and nuts shall rest squarely against the metal. Where bolts are to be used on beveled surfaces having slopes greater than 1 to 20 with a plane normal to the bolt axis, beveled washers shall be provided to give full bearing to the head or nut. Bolt threads shall be upset to prevent the nuts from backing off.

F. Unfinished Bolts: Unfinished bolts shall be of the length that will extend entirely through but no more than 1/4" beyond the nuts. Bolt heads and nuts shall be drawn tight against the work with a suitable wrench not less than 15" long. Bolt heads shall be tapped with a hammer while the nut is being tightened. After having been finally tightened, bolt threads shall be upset to prevent the nuts from backing off.

G. High Strength Bolting: Assemble joints in accordance with "Specifications for Assembly of Structural Joints Using High Strength Steel Bolts", as approved by Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation. Tighten bolts with impact wrenches to a torque not less than recommended for size of bolt. Contact surfaces of joints shall be free of paint, lacquer or other friction reducing coatings.

H. Welded Connections:

1. Do not begin structural welding until joint elements are bolted or tacked in intimate contact and adjusted to dimensions shown, with allowance for any weld shrinkage that is expected. Weld heavy sections and those having a high degree of restraint with low hydrogen type electrodes. No members are to be spliced without prior review.

2. Weld in accordance with AWS D1.1.

3. Perform intermittent welding, continuous welding, and straightening of built-up sections to minimize internal stresses. Built-up sections assembled by welding shall be free of warpage. Each axis shall have true alignment.

4. Welds not specified shall be continuous fillet welds. Use minimum fillet in accordance with AWS.

5. Clean surfaces to be welded of paint, grease, loose scale, and foreign matter. Clean welds each time electrode is changed or a new pass started. Chip clean burned or flame cut edges before depositing welds.
6. Same electrode may be used with various thicknesses of plates, but change current used and number of passes made proportionately.

7. After being deposited, welds shall be brushed with wire brushes. Welds shall exhibit uniform section, smoothness of welded metal, feather edges without undercuts or overlays, and freedom from porosity and clinkers. Visual inspection at edges and ends of fillets and butt joint welds shall indicate good fusion with penetration into base metal.

8. During assembling and welding, hold component parts of built-up member with clamps or other means to keep parts straight and in close contact. Take precautions to minimize "lockup" stresses and distortion due to heat. Do not weld in a wind unless wind protection is in operation. Cut out and replace welds found defective.

9. The maximum space between pieces or members to be butt welded shall not exceed 1/4 in. (6.35 mm). Bevel pieces or members up to 3/8 in. (9.5 mm) thickness to form single or double "Vee" before being welded. Bevel pieces over 3/8 in. (9.5 mm) thickness to form a double "Vee" whenever possible. Lay and size fillet welds as shown. Measure only effective portion of fillet welds. Maximum space between pieces or member to be fillet welded shall not exceed 1/16 in. (1.6 mm).

10. For ASTM Group 4 and 5 rolled shapes and built-up shapes of material 2 inches or thicker to which full penetration welds are made, the following shall be done:

    a. Weld access holes shall conform to the requirements in Fig. C-J1.2 of the Commentary of the Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design of the AISC.

    b. Thermally cut free edges shall be free of gouges greater than 3/16 inch. Gouges greater than 3/16 inch deep and sharp notches shall be removed by grinding or repaired by welding. All reentrant corners shall be shaped to a smooth transition. The steel must be preheated to not less than 150 F prior to thermal cutting.

    c. All thermally cut surfaces, including beam copes and weld access holes shall be ground to bright metal and inspected by either magnetic particle or dye penetrant methods.

    d. The process consumables for all weld metal, tack welds, root pass and subsequent passes, deposited in a joint shall be compatible to assure notch tough composite weld metal.

    e. A preheat before welding equal to or greater than the following table must be used:

Thickness, t	Minimum Preheat Temperature
t < 3/4"	Ambient
3/4" ≤ t < 1-1/2"	75°F
1-1/2" ≤ t < 2"	150°F
2" ≤ t	350°F

f. Weld tabs and backing shall be removed and the surfaces ground smooth.

11. Weld using stringer passes only (no weaving), and proper sequencing when welding into "Z" (through thickness) direction of members. Slag thoroughly and wire brush each pass before proceeding to the next pass. Peening after slagging is recommended for all passes except root pass and last pass for full penetration groove welds, partial penetration groove welds and large fillet welds to eliminate cracking or rejection by U.T.

PART 3 - EXECUTION

3.1 ERECTION:

A. Responsibility: The Contractor shall accept full responsibility for the design, strength, safety, and adequacy of all temporary bracing and all methods of handling and erection and sequencing of erection of work of this Section.

B. During construction, the erected structural steel with steel deck welded in place shall not proceed any further than 8 floors above completely poured concrete slab. The welding and bolting of lateral load resisting frame shall be completed 4 floors below the erected steel. The stability of the frame during erection is the Contractor's responsibility. Vertical and/or horizontal temporary bracing may be required to diaphragm lateral forces to the lateral force resisting structural elements. Any deviation from this recommended procedure is subject to review and approval.

C. Temporary Erection Facilities: Provide all temporary braces, guys, connections, supports, flooring, planking, work platforms, scaffolding and other facilities necessary for the safe and proper erection of the work of this Section, and for the safe support and bracing of erection equipment. As erection progresses, the work shall be securely connected to safely resist all dead loads, wind loads, construction live loads, and erection forces. Temporary bracing shall be introduced wherever necessary to safely resist all loads to which the structure may be subjected, including loads of erection equipment and its operation. Such bracing shall be left in place as long as may be required until, as a minimum, after the permanent structure is capable of resisting all imposed loads. A licensed Professional Engineer paid by the Contractor shall design and supervise the use of each of the above temporary facilities, as well as the removal of temporary bracing.

D. Set base plates and bearing plates level to correct elevations and support temporarily on steel wedges, shims, leveling devices, or as shown on drawings, until corresponding supported member has been positioned, plumbed and anchor-bolted. Installation of embedded base plates into the concrete is specified in Section 03 10 00, Concrete Formwork. Do not do any grouting of column base plates until beams, girders, trusses, etc., are permanently anchored to column.

E. Unload, handle, and erect the work of this Section to avoid bend, twists or other distortions. Erect and install in accordance with the contract documents and the approved shop drawings and conforming to all specified tolerances. Erect plumb and true to the lines and levels of the contract drawings.

F. Align, level and adjust all members accurately prior to final fastening. Bearing surfaces and surfaces that will be in permanent contact shall be cleaned prior to final assembly of members.

G. Fasten compression member splices only after abutting surfaces have been brought completely into contact. Clean all bearing surfaces prior to final assembly of members.

H. Oxygen cutting in the field shall be done only with prior written permission of the Architect.

I. Bolted Field Connections:

1. Standard bolts shall be of a length that will extend not less than 1/4" beyond the nuts. Enter bolts into holes without damaging the threads.

2. Correct poor matching of holes by drilling the hole to the next larger size and using a corresponding larger size bolt. Obtain written approval of Architect before proceeding with corrective work.

3. For high-strength bolts, use specified pre-calibrated bolts or bolts with direct tension indicators or turn-of-nut method to insure proper tensioning of the bolt. Install bolts in accordance with manufacturer's instructions, engaging both the bolt and the nut and driven until the torque control groove of the bolt shears off, or until the indicator element crushes, or until the nut has been turned past the snug tight condition in accordance with AISC requirements for turn-of-nut method for tensioning bolts. Tensioning of group of bolts shall be done first to snug tight condition and subsequently in proper sequence to obtain required tension.

J. Field Welding:

1. All welding operations and the welds shall conform to the applicable provisions of the AWS Code.

2. Each welder working on the project shall be assigned an identification symbol or mark. Each welder shall mark or stamp his identification symbol at each completed weldment.

3. Allow for weld shrinkage so that welded connected members will be accurately aligned and level after completion of the welding work.

K. Shear Connectors: Weld shear connectors to supports through decking units in accordance with manufacturer's instructions. Do not weld shear connectors through 2 layers (lapped ends) of decking units. Weld only on clean dry deck surfaces. Space and align shear connectors as shown on drawings.

L. Erection Tolerances: Dimensional tolerances as stated by the AISC Code of Standard Practice Par. 6.4 and Frame tolerances as stated by AISC Code of Standard Practice Par. 7.11, shall be considered the minimum acceptable standard for structural framing members except that at elevator shafts, the cumulative tolerances of all columns and beams around the shafts shall not exceed one inch toward the shaft. On shop drawings submitted for approval for Architectural metal work, exposed structural framing members or framing members designed to receive exposed Architectural metal work, the Architect may indicate closer tolerances, which shall be acceptable and binding upon the Contractor.

M. Survey: Make an accurate survey of actual column locations immediately upon the completion of every third tier of steel and promptly submit same to the Architect. Survey shall include tier

below. Should column locations vary beyond the allowable tolerances, take necessary corrective measures and modify details or procedures as required and approved by the Architect.

N. Corrective Work: Members or assemblages of work of this Section having fabrication errors, or which exceed permissible tolerances, or which have errors or deformations preventing proper assembly and fitting of parts, shall be reported immediately to Architect. Such members or assemblages shall be corrected, if permitted by Architect, or shall be replaced. Contractor shall submit drawings showing the errors and obtain approval prior to performing any corrective work. All costs, fees and charges for work performed by the Architect shall also be paid for by the Contractor.

3.2 FINISHING AND PAINTING:

A. General:

1. All steel, painted and unpainted iron materials furnished under this Section shall be thoroughly cleaned of rust, scale, grease.

2. All structural steel not to receive galvanized coating or spray-on fireproofing, shall be given one shop coat of an approved rust inhibitive metal primer. This will be required generally at elevator separator beams, any supplementary steel required for stone and glass support and any architecturally exposed steel. Cleaning method for painted steel shall conform to SP-3-63 Power Tool Cleaning. After installation, damaged portions of shop coat shall be touched up in field with same primer.

3. Paint shall be applied at the rate of 350 sq. ft./gallon to give a dry film thickness of 2.5 mils.

4. No material shall be loaded for shipment until shop coat is fully dry.

5. No painting shall be done in the field in wet or freezing weather unless material is protected from dampness or cold. Painting to be done with brushes, entire surface to be covered smoothly, thoroughly, with paint worked into all joints.

6. Work arriving at site which does not conform to item 1 to 4 above shall be cleaned and given an additional coat of paint before being erected, except finish work which will be exposed to view shall be returned to shop for recleaning and repainting.

7. All steel exposed to weather which is not galvanized must be coated with fiberglass for protection against rusting.

B. Surfaces in Contact with Aluminum: Steel surfaces in contact with aluminum shall receive an additional coat of paint consisting of 2 lbs. of aluminum paste pigment (ASTM Spec. D962-49 Type II, Class B) per gallon of varnish meeting Fed. Spec. TT-V-8 lbs., Type II or equivalent.

C. Field Touch Up Painting: After erection, clean exposed surfaces of field connections, unpainted areas adjacent to field connections and damaged areas in shop coat to the same standards as required for the shop coat and paint with the same primer and to the same thickness as used in the shop coat.

D. Galvanizing:

1. Fabricated ferrous metal work, where specifically shown on structural drawings, shall be galvanized by hot-dip process, conforming to ASTM A123, ASTM A153 (Table 1), and ASTM A386 (Table 1) as applicable. Required hot-dip galvanizing shall be done after

fabrication, in largest sections possible. Minimum weight of galvanized coating shall be 2 oz. per sq.ft. of surface.

2. Punched holes in material 3/4" thick or more which is to be galvanized shall be reamed by at least 1/16 inch of metal removed from the periphery of the hole after punching.

3. All edges of tightly contacting surfaces of assemblies which are to be galvanized after assembly shall be completely sealed by welding. A vent hole at least 3/8 inch in diameter shall be provided into the lapped area between the seal welds. The steel member shall be pre-heated to 300 F after acid pickling and before the zinc dip to remove hydrogen.

4. Welding flux residues must be removed by mechanical means (such as wire needle gun or sand blasting) before galvanizing.

5. Free flow of cleaning solution and molten zinc shall be provided for in assemblies of hot-rolled shapes in accordance with recommendation of Section 10 of ASTM A385.

6. Some means other than paint must be used for marking material which is to be galvanized.

7. High strength steel (Fy = 50 ksi and larger) and items too large for available dip tanks shall be sprayed by approved methods, with molten zinc to coating thickness of .003" to .004". Weight of the zinc coating per sq. ft. of actual surface shall average not less than 2.0 oz., no individual specimen shall show less than 1.8 oz.

8. Welding to galvanized plates shall be avoided wherever possible. Where welding is required use 1/16" shim separator between plates to be welded, E7010 electrodes, and an intermittent weld using a 1/4" gap every 3 inches.

9. Shop galvanized metal work necessitating field soldering or welding which in any manner removed original galvanizing shall be restored by field cold galvanizing with "Ferraloy", "Tim Easy Fluid", "Galvaloy", or approved equal. Bolts, screws for attachment of galvanized items shall be galvanized, or of non-corrodible material.

END OF SECTION
END OF SECTION 05 10 00

SECTION 05 40 00 - COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Formed steel stud exterior wall framing.

A. Steel framing, bridging and bracing.

1.2 REFERENCES

A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; current edition.

B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; current edition.

C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; current edition.

D. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; current edition.

E. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; current edition.

1.3 SYSTEM DESCRIPTION

A. Size components to withstand design loads in conformance with applicable codes.

1. Refer to structural drawings for design wind loads.

B. Horizontal Deflection: Design to permit maximum deflection of 1/600 of span.

C. Design wall system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

D. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1. Design stud connections to withstand live load deflections of L/240 for primary building structural members.

1.4 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.

C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.

D. Shop Drawings: Indicate component details, including widths and gages of studs and joists, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.

1. Indicate cold formed stud layout.
2. Describe method for securing studs to tracks and for bolted framing connections.
3. Provide design calculations, stamped by a Professional Structural Engineer, licensed in the State of Illinois.

4. Provide details and calculations for factory-made framing connectors, stamped by a Professional Structural Engineer licensed in the State of Texas.
5. Provide keyed plans depicting stud gage and spacing for all walls, stamped by a Professional Structural Engineer licensed in the State of Texas.

D. Product data for thermal insulation strips.

E. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

1.5 QUALITY ASSURANCE

A. Calculate structural properties of framing members in accordance with requirements of American Specification for the Design of Cold-Formed Steel Structural Members.

B. Manufacturer: Company specializing in manufacturing the types of products specified in this section, and with minimum (5) five years of documented experience.

C. Installer: Company specializing in performing the work of this section with minimum (5) five years of experience.

D. Design structural elements, spacing and sizing off all metal studs on exterior of project under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in State of Texas.

1.6 PROJECT CONDITIONS

A. Verify that field measurements are as indicated on the drawings.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Metal Framing, Connectors, and Accessories:

1. Clark Dietrich Building Systems: 9700 New Decade Dr. Pasadena, Texas 77507
Phone No.: 281-383-1617
2. Super Stud Building Products, Co: 53 W.L. Runnels Industrial Dr, Hattiesburg, MS 39401
Phone No. 601-584-7550
3. SCAFCO Steel Stud Co.: 2800 E. Main Ave. Spokane, WA 99200
Phone No.: 509-343-9000

2.2 FRAMING MATERIALS

A. Studs and Track: ASTM C 955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.

1. Gage and depth: As required to meet specified performance levels and design detail compatibility. Do not exceed stud widths indicated on drawings without architect approval.
2. Galvanized in accordance with ASTM A 653/A 653M G90/Z275 coating.

B. Joists and Purlins: Fabricated from ASTM A 653/A 653M steel sheet.

1. Base Metal: As required to meet specified performance levels and design detail compatibility.

2. Gage and depth: As required to meet specified performance levels and design detail compatibility. Do not exceed joist widths indicated on drawings without architect approval.

3. Provide with rust inhibiting primer and painted finish.

C. Framing Connectors: Factory-made formed steel sheet, ASTM A 653/A 653M SS Grade 50, with G60/Z180 hot dipped galvanized coating and factory punched holes.

1. Structural Performance: Maintain structural and movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold Formed Steel Structural Members; minimum 12 gage, 0.0808-inch thickness.

2. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, screws and anti-friction bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.

3. Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof- to-wall tie-down, hangers, gusset plates, and stiffeners.

D. Studs, Bracing and Runners (Tracks):

1. 2 ½" – 16 gage minimum.

2. 3 5/8" – 16 gage minimum.

3. 6" – 16 gage minimum.

4. Coordinate all noted components with Pre-Engineered metal building framing and installation details.

2.3 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.4 FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A 153/A 153M.

B. Anchorage Devices: Power actuated.

C. Welding: In conformance with AWS D1.1.

2.5 SHOP FABRICATED ASSEMBLIES

A. Shop fabricate metal framing to the greatest extent possible.

B. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.

C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that building framing components are ready to receive work.

3.2 INSTALLATION OF FRAMING AND COMPONENTS

A. Install components in accordance with manufacturers' instructions and ASTM C 1007 requirements.

B. Place studs at 16 inches on center and as indicated on drawings; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.

C. Construct corners using minimum of three studs. Install double studs at wall openings, door jambs.

D. Install studs full length in one piece. Splicing of studs is not permitted.

E. Install studs, brace, and reinforce to develop full strength and achieve design requirements. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

F. Install intermediate studs above and below openings to align with wall stud spacing.

G. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

H. Attach cross studs to studs for attachment of fixtures anchored to walls.

I. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

J. Touch-up field welds and damaged galvanized surfaces with primer.

3.3 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/8 inch.

B. Maximum Variation of any Member from Plane: 1/8 inch.

END OF SECTION

SECTION 05 41 00 - STEEL STUD FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-structural metal framing for the following applications:
   1. Non-load-bearing steel framing systems for interior framing.

1.2 REFERENCES

A. American Concrete Institute (ACI) 318 - Building Code Requirements for Structural Concrete.

B. American Iron and Steel Institute (AISI) S200 - North American Standard for Cold- Formed Steel Framing - General Provisions.

C. ASTM International (ASTM):
   1. ASTM A 641/A 641M - Standard Specification for Zinc- Coated (Galvanized) Carbon Steel Wire.
   2. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   3. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum- Zinc Alloy-Coated by the Hot-Dip Process.
   4. ASTM A875/A875M - Standard Specification for Steel Sheet, Zinc-5% Aluminum Alloy-Coated by the Hot-Dip Process
   5. ASTM A879/A879M - Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.
   6. ASTM A 1003/A 1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
   7. ASTM A1046 - Standard Specification for Steel Sheet, Zinc-Aluminum- Magnesium Alloy-Coated by the Hot-Dip Process.
   8. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members.
   9. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
   10. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board.
   11. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
   12. ASTM E 1190 - Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members.

D. ICC-ES AC70 - Acceptance Criteria for Fasteners Power-driven into Concrete, Steel and Masonry Elements.

1.3 SUBMITTALS

A. Submit under provisions of Division One - Administrative Requirements.

B. Product Data: For each type of product.

1. Studs and Runners: Provide documentation that framing members' code compliance is verified by independent third-party testing to meet the following standards: International Building Code (IBC), ASTM C 645, and American Iron and Steel Institute (AISI) North American Standard for Cold-Formed Steel Framing - General Provisions (AISI S200).

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5-year experience manufacturing similar products.

B. Installer Qualifications: Minimum 5-year experience installing similar products.

1.5 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Metal Framing, Connectors, and Accessories:

1. Clark Dietrich Building Systems:9700 New Decade Dr., Pasadena, Texas 77507
Phone No.: 281-383-1617

2. Super Stud Building Products, Co.: 53 W.L. Runnels Industrial Drive
Hattiesburg, Mississippi 39401-8320
Phone No. 601-584-7550

3. SCAFCO Steel Stud Co.: 2800 E. Main Ave. Spokane, WA 99200
Phone No.: 509-343-9000

2.2 PERFORMANCE REQUIREMENTS

A. Fire Characteristics: For construction that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in according to ASTM E 119 by an independent testing agency.

B. Horizontal Deflection: For wall assemblies, limited based on cladding listed below and a horizontal loading of 5 lbf/sf (24 kilogram-force/square meter). Overall deflection shall be limited to:
1. Gypsum board finishes: 1/120 of wall height.
2. Gypsum board with critical or brittle paint finishes: 1/240 of wall height

2.3 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: Any of the following, as listed in ASTM A1003, table 1, are permitted:
   a. ASTM A 653/A 653M, G40 (Galvanized).
   b. ASTM A792/A792M, AZ50 (Galvalume).
   c. ASTM A875/A875M, T1-25 or T2-100 (Galvan).
   d. ASTM A879/A879M, 20Z/20Z (Electro-galvanized).
   e. ASTM A1046 (Zinc-Aluminum-Magnesium Alloy - ZAM).
3. Other coatings claiming equivalent corrosion resistance are not permitted.

B. Studs and Runners: Minimum 16 gage and compliant, meeting ASTM C 645.

1. Coordinate framing component sizes with details and drawings.
   a. Minimum Base-Metal Thickness:
      i. As required by performance requirements for horizontal deflection.
      ii. For cement-based sheathing products, minimum 5/8”-inch thickness.
   b. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:
1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inches (51 mm) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous sheathing attachment located within 12 inches (310 mm) of the top of studs to provide lateral bracing.
2. Slotted track: minimum 2.5 inches (64 mm) legs with 1.5 inch (38 mm) tall by 0.22 inch (5.6 mm) wide slots with maximum 1 inch spacing along length of track. Track products shall comply with Underwriters Laboratories (UL) head-of-wall designs listings HW-D-0632 and HW-D-0633.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Where studs are installed directly against exterior masonry walls or dissimilar exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at wall substrates and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs. Install two studs at each jamb unless otherwise indicated.

E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work specified in this Section.

1.2 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION:

A. Work, in general, includes furnishing and installing:

1. Rough hardware, loose bearing plates, miscellaneous framing, bracing, supports, angles, clips, and plates.
2. Trench drain gratings
3. Angles, clips, plates.
4. Edge angles.
5. Miscellaneous bracing.
6. Areaway grating, access grating, and grating work platforms.
7. Framing and steel support for Exterior Wayfinding Signage Kiosk.

1.3 RELATED WORK OF OTHER SECTIONS:

A. Coordinate work of this Section with work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the work of other Sections.

1.4 SYSTEM PERFORMANCES:

A. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.5 QUALITY ASSURANCE:

A. Comply with the provisions of the following codes, standards, and specifications, except as otherwise shown and specified.

1. AISC S335 "Specification for Structural Steel Buildings Allowable Stress Design and Plastic Design with Commentary".
2. AWS D1.1 "Structural Welding Code".
3. AWS D1.2, "Structural Welding Code--Aluminum."
4. AWS D1.3, "Structural Welding Code--Sheet Steel."
5. AWS D1.6, "Structural Welding Code--Stainless Steel."

B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel" and AWS D1.3 "Structural Welding Code-Sheet Steel".

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes

involved and, if pertinent, has undergone recertification.

C. Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of the work. However, do not delay Job progress; allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work.

D. Furnish inserts and anchoring devices which must be set in concrete or built into masonry for the installation of miscellaneous metal work. Provide setting drawings, templates, instructions, and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

E. Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the Project Site. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

F. Provide miscellaneous metal work fabricated by processes and techniques which will result in the appropriate workmanship class as scheduled.

1. Class 1 Workmanship: Sandblast exposed surfaces smooth with pits, mill marks, nicks, and scratches filled and ground smooth so that no defects are visible from a distance of 6' after painting.

    a. Conceal welds where possible. Where exposed, grind welds to small radius with uniform size cove. Welds shall be undetectable after painting.
    b. Use only flat head countersunk bolts in exposed locations.
    c. Fit all joints to hairline finish.
    d. Distortions visible to the eye will be cause for rejection.

2. Items required to have Class 1 Workmanship include:
    a. Overhead door clearance bars.

3. Class 2 Workmanship: Grind exposed surfaces to remove surface irregularities. Moderate imperfections not visible at 20' may remain. Mill marks may remain.

    a. Grind welds to small radius with uniform sized core and smooth transition between joined pieces.
    b. Use only flat or oval head, countersunk bolts where exposed to view.
    c. Straightness: Minor distortions will be permitted.
    d. Joints: Provide maximum gap of 1/16".

4. Items required to have Class 2 Workmanship include:
    a. Exposed door supports, guides, and bracing.

5. Items required to have Class 3 Workmanship include all concealed items and those items exposed to view only in "service" areas such as mechanical equipment rooms, and other areas accessible only to building maintenance staff.

1.6 SUBMITTALS:

A. Submit copies of manufacturer's specifications, dimension diagrams, anchor details, and installation instructions for products to be used in the fabrication of miscellaneous metal work, including paint products. Indicate by transmittal that copy of instructions has been distributed to the installer.

B. Submit shop drawings for the fabrication and erection of all assemblies of miscellaneous metal work which are not completely shown by the manufacturer's data sheets. Include plans and elevations and include details of sections and connections. Show anchorage finishes and accessory items.

C. Welding certificates.

PART 2 PRODUCTS

2.1 MATERIALS:

A. For the fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding or by welding and grinding prior to cleaning, treating, and application of surface finishes and including zinc coatings.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A36M.

C. Malleable-Iron Castings: ASTM A 47, Grade 32510 (ASTM A 47M, Grade 22010).

D. Uncoated Structural Steel Sheet: Product type (manufacturing method), quality and grade as follows:

1. Hot-Rolled Structural Steel Sheet: ASTM A 570/A 570M, grade as follows:

a. Grade 30, unless otherwise indicated or required by design loading.

E. Steel Primer Paint: Fabricator's standard rust-inhibitive primer, lead-free and complying with VOC regulations.

F. Galvanizing Repair Paint: High zinc-dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94% zinc dust by weight, complying with SSPC-Paint 20.

G. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.

2.2 FASTENERS:

A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.

D. Machine Screws: ASME B18.6.3.

E. Lag Bolts: ASME B18.2.1.

F. Plain Washers: Round, carbon steel, ASME B18.22.1.

G. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

I. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.3 FABRICATION, GENERAL:

A. Use materials of the required size and thickness to produce adequate strength and durability in the finished product for the intended use but not less than that needed to comply with performance requirements indicated. Work to the dimensions shown or accepted on shop drawings using proven details of fabrication and support.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32". Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.

C. Weld corners and seams continuously and in accordance with the recommendations of AWS. Grind exposed welds smooth and flush.

D. Fill pinholes in welds and surface damage on all exposed surfaces of work visible under finished lighting condition when viewed from a distance of 6', with 2 component automotive body filler compatible with primer paint. Match adjacent metal surface finish unless otherwise indicated.

D. Fabricate and space anchoring devices as required to provide adequate support for the intended use of the work.

E. Hot-dip galvanize items shown on the Drawings or specified to be galvanized after fabrication.

Galvanize metal exposed to the exterior and at all non-conditioned spaces.

1. ASTM A 153 for galvanizing of iron and steel hardware.
2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars and strip 0.0299 inch (0.76 mm) thick or thicker.

F. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

G. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of bearing plates. Set loose bearing plates on wedges or other adjustable devices. After items have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with mortar. Pack bedding mortar solidly between bearing surfaces and plates to ensure that no voids remain.

B. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal items to in-place construction, including threaded fasteners for concrete and masonry inserts.

C. Perform cutting, drilling, and fitting required for the installation of the miscellaneous metal items. Set the work accurately in location, alignment and elevation, plumb, level, true, and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry of similar construction.

D. Comply with AWS D1.1 procedures of manual shielded metal-arc welding, appearance and quality of welds, and methods used in correcting weld.

E. Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Section 09 91 13 or 09 91 23.

3.2 SCHEDULE OF MISCELLANEOUS METAL FABRICATION ITEMS:

A. Furnish custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes for framing and supporting and anchoring Project Work, unless specified to be provided under other Sections of the Specifications. Provide with hot-dipped galvanized finish unless otherwise noted.

B. Provide loose bearing plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.

C. Provide miscellaneous structural steel framing and supports as required to complete the work.

D. Fabricate miscellaneous units to the sizes, shapes, and profiles shown or of the required dimensions to receive adjacent work to be retained by the framing. Fabricate from structural steel shapes and plates and steel bars of all welded construction using mitered corners, welded brackets and splice plates, and a minimum number of joints for field connection. Cut, drill, and tap units to receive hardware and similar items to be anchored to the work.

E. Equip units with integrally welded anchor straps for casting into poured concrete or building into masonry wherever possible. Furnish inserts if units must be installed after concrete is poured. Space anchors 2'-0" o.c. and provide minimum anchor units of 1-1/4" x 8" steel straps.

F. Provide miscellaneous steel shapes and sizes as required for the profiles shown. Except as otherwise noted, fabricate units from structural steel shapes and plates and steel bars with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings, and anchorages as required for coordination of assembly and installation with other work.

3.3 LOOSE BEARING AND LEVELING PLATES:

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of the required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

3.4 GRATINGS:

A. Metal Bar Grating Standard: "Standard Specifications for Metal Bar Grating and Metal Bar Grating Treads" published in ANSI/NAAMM MBG 531 "Metal Bar Grating Manual".

B. Heavy-Duty Metal Bar Grating Standard: "Guide Specifications for Heavy Duty Metal Bar Grating"

published in ANSI/NAAMM MBG 532 "Heavy Duty Metal Bar Grating Manual".

C. Provide banded metal bar grating as shown on the Drawings, complying with the NAAMM "Metal Bar Grating Manual" and as specified herein.

1. Grating shall be provided complete with angle frames where indicated on the Drawings. Frames and fastening devices shall be of same material and finish as grating being fastened.
2. Provide removable grating sections with end-bearing bars, 4 saddle clip anchors designed to fit over 2 bearing bars, and 4 stud bolts with washers and nuts unless otherwise shown.
3. Notching of bearing bars at supports to maintain elevations will not be permitted.

3.5 TRENCH DRAIN GRATINGS AND FRAMES:

A. Provide cast gratings and frames as manufactured by McKinley Iron Works, Inc., Fort Worth, Texas, or approved equal manufacture.

B. Assembly shall be multiples of stock lengths.

END OF SECTION

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 – GENERAL

1.1 SECTION INCLUDES:

A. Preservative treated wood materials.

B. Miscellaneous framing.

C. Concealed wood blocking, nailers, and supports.

1.2 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; Current Edition.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; Current Edition.

C. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; Current Edition.

D. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); Current Edition.

1.3 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.

1. Species: Douglas Fir-South, unless otherwise indicated.
2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
3. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.

1. Boards: Standard or No. 3.

2. Lumber: S4S, No. 2 or Standard Grade.

2.3 SHEET MATERIALS

A. Communications Room Mounting Boards: PS 1 A-C plywood A side out; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84; free of defects (knots and voids shall be considered a defect) to be installed covering all walls. The plywood shall be 4 feet by 8 feet and be installed 24 inches above finished floor. Plywood shall be mounted with the A side exposed to the interior of the room and the C side against the wall. Backboards shall be painted with Architect selected color, leaving the UL fire-rating symbol unpainted and visible.

2.4 ACCESSORIES

A. Fasteners and Anchors:

1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere with 100% recycled content.
2. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete, recycled content 100%.

2.5 FACTORY WOOD TREATMENT

A. All interior rough carpentry items are to be fire retardant treated.

B. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

C. Fire Retardant Treatment:

1. Manufacturers: Reference PAR 2 PRODUCTS.

2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.

a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
b. All interior rough carpentry items are to be fire retardant treated.
c. Treat rough carpentry items as indicated
d. Do not use treated wood in applications exposed to weather or where the wood may become wet.

1. Manufacturers:
   a. Boise Cascade Co.: 702 Reed Rd., Sugarland, Texas 77478
      Phone No.: 281-313-5575

   b. Sierra Pacific Industries: 2445 Higgins Rd., Elk Grove Village, IL 60007
      Phone No.: 847-258-4746

   c. Georgia Pacific Building Products: 650 Gellhorn Dr. Houston, Texas 77029
      Phone No.: 713-675-3544

2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.

   a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   b. Treated lumber in contact with masonry or concrete.
   c. Treated lumber less than 18 inches above grade.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.2 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fire blocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.3 INSTALLATION OF CONSTRUCTION PANELS

A. Communications Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.

1. Install adjacent boards without gaps.

3.4 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

3.5 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

3.6 CLEANING

A. Waste Disposal:

1. Comply with applicable regulations.
2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. 5/8” x 4’-0” x 8’-0” Fiber cement board.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. Georgia Pacific Building Products: 650 Gellhorn Dr. Houston, Texas 77029
Phone No.: 713-675-3544

B. United States Gypsum Co.: 1 Usg Rd. Sweetwater, Texas 79556
Phone No.:325-236- 7700

C. PermaBASE Building Products: 811 Sparks Drive, Cleburne, Texas 76033
Phone No.: 817-645-3435

2.2 MATERIAL
A. Base Product: USG” DUROCK” Cement Board or approved equal.

2.3 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.4 WALL SHEATHING

A. Fiber Cement Board: ANSI A118.9 and ASTM C1325.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Screws for Fastening Fiber Cement Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.

1. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C 954.

2.6 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Fiber Cement Board Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with fiber cement sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m) of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing sheathing and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2).
3. ICC-ES evaluation report for fastener.

D. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 SHEATHING INSTALLATION

A. Comply with manufacturer's written instructions.
   1. Fasten sheathing to cold-formed metal framing with screws.
   2. Install panels with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements.
   3. Install panels with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.

   1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.

D. Seal sheathing joints according to sheathing manufacturer's written instructions.

   1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
   2. Apply fiber cement board sheathing tape to sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION

SECTION 06 22 00 – ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Base Cabinets.

B. Counter tops.

1.2 RELATED SECTIONS:

A. SECTION 06 10 00: Rough Carpentry: Blocking, bracing and back-up framing.

B. SECTION 09 90 00: Paints and Coatings: Back priming countertops.

1.3 DEFINITIONS:

A. Exposed: Where used "exposed" portions of casework includes surfaces visible when doors and drawers are closed. Bottoms of cases more than 4'-0" above finish floor are considered exposed. Visible surfaces in open cases or behind clear doors also are considered as exposed portions.

B. Semi-Exposed: Where used "semi-exposed" portions of cabinet work includes those members behind opaque doors, such as shelves, divisions, interior faces of ends, case backs, drawer sides, backs and bottoms, and back face of doors. Tops of cases 6 feet - 6 inch or more above finish floor shall be considered semi-exposed.

1.4 REFERENCES:

A. American National Standards Institute (ANSI):

1. A161.2, Performance Standards for Fabricated High-Pressure Decorative Laminate Countertops.

B. Architectural Woodwork Institute (AWI):

1. Architectural Woodwork Quality Standards, 6th Edition, 1993.

C. American Plywood Association (APA):

1. E30E-85 Residential Commercial Construction Guide.

D. Federal Specifications (FS):
1. FS MM-L-736C, Lumber Hardwood.
2. FS MMM-A-1308, Adhesive, Contact.

E. National Electrical Manufacturer's Association (NEMA):
1. LD-3, High Pressure Decorative Laminates.

F. Product Standards (PS):
1. 1, Construction and Industrial Plywood.
2. 20, American Softwood Lumber Standard.
3. 51, Hardwood and Decorative Plywood.
4. 58, Basic Hardboard.

1.5 SUBMITTALS:

A. Procedures for Submittals: Section 01 33 00.

B. Shop Drawings:
1. Indicate required field measurements.
2. Indicate profiles, sections, and views of stock items as well as specially fabricated items for the work, at scale large enough to permit checking for design conformity.
3. Indicate sizes, quantities, markings, materials, wood species, finishes and accessories.
4. Include assembly and installation drawings to show methods of blocking, fastening, bracing, jointing, and connecting to work of other trades.
5. Indicate dimensions necessary for fitting millwork to adjacent equipment and appliances to fixed planes. Be responsible for details and dimensions not controlled by job conditions.
6. Indicate cut-out locations.

C. Product Data: Manufacturer’s data for each item of hardware and specialty.

D. Samples:
1. 8-1/2 inch by 11-inch plastic laminate samples in standard Manufacturer’s offerings.
2. 6-inch by 6-inch solid plastic samples in each color.

E. Quality Control Submittals:
1. Qualification Data: Fabricator's qualifications verifying 5 years of experience; include list of completed projects having similar scope of work identified by name, location, date, reference name and phone number.

1.6 QUALITY ASSURANCE:

A. Fabricator Qualifications: Company specializing in fabrication of custom millwork of quality and having minimum of 5 years documented experience.

B. Fabrication Standards: Fabricate products and items in accordance with AWI standards listed below using custom grade unless noted otherwise.
1. Lumber grades: AWI Section 100.
2. Standing and running trim: AWI Section 300.
3. Laminate Clad Cabinets: AWI Section 400B.
4. Counter tops: AWI Section 400C.
5. Paneling: AWI Section 500.
6. Shelving: AWI Section 600.
7. Miscellaneous work: AWI Section 700.

1.7 DELIVERY, STORAGE AND HANDLING:

A. Deliver, store, handle, and protect products in accordance with Sections 01 60 00.

B. Protect materials from damage, soiling and deterioration.

C. Do not deliver finish carpentry materials until job site conditions and operations which could damage, soil or deteriorate work are complete.

D. Store products and materials in ventilated, interior locations under constant minimum temperature of 60 degrees F. and relative humidity not to exceed 55%.

1.8 ENVIRONMENTAL REQUIREMENTS:

A. Maintain temperature and moisture conditions as recommended by casework fabricator from date of installation through remainder of construction period.

1.9 FIELD MEASUREMENTS:

A. Verify that field measurements are as indicated on shop drawings.

1.10 SEQUENCING AND SCHEDULING:

A. Verify that blocking is in place and back priming complete before beginning work.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. General:
1. Comply with quality and grading standards specified for each material.
2. Sizes noted on Drawings or specified for lumber are nominal unless detailed by specific dimensions of actual size. Minimum thickness is nominal 1 x material - unless noted or shown otherwise.
3. Plywood 3/4-inch thickness unless noted or detailed otherwise.
4. Products surfaced four sides, unless noted otherwise.
5. Particle board (wafer board) is not acceptable for millwork construction.

B. Hardboard:
1. Quality standard: PS 58.
2. Grade: Tempered.
3. Face: Both faces sanded.
4. Thickness: 1/4 inch, minimum.

C. Laminate Materials:
1. High Pressure Laminate Surface:
a) Quality standard: NEMA, LD-3.
b) Grade: General purpose and post formable (for counter tops).
c) Thickness: 0.050 inch for horizontal grade; 0.028 to 0.032 inch for vertical grade.
d) Core: Standard.
e) Finish: Matte textured.
f) Color: Laminate manufacturer’s standard offerings to be selected by Architect.
g) Manufacturers:
1) Wilsonart: 552 Garden Oaks Blvd., Houston, Texas 77018
Phone No.: 713-699-4043
2) FORMICA Corporation: 902 W. North Carrier PKWY,
Grand Prairie, Texas 75050
Phone No.: 972-623-4150
3) NEVAMAR Decorative Surfaces: 11121 Zodiac Ln., Dallas, Texas 75229
Phone No.: 972-243-1175
2. Laminate Backing Sheets:
a) Composition: High pressure laminate of paper and melamine, hot press cured onto substrates, without decorative finish, 0.020-inch-thick minimum.
b) Conform to NEMA LQ-1-1977 requirements for "General Purpose" decorative board (not "Light Duty" liner type).

c) Satin finish, opaque color.
d) Resin: Polyester; or Melamine; phenolic resin may be used on concealed surfaces.
e) Color: Manufacturer's standard premium light, neutral, solid color.

2.2 ACCESSORIES AND TREATMENT:

A. Contact Adhesive: FS MMM-A-130B of type recommended by millwork manufacturer to suit application.

B. Bolts, Nuts, Washers, Lags, Pins, Nails, and Screws: Size and type to suite application. Provide allen or torx head with security pin configuration except that interior of cabinets need not have security fasteners.

C. Hardware Base Products:
1. Cabinet Pulls: Stanley No. 4484 US26D finish, 4 x 1-5/16-inch projection or approved equal product.
2. Threaded Finger Pull for Doors: Knape and Vogt No. 836, 1-inch diameter, US26D finish or approved equal product.
3. Door Catches: Stanley No. 46 plain finished, aluminum encased, impregnated rubber magnet or approved equal product.
4. Full Extension Drawer Slide: Knape and Vogt No. 8400 with telescopic movement on ball bearings, rubber bumpers, tracks, mounting brackets, all zinc plated steel or approved equal product.
5. Locks: Heavy duty institutional pin tumbler type; latch or cam suitable for application on drawered doors.
   a) Locks keyed alike in each Room or Area, or as otherwise directed by Owner.
   b) Provide 3 keys for each lock.
   c) Master key and grand master key as directed.
6. Adjustable Shelf Standards Within Cabinets: Knape and Vogt No. 255, 5/8-inch-wide, 1/2-inch adjustment intervals, bright zinc plated steel finish or approved equal product.
7. Shelf Supports Within Cabinets: Knape and Vogt No. 256 and No. 256R, 3/4-inch-wide, with and without rubber cushions, satin chrome finish or approved equal product.
8. Shelf Standards and Supports: Knape and Vogt Co., No. 87 Standards and No. 187 brackets, satin chrome finish or approved equal product.
9. Grommets: MG Series by Doug Mockett Co., No. MG-1, clear satin finish. Size: 1-5/8 inch or approved equal product.

2.3 SHOP FABRICATION:

A. Fabricate casework to AWI custom standards for reveal overlay construction as detailed (or as indicated in AWI Architectural Casework Details if details are not present).

B. Prime seal concealed and semi-concealed surfaces. Brush apply only.

C. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures. Verify locations of cutouts from site dimensions. Seal edge surfaces of cutouts.

D. Before proceeding with millwork required to be fitted to other construction, obtain measurements and verify dimensions of shop drawings details for accurate fit.

E. Fabricate casework to dimensions, profiles, and details shown.

F. Route and groove back of flat trim members, kerf backs of other wide flat members except plywood or veneered members.

G. Assemble casework in mill in as large of units as practicable to minimize field cutting and

fitting.

H. Miter trim joints, where required, by joining, splining, and gluing to complying with requirements for specified grade.

I. On high pressure laminate work:

1. Apply laminate finish in full, uninterrupted sheets of maximum practical lengths. Apply backing sheets to reverse side of items receiving laminate surfacing. Use laminate backing sheets for all cabinet interiors.
2. Form corners and butt joints with hairline joints.
3. Do not locate joints within 2 feet of sink cut-out.
4. Cap all exposed edges with laminate.

J. Construction:

1. General:
   a) Construct bodies, bottoms, dividers, sides, tops, shelves, doors, drawer fronts and countertops of 3/4 inch sheet material.
   b) Use 1/2-inch-thick solid lumber material for drawer sides, back and sub-front.
   c) Use 5/16-inch-thick tempered hardboard for drawer bottoms and cabinet backs.
2. Overlay reveals:
   a) Unless shown or noted otherwise, allow 1/4 inch between adjacent drawers and doors and at vertical edges.
   b) Allow 1/2-inch reveal at top and bottom of wall cabinets and at bottom of base cabinets.
3. Methods of Joinery:
   a) Provide face plates, paneled ends, and construction, glued under pressure.
   b) Provide body web frames of stile plowed and stub tenoned construction.
   c) Join case body members by dado or concealed dowel joints.
   d) Do not use mechanical fasteners or metal clips for attachment of body members to other body members or to web frames.
4. Base Cabinets:
   a) Use finished end panels unless condition will be fully concealed.
   b) Provide finished toe space fronts, finished to match cabinet front.
   c) Construct drawers with rabbited (tongue and groove) construction.
   d) Provide plywood at wet areas, do not use particle boards or wafer boards.
5. Countertops:
   a) Provide with 1-1/2-inch-deep face edge, faced with high pressure laminate unless noted or shown otherwise, with post-formable 4" high, integral backsplashes.
   b) At cabinet top ends, provide loose 4-inch-high pressure laminate covered splashes typically unless taller splashes shown or noted.
   c) Standard edging.
   d) Material: Plastic Laminate.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Verify that surfaces openings and conditions are ready to receive work of this section. Notify Architect of any existing condition which will adversely affect execution. Beginning of

execution will constitute acceptance of existing conditions.

B. Verify that field measurements are as shown on Shop Drawings.

C. Verify that mechanical, electrical, and other items affecting work of this section are in place and ready to receive the work.

3.2 PREPARATION:

A. Prime paint or seal concealed surfaces and items or assemblies which will be in contact with cementitious materials or surfaces.

B. Make field cuts with extreme care to avoid splintering.

3.3 INSTALLATION:

A. Install work in accordance with AWI Custom Quality Standards. Handle materials to avoid dents and other damages.

B. Set and secure materials and components, rigid, plumb, and square. Use joint fasteners to align and secure adjoining cabinets and countertops. Affix base cabinets to floor.

C. Shim as required using concealed shims.

D. Field Fitting:
1. Cut to fit and carefully scribe.
2. Where casework abuts other finished work, scribe and cut for accurate fit.
3. Where necessary to fit at site, provide ample allowance for cutting and fitting.
4. Do not use overlay trim pieces to cover joints.

E. Before making cutouts, drill pilot holes at corners.

F. Stagger joints in adjacent members.

G. Cope moldings at returns and miter at corners.

H. Attach items securely in place with uniform joints providing for thermal and building movements, blind nail where possible.

I. Use fine finishing nails where exposed.

J. Secure woodwork to anchors, built-in blocking, or directly attach to substrates where capable of adequately supporting load. Use toggle bolt type fasteners for wall mounted components. Secure countertops to base cabinets.

K. Install hardware in accordance with manufacturer's recommendations.

L. On field applied laminate plastic work:
1. Apply plastic laminate finishes where indicated.
2. Adhere with adhesive over entire surface. Make joints and corners hairline.
3. Match patterns. Slightly bevel arises.
4. Cap exposed edges with plastic laminate of same finish and pattern.
5. Apply laminate backing sheet on reverse side of plastic laminate finished surfaces.

3.4 ADJUSTING:

A. Adjust moving or operating parts to function smoothly and correctly.

3.5 CLEANING/PROTECTION:

A. Protect woodwork from marring, defacement, or other damage until final completion.

B. Clean spaces of debris and vacuum and wipe down casework. Leave in condition ready for use.

3.6 TOLERANCES FOR FIELD ASSEMBLIES/JOINED ITEMS:

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/64 inch for plastic laminate countertops and splashes, 1/32 inch for other components.

END OF SECTION 06 22 00

SECTION 06 82 00- FIBER REINFORCED PANEL

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes furnishing all materials, labor, equipment, and related services necessary to supply and install architectural fiber reinforced panels (FRP) fabrications as indicated in the contract documents, and in compliance with applicable codes.

1.2 RELATED SECTIONS

A. Section 06 10 00 Rough Carpentry.

B. Section 07 92 00 Joint Sealants.

C. Section 09 21 16 Gypsum Board Assemblies.

D. 09 65 13 Resilent Flooring, Base & Accessories-VCT

1.3 REFERENCES

A. ASTM International (ASTM)

1. D790 - Standard Test Methods of Flexural Properties of Unreinforced and Reinforced Plastics
2. D638 - Standard Test Method For Tensile Properties of Plastics
3. D256 - Standard Test Methods For Determining the Izod Pendulum Impact Resistance of Plastics.
4. D570 - Standard Test Method For Water Absorption of Plastics
5. D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
6. E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

1.4 ACTION SUBMITTALS

A. Product Data: Submit product data sheets for each specified product.

B. Past Projects: Submit a minimum of 3 previously completed installations of similar materials and complexity.

C. Shop Drawings: Submit drawings for approval showing plans, sections, details, joint treatment, reinforcing,, fastening and the relation of the FRP panels to the surrounding construction.

D. Samples: Submit Manufactures standard offerings for FRP current finishes.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

a. Manufacturer shall have a minimum of ten (10) years experience having successfully supplied FRP panels for other projects similar in scope and complexity for the work of this Contract.
b. Manufacturer shall have a minimum of ten (10) years' experience fabrication of FRP products.

B. Installer Qualifications: Installer shall have a minimum of 5 years' experience having successfully completed projects similar in scope and complexity for the work of this Contract.

C. Substrates to accept FRP panels shall be installed straight and true within 1/8 in. in 8 linear ft. (3mm in 2500mm) and shall be free of obstructions and interference that prohibits the correct alignment and attachment of the FRP panels.

D. Where the work schedule permits, confirm dimensions and site conditions prior to manufacturing FRP panels specified in this section. Any deviations from the design conditions or dimensions to be provided to the manufacturer for inclusion in the shop drawings.

1.6 DELIVERY, STORAGE AND HANDLING

A. Handle and transport FRP panels to avoid damage.

B. Panels shall be kept clean and dry and stored to prevent distortion, warping, and other physical damage in accordance with the manufacturer's recommendations.

C. Place stored panels so panel identification labels are clearly visible.

D. The installing contractor is responsible for damage to the FRP panels after delivery.

1.7 WARRANTY

A. Manufacturer Warranty: Provide manufacturer's standard product warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Specialized Building Systems: 6503 Wesco Way, Houston, Texas 77041
Phone No.: 713-896-9140

B. Marlite: 516 Great Southwest Parkway N, Arlington, TX 76011
Phone No.: 817-385-0549

C. USFRP.COM: P.O. Box 1091, Indiana, PA 15701
Phone No.: 1-844-698-7377

2.2 FIBER REINFORCED PANELS (FRP) FABRICATIONS

A. Fabrications: FRP panels shall have a Class 1 (or A) fire rating with a Flame Spread Rating: ≤ 25; Smoke Development Index: ≤ 450, when tested in accordance to ASTM E84 (See 1.3 References).

B. Gelcoat: FRP panels shall have an ultra violet stabilized polyester gelcoat with a minimum thickness of 15-20 mil.

C. Back-up Laminate: FRP reinforcement shall consist of a fiber polyester composite with 25-30% fiber content.

D. All reveals, set backs or returns to have a minimum of 3º draft angle.

E. All outside corners to have a minimum 1/8” (3mm) radius.

F. Identification: All FRP panels to have labels affixed to the back individually identifying them used on the shop drawings.

G. Nomial Panel Size: 4’-0” x 8’-0”.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Site Conditions: Verify the conditions for compliance with the requirements including environmental conditions, installation tolerances and other conditions affecting the installation and performance of FRP panels. Any unsatisfactory conditions to be corrected prior to installation.

B. Field Dimensions: Field dimensions are to be verified including those not shown on the drawings. Any discrepancies are to be brought to the attention of the Architect with resolutions to the discrepancies to be mutually agreed upon by all parties involved. Details of any changes required must be incorporated into the manufacturer’s shop drawings prior to commencing the manufacture of the FRP panels.

C. Design Dimensions: Where field measurements can not be made without delaying the Work, the installing contractor is to confirm with the Architect whether to proceed with fabricating the FRP panels to the design dimensions with construction coordinated to ensure the actual dimensions correspond with the design dimensions.

3.2 PREPARATION

A. Substrate: Substrates to accept FRP panels, provided by others, shall be installed straight and true within 1/8 in. in 8 ft. (3mm in 2500mm) and shall be free of obstructions and interference that prohibits correct attachment of FRP panels.

B. Structural framing members and bearing surfaces, provided by others, shall be true and level, of the proper size, spacing and design for the intended use and shall be sufficient to properly support the installed FRP panels.

3.3 INSTALLATION

A. Install in accordance with the manufacturer's instructions, contract documents and shop drawings.

B. The Installing contractor to provide all support brackets, connection hardware, adhesives, and other accessories required for the proper installation of the FRP fabrications in accordance to the manufacturer's requirements and applicable building codes.

C. Position and secure FRP panels carefully into place plumb, level and aligned with adjacent parts, shimmed where necessary.

D. Anchors and fasteners to be type 304 stainless steel where exposed; hot dipped galvanized steel where unexposed.

E. Provide temporary supports or bracing as required to maintain position, stability and alignment of panels until permanently secured.

F. Installing contractor to repair and patch holes or defects to match the original work. Provide joint spacing between panels as detailed for expansion and the application of joint treatment materials.

G. Provide joint spacing between panels as indicated by Manufactures installation instructions.

3.4 JOINT PROTECTION

A. Seal all joints with a low modulus exterior elastomeric sealant recommended by the manufacturer. Color of selant to be selected by the Architect.

3.5 CLEANING AND PROTECTION

A. Perform cleaning procedures, if necessary, according to FRP manufacturer's written instructions. Take precautions to prevent damage to FRP surfaces and staining of adjacent materials.

END OF SECTION

SECTION 07 21 00 – BUILDING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Batt insulation at locations detailed on the drawings.

1.2 RELATED REQUIREMENTS

A. Section 09 21 16 – Gypsum Board Assemblies.

1.3 REFERENCE STANDARDS

A. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C.

D. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

1.4 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.5 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 - PRODUCTS

2.1 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.

1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
2. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
4. Thickness: Full depth of wall framing.
5. Facing: Unfaced.

6. Manufacturers:

   a. Owens Corning Co.: (11100 – 11102) Market St., Houston, Texas 77029
      Phone No.: (713)- 672-8338

   b. Johns Manville Building Products: 2005 Turning Basin Dr., Houston, Texas 77029
      Phone No.: 713-672-3991

   c. Climate Control Insulation: 2470 North Main St., Mansfield, Texas 76063
      Phone No.: (817) -561-9825

2.2 ACCESSORIES

A. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.

B. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.

C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

D. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install in exterior wall and roof spaces without gaps or voids, where indicated on drawings. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

3.4 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 26 13 SELF ADHERING WATERPROOF MEMBRANE

PART I - GENERAL

1.1 DESCRIPTION

Fully self-adhering, dual membrane comprised of reinforced TPO and Butyl Alloy adhesive with a total thickness of 70 mils and has a TPO selvedge to allow welded seams.

1.2 RELATED SECTIONS - Includes, but not limited to the following

A. 06 10 00 Rough Carpentry
B. 06 16 00 Sheathing
C. 07 92 00 Joint Sealants

1.3 REFERENCE STANDARDS

A. ASTM D 412 Standard Test Methods for Rubber Properties in Tension.
B. ASTM D 624 Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
C. ASTM D 882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
D. ASTM D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
E. ASTM D 751 Standard Test Methods for Coated Fabrics.
F. ASTM D 1876Standard Test Method for Peel Release of Adhesives (T-Peel).
G. ASTM D 5385Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes.
H. ASTME 96 Standard Test Methods for Water Vapor Transmission of Materials.

1.4 QUALITY ASSURANCE

A. Approved Applicator in compliance with shop drawings and Specifications.
B. Pre-installation meeting is to be coordinated by the General Contractor and attended by an Owner’s Representative, the Waterproofing Consultant, the waterproofing applicator and membrane manufacturer’s representative. The purpose of this meeting is to discuss the necessity of ensuring proper waterproofing membrane protection during all phases of installation and to review other applicable requirements or unusual field conditions.
C. Approved applicator shall have at least one field personnel who has received training from the Manufacturer. The Field Superintendent shall have direct involvement from the beginning to the end of the waterproofing membrane installation.

1.5 SUBMITTALS

A. General: Submit in accordance with Section 01 33 00.
B. Product Data: Submit manufacturer's product literature and installation instructions.
C. Warranties: Submit sample warranties identifying the terms and conditions stated in Section 1.6.

1.6 WARRANTY

A. Installer’s Warranty - Provide a written workmanship warranty separate from manufacturer and agree to promptly make repairs to any water infiltration through the waterproofing system for a period of 2 years from the date of final installation of the waterproofing system.
B. Manufacturer’s Waterproofing Warranty - Provide a written warranty for all system components agreeing to promptly make repairs or replace defective waterproofing system materials.
C. Provide a ten (10)-year Material Warranty.

D. Manufacturer's Gas Vapor Barrier Warranty: Provide a written, single-source warranty for all system components agreeing to replace defective materials and /or workmanship.

1.7 PROJECT CONDITIONS

A. Coordination between various trades is essential to avoid unnecessary traffic to prevent damage to the membrane. Heavily traveled areas must be protected by placing temporary protection courses to prevent damage to the membrane.
B. Coordinate waterproofing work with other trades. The applicator shall have sole right of access to the specified areas for the time needed to complete the application.
C. Protect adjoining surfaces not to be waterproofed against damage or soiling.
D. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact.
   1. Name of material
   2. Manufacturer's stock number and date of manufacture
   3. Material's Safety Data Sheet
B. Store membrane and accessory products in a protected area out of direct sunlight and between 40ºF and 100ºF. Protect from rain, physical damage and construction traffic.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. W.R. MEADOWS: 2555 N.E. 33RD Street, P.O. Box 7752, Fort Worth, Texas 76111
Phone No.: 817-834-1969
B. CARLISLE COATINGS &WATERPROOFING, INC: 900 Hensley Lane, Wylie, Tx 75098
Phone No.: 800-527-7098
C. HENRY COMPANY: 1277 Boyles Street, Houston, Texas 77020
Phone No.: 800-486-1278

2.2 MATERIAL

A. Base Product Manufacture: CARLISLE COATINGS & WATERPROOFING, INC.

2.3 MEMBRANE

A. Sheet membrane for horizontal substrate: Shall be self-adhering adhesive coated pre-applied membrane and shall meet or exceed the requirements listed in section 2.4.
B. Sheet membrane: Shall be self-adhering adhesive coated pre-applied membrane and shall meet or exceed the requirements listed in section 2.4.

2.4 RELATED ACCESSORY PRODUCTS

A. Self-adhering tape pre-applied adhesive coating for detailing.
B. Prefabricated inside corner.
C. Prefabricated outside corner.
D. Prefabricated detail strip: Strip for transitions and various detailing
E. 45-mil reinforced TPO 10" strip: Strip for end laps/splices and various detailing.
F. Swellable Sealant used for use in non-moving joints to create watertight joints.
G. Pre-formed hydrophilic water stop strip: Use in non-moving joints to create watertight joint.

PHYSICAL PROPERTIES

Property	Method	Unit	Typical Value
TPO Thickness	—	mils (mm)	45 (1.14)
Butyl Alloy Thickness	—	mils (mm)	25 (0.64)
Total Membrane Thickness	ASTM D5147	mils (mm)	70 (1.78)
Water Vapor Transmission (Water Method)	ASTM E96	perms	0.020
Tensile Strength[1]	ASTM D882	psi	1,500
Tensile Strength[1]	ASTM D412	psi	2,100
300% Modulus[1]	ASTM D412	psi	1,000 ± 10%
Elongation @ Break @ 23°C (Die C) [1]	ASTM D412	%	500
Factory Seam Strength	ASTM D751 grab method	pli	66.0
Field Seam Strength	ASTM D1876	pli	25.0
Flexibility Temperature @ -29ºC (-20ºF) [1]	ASTM D1970	pass/fail	No Cracking @-29ºC (-20ºF)
Hydrostatic Pressure Resistance	ASTM D5385	ft.	>231 ft. (100 psi)
Peel Strength Over Poured Concrete	ASTM D903	lb.	>5.0
Resistance to Puncture	ASTM E154	lb.	300
Tear Strength of Vulcanized Rubber and Thermoplastics Die C[1]	ASTM D624	psi	250

PART 3 EXECUTION

3.1 GENERAL

A. Before any waterproofing work is started the waterproofing applicator shall thoroughly examine all substrates to receive the waterproofing for any deficiencies Should any deficiencies exist, the architect, owner shall be notified in writing and corrections made.

3.2 SUBSTRATE REQUIREMENTS

A. The substrate must be even without noticeable high spots or depressions, smooth, free of protrusions, debris, sharp edges or foreign materials and must be free of any unacceptable conditions.
B. All work shall be performed in accordance with Manufacture’s application instructions.

3.3 INSTALLATION: HORIZONTAL

A. Refer to the applicable manufacturer's literature for cautions and warnings.
B. All substrates shall be smooth and even.
C. Always comply with the instructions found in manufacturer’s literature:
    1. Apply TPO surface against the prepared surface and the adhesive side facing up with the TPO selvedge on the side for the succeeding sheet to lap onto.
    2. At side laps, carefully position successive sheets to overlap the previous sheet by 3 in. (75mm) minimum along the TPO selvedge (i.e., side lap). Be sure the product lays flat with no openings.
        a. Probe all seams prior to applying adhesive tape.
        b. Center Tape over edge of welded seams, remove release liner and roll the tape with a hard rubber roller using firm hand pressure.
    3. At end laps, carefully position a 12” minimum inverted strip of TPO Flashing centered under end laps to provide a TPO target strip. Be sure the product lays flat with no openings. End laps must be staggered.
        a. Probe all seams prior to applying tape.
        b. Center tape over edge of welded seams, remove release liner and roll the tape with a hard rubber roller using firm hand pressure.

3.4 INSTALLATION: VERTICAL

A. Refer to the applicable manufacturer's literature for cautions and warnings.
B. All substrates shall be smooth and even.
C. Always comply with the instructions found in manufacturer’s literature:
    1. Apply TPO surface against the prepared surface and the adhesive side with release liner and the TPO selvedge facing outward.
    2. At side laps, carefully position successive sheets to overlap the previous sheet by 3 in. (75mm) minimum along the TPO selvedge (i.e., side lap). Be sure the product lays flat with no openings.
        a. Probe all seams prior to applying tape.
        b. Center tape over edge of welded seams, remove release liner and roll the tape with a hard rubber roller using firm hand pressure.
        c. Side laps shall be held back a minimum of 12” from any inside or outside corner.

3. At end laps, carefully position a 12” minimum inverted strip centered under end laps to provide a TPO target strip.
4. Make sure the product lays flat with no openings. End laps must be staggered.
    a. Probe all seams prior to applying tape.
    b. Center Detail Tape over edge of welded seams, remove release liner and roll the tape with a hard rubber roller using firm hand pressure.
    c. Install fasteners as required along the outside edge in the TPO selvedge prior to overlapping the subsequent sheet to assist with installation.
    d. Fastener type and means to install the fastener shall be applicable to substrate.
    e. Leave plastic release liner on until ready for specified exterior cladding.

3.5 PROTECTION

A. Protect waterproofing as per manufacturer’s recommendations until cladding is applied.
B. Inspect waterproofing for damage. Repair waterproofing as per manufacturer’s recommendations.

END OF SECTION

SECTION 07 41 13 – PREFORMED METAL ROOF PANELS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Base Bid:

1. General Contractor provide preformed standing seam metal roofing and flashing systems as shown and specified.

a. Install New:

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1. Prefabricated roof panels.
2. Flashings & trim.
3. End closures.

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1.2 RELATED WORK

A. 06 10 00 – Rough Carpentry.
B. 07 62 00 – Sheet Metal Flashing & Trim.
C. 07 72 00 – Roof Accessories.
D. 07 92 00 – Joint Sealants.

1.2 QUALITY ASSURANCE

A. Installing Contractor's Qualifications:

1. Shall be "Certified" and trained by the roofing manufacturer. The job foreman shall also be trained by the manufacturer in the installation of the specified system. Show proof of training at the pre-construction meeting, or at least 2 weeks before commencement of roofing work.

a. Provide the A/E with a list of five project locations and contact persons that can be contacted prior to approval to do this work.

b. Take field measurements, where possible, prior to fabrication of components.

c. Use an adequate number of thoroughly trained and experienced workmen who are familiar with the specified requirements of this Section.

B. Manufacturer's Qualifications:

1. Maintains a "Certified" installer training program and a list of installing contractors.

2. Has technically qualified personnel available to inspect the installation at a time when corrections can still be made if needed, and at completion.

C. Manufacturer's Responsibility:

1. The manufacturer has primary responsibility for the system, following the minimum specified requirements.

D. Performance Requirements:

1. Air Infiltration: maximum air infiltration rate of 0.009 cfm/ft 2 at a pressure differential of 6.24 psf when tested in accord with ASTM E1680-95.

2. Water Penetration: No uncontrollable water leakage at a pressure differential of 6.24 psf when tested in accord with ASTM E1646-95.

3. Wind Uplift: Comply with Underwriter's Laboratories, (UL) Test Method 580, Class 90 Rating.

1.3 REFERENCES

A. Cited standards and manufacturer's catalogs, current at the date of bidding documents, unless otherwise specified, are incorporated herein by reference and govern the work. In conflict between these standards or catalogs and the project specifications, request written clarification from the A/E.

1.4 SUBMITTALS

A. Submit to the A/E at the pre-construction meeting, or on new construction, at least two weeks prior to commencement of roofing work:

1. The roofing contractor’s name, address and telephone number, and the name of the job foreman for this project.
2. The manufacturer’s written statement that the job foreman has been trained in the installation of the specified system, and the contractor is currently a “Certified” installer.

B. Shop Drawings:

1. Manufacturer is to supply shop drawings.

2. The manufacturer’s shop drawings shall be submitted to the Architect. A copy shall be used at the job site.

3. If the manufacturer has an agreement with the contractor allowing them to supply the shop drawings, the manufacturer shall review drawings and submit to the A/E.

4. Submit the following:

a. Panel profile with concealed clip.
b. All flashing, closures, and trim.
c. Curbs and other penetrations.

C. Samples:

1. Sample of size and shape to show panel finish, seam, and concealed clip.

D. Product Data:

1. Specifications for roof panels, attachment clips, and insulation.

2. Installation instructions for all components.

1.5 DELIVERY, STORAGE AND HANDLING Comply with the manufacturer's instructions to prevent components from being damaged, deformed, or stained.

1.6 WARRANTY

A. Warranty

1. All materials either furnished or approved by the roofing manufacturer.

2. The use of manufacturer supplied shop drawings during construction.

3. Two inspections by the manufacturer: 1) during construction, 2) prior to issuing their warranty.

4. Installation by manufacturer trained and approved contractor and job foreman.

B. General Contractor: Five (5)- years in accord with the Standard Documents for Construction.

C. Manufacturer: The following warranties shall be submitted to the Owner before Final Completion and become effective on the date the materials were shipped from the factory.

1. Provide a single source, total system, non-pro-rated, twenty (20)-year, weather-tightness warranty for materials supplied or approved by the manufacturer, and for labor.

a. The warranty shall cover leaks in roof panels, trim, flashings, and penetrations, resulting from workmanship, ordinary wear, and normal weather conditions.
b. The warranty to be signed by the manufacturer and the Certified/Approved installing contractor, agreeing to repair/replace defective materials and workmanship during the warranty period.
c. Liability shall be limited to the installed cost of the roofing system, as listed on the Contractor’s Schedule of Values.

2. The manufacturer shall provide a twenty (20)-year Finish Warranty on paint integrity and color retention. This includes cracking, flaking, blistering, chalking in excess of number 8 rating of ASTM D659, or fade in excess of 5 units per ASTM D2244.

PART 2 PRODUCTS

2.1 PREFORMED METAL ROOF PANELS

A. Determine and provide the specified group and roof system type for this job.

B. The manufacturer's recommendations for spacing between panel supports are maximum distances. Reduce spacing when necessary to produce a constant panel slope.

C. Architectural standing seam metal roof panels have field crimped side joints, designed for concealed clip attachment over structural frame. They are attached to purlins with concealed clips and have a U.L. 90 Wind Uplift classification.

2.2 STRUCTURAL TRAPEZOIDAL LEG ROOF PANEL:

A Ultra-Dek profile configuration 3” in height and 18” standing seam center to center or approved equal type fabrication.

2.3 MANUFACTURERS:

A. PAC-CLAD: 10551 PAC Rd., Tyler, Texas 75707
Phone No.: 800-441-8661

B. Berridge Manufacturing:1720 Maury St., Houston, Texas 77026
Phone No.: 713-223-4971

C. MBCI: 14031 W. Hardy Rd., Houston, Texas 77060
Phone No.: 281-445-8555

2.4 ROOFING PANELS

A. Preformed roofing panels to have manufacture’s profile for Roof Panel specified. Fabricate from 24 ga. Galvalume coated steel conforming to ASTM 792) (24 ga. Galvalume, ASTM 792, and Kynar 500 prefinished steel or approved equal)

B. Base Product: MBCI “ULTRA-DEK concealed fastening standing seam metal roof system.

C. Panel width to be from (18 inches) to (18 inches).

D. Panel Profile Height: 3”-inches.

E. Panel end laps are not allowed.

F. Panels to be designed for attachment with concealed clip fasteners, spaced as required by the manufacturer to provide for both positive and negative design loads, while allowing for expansion and contraction of the entire roofing system resulting from variations in temperature. Exposed fasteners are permitted only to control expansion, and at panel end splices.

G. Factory installed sealant in panel side joints.

H. Interior Finish: Manufacturer's corrosion resistant paint.

2.5 ROOF and WALL INSULATION: **REFER TO SECTION 13 12 10.**

2.6 OTHER MATERIALS

A. Exposed threaded fasteners shall be #300 stainless steel, stainless steel capped, or zinc capped with neoprene washers. Series 400 or self-drilling stainless steel fasteners are not acceptable.

B. Eave Closures: Shall be fabricated from the same material as the roof panels finished to match adjoining components. Panel end closures shall be pre-formed rubber that tightly fits the opening for trapezoidal panels.

C. Provide other shapes, tape, fasteners, and flashing as required or recommended by the manufacturer to complete a weather-tight system.

D. Building Sealants: As required or recommended by the manufacturer. For general purpose sealants see Section 07 92 00.

E. Touch-up Paint: Kynar 500 to match panel and trim finish.

3. EXECUTION

3.1 INSPECTION

A. Verify the substrate or structural system is complete, at proper elevation, and otherwise ready for roofing installation.

B. Verify the work of other contractors which penetrates the roof or requires people and equipment to traverse the roof deck is complete.

C. Notify the Architect in writing of unsatisfactory conditions that may adversely affect the performance or appearance of the roof. Do not proceed with installation until those conditions are corrected.

3.2 INSTALLATION

A. Install high temperature ice & water dam sheet where shown on the drawings, and in accord with the manufacturer’s recommendations.

B. Install sloped substructure panel supports of varying height, and with varying spacing where needed, to provide a constant specified slope. Do not exceed manufacturer’s maximum spacing.

C. String lines or other means shall be used to indicate the correct placement height of each panel support. The top surface of each panel support shall be bent to match the specified slope, as shown in the drawings.

D. Install roofing panels in accord with the manufacturer's instructions using concealed attachment clips.

1. Secure panels to prevent movement only at the location determined by the manufacturer.

2. Install panels properly aligned, constant slope, and within 1/4" in 20 feet.

E. Install all flashing, trim as detailed and per the roofing manufacturer's instructions.

F. Close field seams with the tools and seaming machine recommended by the manufacturer, operated in a manner to avoid damage to the panel finish.

G. Paint all field cut and other raw edges with Kynar 500 to match panels and trim.

3.3 FIELD QUALITY CONTROL

A. The roofing manufacturer shall provide on-site observation and instruction soon after the start of installation, during installation as they deem necessary, and at completion.

B. The A/E will provide periodic observation during installation.

C. Accompany the manufacturer's technical representative during his completion inspection. Assist the inspector with equipment and workmen when necessary to provide access to the roof. Correct all items noted.

3.4 CLEAN AND ADJUST

A. Carefully inspect all completed work and correct all defects.

B. Prevent movement or storage of materials or equipment on the completed roof.

C. Remove from the job site and legally dispose of all debris and metal scraps. Remove all surplus materials, tools and equipment.

D. Sweep the roof daily to remove construction debris and power wash the entire roof at project close out.

END OF SECTION

SECTION 07 42 00 - METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Work includes all labor, materials, equipment and services necessary for fabrication and installation of metal wall panels as shown on drawings and as herein specified.

B. Related Sections include the following:
1. Division 05 Section - Cold Formed Metal Framing, for sub-girts and support framing.
2. Division 07 Section - "Roofing" Sections, and "Sheet Metal Flashing and Trim", for coordination of air barrier and terminations between metal wall panels, and roofing.
3. Division 07 Section - Joint Sealant.
4. Division 07 Section - Sheathing
5. Division 09 Section - Painting.

1.3 REFERENCE STANDARDS

A. References in these specifications to standards, test methods and codes, are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.
1. ASTM - American Society for Testing and Materials, Philadelphia, PA.
2. FM - Factory Mutual Engineering and Research, Norwood, MA.
3. NRCA - National Roofing Contractors Association, Rosemont, IL.
4. OSHA - Occupational Safety and Health Administration, Washington, DC.
5. SMACNA - Sheet Metal and Air Conditioning Contractors National Association.
6. UL - Underwriters Laboratories, National Reference Operation Sites.

1.4 QUALITY ASSURANCE

A. Fabricator and erector shall demonstrate experience of a minimum of five years of related industry experience.

B. Design Criteria: Engineering panels for structural properties in accordance with the latest edition of the American Iron and Steel Institute "Cold Formed Steel Design Manual", using "effective width" concepts.

C. Metal Shapes Design Criteria: Conform to latest edition of Sheet Metal and Air Conditioning contractors National Association (SMACNA).

1.5 PERFORMANCE REQUIREMENTS

A. Material Compatibility: At panels adjacent to roofing, provide materials that are compatible with adjacent roofing materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

B. Testing Requirements: The roof system shall be tested in compliance with local code requirements and as follows:
1. Wind Resistance: The system shall be tested to comply wind resistance forces per local code requirements.
2. Physical Weathering Properties: Metal panels shall have corrosion resistance in

accordance with local code requirements for the materials indicated.

3. Fire Classification: The system shall be identified and listed for the fire class as required by local code by an approved testing agency, tested in compliance with ASTM E 108 or UL 790.

C. Structural Performance: Provide wall panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
   1. Wind Loads: As required by code and indicated wind rating, whichever is greater.
   2. Other Design Loads: As indicated on Drawings, where applicable.
   3. Deflection Limits: For wind loads, no greater than 1/240.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F ambient; 180 deg F material surfaces.

E. Jobsite Safety: Execute all operations and provide a safe work environment in accordance with OSHA standards and regulations.
   1. Follow all industry, code, fire prevention guidelines and requirements for storage of materials, staging areas, roof access, and application means and methods.

1.6 SUBMITTALS

A. Product data and shop drawings based on the Contract Documents and field conditions of each metal panel type, profile and trim configuration to be installed.

B. Samples:
   1. Submit samples for approved metal wall finish.
   2. Submit samples of each type and color of sealant.

C. Shop drawings showing profile and gauge of sheets, location and type of fasteners, location, gauges, shape and method of attachment of all trim, location and type of sealants, and any other details as may be required for a weathertight installation. Indicate field and factory applied sealant.

D. Informational Submittal: Letter from Manufacturer stating acceptance of proposed underlayment for use with their products, including anticipated service temperatures.

1.7 STORAGE AND HANDLING

A. Panels should be stored on edge in a clean dry place. One end should be slightly elevated to allow moisture to run off rather than accumulate on the faces.

B. Panels with strippable plastic film must not be stored in the open, exposed to the sun.

C. Stack pre-formed and prefinished material to prevent twisting, bending, or abrasion and to provide ventilation.

D. Prevent contact with materials during storage which may cause discoloration or staining.

E. In handling prefinished panels, lift up panels and do not slide panels when un-stacking.

1.8 FIELD CONDITIONS AND COORDINATION

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers'

written instructions and warranty requirements.

B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of canopies and soffit supports, and other adjoining work to provide a leak-proof, secure, and noncorrosive installation.

1.9 WARRANTY

A. Provide manufacturer's standard twenty (20) year warranty stating architectural fluorocarbon finish will be:
   1. Free of fading of color change in excess of 6 NBS units as measured per ASTM D 2244-68.
   2. Will not chalk in excess of numerical rating of 7 when measured in accordance with standard procedures specified in ASTM D 659-74.
   3. Will not peel, crack, chip, or de-laminate.

B. Furnish written warranty signed by applicator for five (5)-year period from date of substantial completion of building covering.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. PAC-CLAD: 10551 PAC Rd., Tyler, Texas 75707
Phone No.: 800-441-8661

B. Berridge Manufacturing: 1720 Maury St., Houston, Texas 77026
Phone No.: 713-223-4971

C. MBCI: 14031 W. Hardy Rd., Houston, Texas 77060
Phone No.: 281-445-8555

2.2 MATERIALS

2.3 WALL PANELS: Base Product- MBCI “MASTERLINE” 16 profile configuration 7/8” in depth 24 gage minimum with concealed fasting wall system 16” coverage or approved equal type fabrication.

A. Aluminum Trim: Miscellaneous extruded and formed aluminum components shall match profiles of existing trim and/or as detailed on drawings.

B. Closures: Pre-molded neoprene and/or sheet metal shaped to fit the panel contour.

C. Anchoring Devices: Provide spacers, fasteners, clips, angles and other devices necessary to install metal panels.

D. Accessory Materials:
   1. Sub-girts and support framing: Provide subgirts and support framing of size and configuration as detailed in Drawings and as necessary for complete installation. Refer to Division 05 Section "Cold Formed Metal Framing" for wall support sub-girts and framing.
   2. Panel Fasteners: Galvanized steel with washers where required.
   3. Aluminum Trim Fasteners: Exposed fasteners shall be aluminum or stainless steel. Unexposed fasteners may be cadmium or zinc plated steel in accordance with ASTM A164-55 and 165-55. Steel anchors shall be properly insulated from aluminum.
   4. Sealant: Color-coordinated, primerless silicone or high grade, non-drying butyl as recommended by panel manufacturer. Do not use sealant containing asphalt.

PART 3 - EXECUTION

3.1 COORDINATION AND INSPECTION

A. Coordinate with other trades, prior to rough-in and penetrations, exact locations for roughing-in of components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels. Conduit, pipe and other small penetrations shall not be located in panel seams. Examine and confirm these locations again before installation to avoid conflicts.

1. Contractor is responsible to relocate pipe and similar penetrations as required to avoid seams. Contractor shall not be due additional compensation to relocate items and make other corrections as required due to failure of Contractor to coordinate between trades.

B. Fabricator and erector are responsible for inspecting all conditions to verify general conditions, panel profiles and panel attachments and examine all parts of building affecting the installation of his work.

1. Examine sheathing and substrates to ensure they are properly supported, braced, and anchored; and are within flatness tolerances required by metal panel manufacturer.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install sub-framing, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 PANEL INSTALLATION

A. Install metal panels, fasteners, trim and related sealants in accordance with manufacturer's recommendations, approved shop drawings, and code requirements, and as may be required for a weathertight installation.

B. Remove all strippable coatings and provide a dry wipe-down cleaning of the panels as they are erected.

1. Comply with Manufacturer's installation instructions for cleaning.

C. Install panels to interlock with adjoining panels in order to prevent water penetration and air leakage per industry standards.

D. Panels shall be installed plumb and true in proper alignment.

3.4 ACCESSORY INSTALLATION

A. Dissimilar Materials: Isolate aluminum surfaces from contrasting steel or other ferrous metals using EC-1202 tape or zinc chromate paint.

B. Closures: Furnish and install closure trim profiles abutting adjacent materials, adjoining walls, etc. as required to close off cavities and where panel profile would otherwise be exposed to view. Closure shall be installed using proper adhesive and fit flush with edge of panel. Seal perimeter of closure. Coordinate installation with adjacent material installers and painting as applicable.

C. Trim: Install trim using specified fasteners at locations shown on Drawings, or where not indicated at equal spacing as required by installation instructions and wind loading and other structural requirements.

3.5 PROTECTION AND REPAIR

A. If applicable, remove factory protective plastic coatings at time as recommended by wall panel Manufacturer. Do not allow protective coatings to melt onto wall panel surfaces.

B. Protect panels from damage during remainder of construction period. Upon determination of responsibility, replace damaged metal panels and trim to the satisfaction of the Architect and / or Owner.

END OF SECTION

SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, cap flashing, coping, and other items indicated.

1.2 REFERENCES

A. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar; 2003.

B. ASTM B 32 - Standard Specification for Solder Metal; 2004.

C. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2000.

D. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.1 PERFORMANCE REQUIREMENTS

E. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the design pressure as indicated on the Drawings.

1.3 SUBMITTALS

A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

B. Samples: Submit two samples 12 x 12 inch in size illustrating metal finish color.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with three years of documented experience.

C. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials which may cause discoloration or staining.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS

A. Manufacturers:

1. AMERIMAX Building Products, Inc.: 5208 Tennyson Parkway, Suite 100
Plano, Texas 75024
Phone No.:800-347-2586

2. NORTHSHORE SHEET METALS: 418 Mercantile CT, Wheeling, IL 60090
Phone No.:847-947-6797

3. Architectural Sheet Metal (DLSS Mfg.): 201 N. Cobb Ave. Burlington, NC. 27217
Phone No.:919-619-7594

B. Pre-finished, material gauge as required for scope of work and recommended by product manufacturer and specific application.

2.2 ACCESSORIES

A. Fasteners: Stainless steel, with soft neoprene washers.

B. Self-adhering sheet, 40 mils thick.

C. Protective Backing Paint: Zinc molybdate alkyd.

D. Sealant: Type specified in Section 07 92 00.

E. Plastic Cement: ASTM D 4586, Type I.

2.3 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet, minimum 3 inches wide, interlocking with sheet.

C. Form pieces in 10 feet lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Stainless-Steel Soldering: Pretin edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.

G. Fabricate corners from one piece, seam for rigidity, seal with sealant.

H. Fabricate vertical faces with bottom edge formed outward and hemmed to form drip.

2.4 DOWNSPOUT FABRICATION

A. Downspouts: Square profile.

B. SMACNA Architectural Sheet Metal Manual.

C. Downspouts and Gutters: Size as required for roof, verify designed profile for area and current applicable code.

D. Accessories: Profiled to suit gutters and downspouts.

1. Anchorage Devices: In accordance with SMACNA requirements.
2. Gutter supports: Brackets.
3. Downspout Supports: Brackets.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify framing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Back paint concealed metal surfaces with protective backing paint.

3.3 INSTALLATION

A. Conform to drawing details:

1. Roof Penetrations: SMACNA Architectural Sheet Metal Manual, Detail figure 4-14A or figure 4-148, or figure 4-14C as applicable.

B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

C. Apply plastic cement compound between metal flashings.

D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

F. Stainless-Steel Soldering: Pretin edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.

G. Secure gutters and downspouts in place using concealed fasteners.

H. Slope gutters ¼ inch per foot minimum.

I. Set splash pads under downspouts where indicated.

END OF SECTION

SECTION 07 72 00 – METAL ROOF AND WALL PANEL ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Manufactured curbs, miscellaneous equipment components, pedestals closure metal trim.

1.2 REFERENCE STANDARDS

A. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; curent edition.

B. UL (BMD) - Building Materials Directory; current edition.

1.3 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.

C. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

PART 2 – PRODUCTS

2.1 MANUFACTURED CURBS

A. Manufacturers:

1. MBCI: 14031 W. Hardy Rd., Houston, Texas 77060
   Phone No.: 281-445-8555
2. BCI Building Components: 11919 N. Garden St., Houston, Texas 77071
   Phone No.: 281-261-1224
3. McElroy Metal Center: 1440 Aldine Bender Rd., Houston, Texas 77032
   Phone No.: 855-885-7600

B. Manufactured Curbs, Roof and Wall Mounting Assemblies: Factory- assembled hollow sheet metal construction with fully mitered and welded corners, integral counterflashing, internal reinforcing, and top side and edges formed to shed water.

1. Sheet Metal: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33; G60 coating designation; 18 gage, 0.048 inch thick.
2. Roofing Cants: Provide integral sheet metal roofing cants dimensioned to begin slopeat top of roofing; 1:1 slope; minimum cant height 4 inches minimum.
3. Manufacture curb bottom and mounting flanges for installation directly on roof; match slope and configuration of roof.
4. Provide the layouts and configurations shown on the drawings.

C. Pipe, Duct, and Conduit Mounting Pedestals: Vertical posts, minimum 8 inches square unless otherwise indicated.
   1. Provide sliding channel welded along top edge with adjustable height steel bracket, manufactured to fit item supported.
   2. Height Above Finished Roof Surface: 12 inches, minimum.

D. Vent Pipe Flashing: EPDM rubber with sheet metal flashing base flange and collar clamp mechanically anchored to vent pipe and metal roof panel. Provide watertight installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLAT ION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing weather integrity.

3.4 CLEANING

A. Clean installed work to like-new condition.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 92 00 – JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Sealants and joint backing.

B. Precompressed foam sealers.

C. Hollow gaskets.

1.2 REFERENCES

A. ASTM C 834 - Standard Specification for Latex Sealants; current edition.

B. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications; current edition.

C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; current edition.

D. ASTM C 1193 - Standard Guide for Use of Joint Sealants; current edition.

E. ASTM D 1056 - Standard Specification for Flexible Cellular Materials--Sponge or Expanded Rubber; current edition.

F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.3 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics.

C. Manufacturer's Installation Instructions: Indicate special procedures.

1.4 QUALITY ASSURANCE

A. Maintain one copy of each referenced document covering installation requirements on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

C. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years' experience.

D. General Contractor is to arrange for manufacturer inspection to generate field report documenting acceptable practices for this scope of work.

E. Joint sealer to be applied to all dissimilar materials whether indicated on drawings or not. Colors must be submitted and approved as a mockup prior to commencement of Work.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.6 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.7 WARRANTY

A. General Contractor: Correct defective work within a (1) one-year period after Date of Substantial Completion.

B. Manufacture Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure for a period of (5) five years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. 3M Company: 1508 E. Cedar St. Angleton, Texas 77515
Phone No.: 979-848-8489

B. DOW Corporation: 305 5th St. S., Texas City 77590
Phone No.: 409-945-7411

C. GE Company: 3202 Manor Way, Dallas, Texas 75235
Phone No.: 214-902-6600

2.2 SEALANTS

A. Unless indicated otherwise in individual sections, or plan details, provide sealants in conformance with the following paragraphs.

B. General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component.
1. Color: Standard colors matching finished surfaces.
2. Applications: Use for:
a. Control joints in masonry.
b. Joints between concrete and other materials.
c. Joints between metal frames and other materials.
d. Other exterior joints for which no other sealant is indicated.

C. Exterior Control Joint Sealer: Pre-compressed foam sealer; urethane with water-repellent:
1. Color: Selected from standard range by Architect.
2. Size as required to provide weathertight seal when installed.

D. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, non-skinning, non-curing.
1. Applications: Use for:
a. Concealed sealant bead in sheet metal work.

E. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
1. Color: Standard colors matching finished surfaces as approved by Architect.
2. Applications: Use for:
a. Interior wall and ceiling control joints.
b. Joints between door and window frames and wall surfaces.
c. Other interior joints for which no other type of sealant is indicated.

2.3 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1056, sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.3 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C 1193.

C. Perform acoustical sealant application work in accordance with ASTM C 919.

D. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
   1. Width/depth ratio of 2:1.
   2. Neck dimension no greater than 1/3 of the joint width.
   3. Surface bond area on each side not less than 75 percent of joint width.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

I. Pre-compressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

J. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal all joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.4 CLEANING

A. Clean adjacent soiled surfaces.

3.5 PROTECTION OF FINISHED WORK

A. Protect sealants until cured.

END OF SECTION

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Non-fire-rated steel doors and frames

B. Accessories.

1.2 REFERENCES

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; current edition.

B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; current edition.

C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; current edition.

D. Americans with Disabilities Act, Title III.

E. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; current edition.

F. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; current edition (ANSI/DHI A115 Series).

G. NAAMM HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; current edition.

H. NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; current edition.

I. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; current edition.

J. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association; current edition.

K. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

L. FEMA 320 and 361 guidelines and ANSI ICC500-2014 standard

1.3 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.

C. Shop Drawings: Details of each opening, showing elevations, frame profiles, and identifying location of different finishes, if any. General Contractor is responsible for verifying wall thickness to ensure frame thickness is properly submitted and installed.

D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum (5) five years documented experience and must be a member of steel door institute (SDI).

B. Installer: Certified by Product Manufacturer with minimum of (5) years of experience with successful installation of specified Products.

C. Maintain at the project site a copy of all reference standards dealing with installation.

D. For all metal door and frames: Obtain field inspection from manufacturer to determine corrective measures for:

1. Frame or door damage
1. Frame or door scratches
2. Frame or door stains
3. Frame or door alignment

E. Manufacturer inspection report must be satisfied prior to requests to Owner.

1.5 WARRANTY

A. General Contractor: Provide written warranty one (1) year installation of specified Products.

B. Manufacture Warranty: Provide written warranty for period of five (5) years coverage for all specified Products provided and installed.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 - PRODUCTS

2.2 MANUFACTURERS:

A. Door PRO Systems: 6711 Bingle Rd., Houston, Texas 77092
Phone No.: 713-462-0860

B. CECO Steel Doors & Frames: 13 E. Avenue K., San Angelo, Texas 76903
Phone No.: 325-655-5188

C. Republic Doors & Frames: 7807 Bluff Point Drive, Suite 150, Houston, TX 77086
Phone No. 281-537-5282

2.3 DOORS, FRAMES

A. Requirements for All Doors and Frames:

1. Accessibility: Comply with ANSI/ICC A117.1, Americans with Disabilities Act.
1. Door Edge Profile: Beveled on both edges.
2. Doors, Frames Texture: Smooth faces.

3. Hardware Preparation: In accordance with DHI A115 Series, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
4. Finish: Factory primed.

2.4 STEEL DOORS

A. Exterior Doors to meet steel door institute (SDI) 100, grade 3, Extra Heavy Duty, 16 gauge or better, steel, foamed core with welded seams. Frames to be 16 gauge. If doors exceed 36” width, provide 14-gauge door/frame.

1. Grade: 3, extra heavy duty 16-gauge door and frames.
2. Core: Foamed core with weld seams.
3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653, with manufacturer's standard coating thickness.
4. Finish: Field painted color to be selected by Architect.

B. Interior Doors, Non-Fire-Rated to meet steel door institute (SDI) 100, grade 2, heavy duty, 18 gauge or better, steel, foamed core with welded seams. Frames to be 18 gauge or better. If door exceeds 36” width, provide 16-gauge door/frames:

1. Grade: Grade 2, 18-gauge, 16 gauge if door exceeds 36” width.
2. Core: Foamed core with wield seams.
3. Thickness: 1-3/4 inches.
4. Finish: Field painted color to be selected by Architect.

2.1 STEEL FRAMES

A. General:
1. Comply with the requirements of grade specified for corresponding door.
2. Finish: Field painted color to be selected by Architect.

B. Exterior Door Frames: Face welded, seamless with joints filled.
1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
2. Weatherstripping: Separate, see Section 08 71 00.

C. Interior Door Frames, Non-Fire-Rated: Fully welded type.
1. Terminated Stops: Provide all interior doors with closed end stops mitered where adjoined.

2.2 ACCESSORY MATERIALS

A. Temporary Frame Spreaders: Provide for all factory or shop assembled frames. No knot -down frames permitted.

2.3 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. All metal doors and frames are to receive shop primer per manufacturer’s standard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify construction conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. In addition, install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Coordinate installation of hardware.

E. Coordinate installation of glazing.

3.3 ERECTION TOLERANCES

A. Clearances between door and frame: As specified in ANSI A250.8.

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.4 ADJUSTING

A. Adjust for smooth and balanced door movement.

B. Insure all frames a plumbed and true.

3.5 SCHEDULE

A. Refer to Door Schedule on the drawings.

END OF SECTION

SECTION 08 32 13– HORIZONAL SLIDING ALUMINUM-FRAMED GLASS WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Horizontal Sliding aluminum-framed glass window system to serve as an operable and fixed window system.

B. Related Sections:
1. 08 80 00 Glazing

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal Sliding aluminum-framed glass window system shall withstand the effects of the following performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Horizontal Sliding Aluminum-Framed Glass Window Performance Requirements:

1. Performance Requirements: Provide horizontal sliding aluminum-framed glass window of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).

a) Performance Class and Grade: AW-PG45-SD.

b) Performance Class and Grade: AW-PG65-SD.

2. Wind Loads: Provide horizontal sliding window system; include anchorage, capable of withstanding wind load design pressures of design based on the IBC Building Code; 2012 Edition.

3. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. The air infiltration rate shall not exceed 0.30 cfm/ft2 (1.5 L/s•m2) at a static air pressure differential of 6.27 psf (300 Pa).

4. Air Exfiltration: The test specimen shall be tested in accordance with ASTM E 283. The air exfiltration rate shall not exceed 0.10 cfm/ft2 (0.5 L/s•m2) at a static air pressure differential of 1.57 psf (75 Pa).

5. Water Resistance: The test specimen shall be tested in accordance with ASTM E 547 and ASTM E 331. There shall be no leakage as defined in the test method at a static air pressure differential of:

a) 12 psf (580 Pa) with standard sill.

6. Uniform Load: A static air design load of 45 psf (2160 Pa) or 65 psf (3120 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member at design load. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing member in excess of 0.2% of the clear spans shall occur.

7. Forced Entry Resistance: Comply with Performance Grade 10 requirements when tested according to ASTM F 842.
8. Operating Force: Tested according to and complying with ASTM E2068.
9. Energy Efficiency:
    a) Thermal Transmittance (U-Factor): The thermal transmittance (U-Factor) shall not be more than 0.41 when tested to AAMA 1503
10. Condensation Resistance Factor (CRF): When tested to AAMA 1503, the Condensation Resistance Factor shall not be less than:
    a) 48frame and 65glass.
11. The Condensation Index (I): When tested to CSA-A440 shall not be less than:
    a) 29frame and 63glass.
12. Sound Transmission class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested in accordance with ASTM E90, the STC and OITC rating shall not be less than:
    a) 37 (STC) and 30 (OITC).
13. Environmental Product Declarations (EPD): Shall have a Type III Product-Specific EPD created from a Product Category Rule.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for horizontal sliding aluminum-framed glass windows indicated.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.

C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

D. Samples for Verification: For horizontal sliding aluminum-framed glass window and components required.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, class, grade, and size of horizontal sliding aluminum-framed glass window. Test results based on use of downsized test units will not be accepted.

F. Other Action Submittals:

1. Horizontal Sliding Aluminum-Framed Glass Window Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of sliding window hardware, as well as procedures and diagrams.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications: A manufacturer capable of fabricating sliding aluminum-framed glass window that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

C. Source Limitations: Obtain horizontal sliding aluminum-framed glass window through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of horizontal sliding aluminum-framed glass window and are based on the specific system indicated. Refer to Division 01 Section “Product Requirements”. Do not modify size and dimensional requirements.

E. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section “Project Management and Coordination”.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of horizontal sliding aluminum-framed glass window opening by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.7 WARRANTY

A. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty.

1. Warranty Period: Five (5) years from Date of Substantial Completion of the project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. Kawneer Company, Inc.: 6615 Roxburgh Dr., Ste 400, Houston, Texas 77041
Phone No.: 713-896-8906
2. YKK AP, Inc.: 346 E. Belk Line Rd., Ste. 600-, Coppel, Texas 75019
Phone No.: 469-528-6907
3. EFCO Corporation: 480 N. Sam Houston Pkwy E. Ste. 112 Houston, Texas 77060
Phone No.: 281-591-76227

2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by horizontal sliding aluminum-framed glass window manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and sash members.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with sliding aluminum-framed glass window members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

E. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.

F. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

G. Sealant: For sealants required within fabricated sliding window, provide horizontal sliding aluminum- framed window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

2.3 HORIZONTAL SLIDING WINDOW

A. Horizontal Sliding Aluminum-Framed Glass window:

1. AA™3200M Thermal Sliding Window.
2. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
3. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposed shall be stainless steel.
4. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
5. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
6. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle sliding window material and components to avoid damage. Protect sliding window material against damage from elements, construction activities, and other hazards before, during and after sliding window installation.

2.4 GLAZING

A. Glass and Glazing Materials: Refer to 08 80 00 Glazing section for glass units and glazing requirements applicable to glazed sliding aluminum-framed glass window units.

2.5 HARDWARE

A. General: Provide manufacturer’s standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock sliding aluminum-framed glass window.

B. Standard Hardware:

1. One pair of stainless-steel tandem rollers per sliding panel.
2. Stainless steel roller track.
3. Hookbolt lock: 2-point Hookbolt lock or Manufacture’s standard mechanism.

2.6 FABRICATION

A. Fabricate horizontal sliding aluminum-framed glass window in size indicated. Include a complete system for assembling components and anchoring window.

B. Fabricate horizontal sliding aluminum-framed glass window that is re-glazable without dismantling perimeter framing.

1. Master Frame: Joined together with butt type joints, neatly sealed and assembled by a minimum of 2 stainless steel fasteners per joint anchored into continuous integral screw raceways.
2. Sliding Panels: Shall have coped butt type joinery secured with stainless steel fasteners. Sliding panels shall not be removable when in a locked position.
3. Fixed Panels: Shall have coped butt type joinery secured with stainless steel fasteners.

C. Weather Stripping: Provide weather stripping locked into extruded grooves in window panels or

frames as indicated on manufacturer's drawings and details.

D. Weep Holes: Provide weep holes and internal drainage passages to conduct infiltrating water to exterior.

E. Factory-Glazed Fabrication: Glaze horizonal sliding aluminum-framed glass window in the factory where practical and possible for applications indicated. Comply with requirements in Division 08 Section “Glazing” and with AAMA/WDMA/CSA 101/I.S.2/A440.

2.7 FINISHES, GENERAL

A. Comply with AAMA-AFPA “Anodic Finishes” for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:

1. To be selected from Manufactures’ Standard offerings by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight sliding window installation.

1. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing sliding windows, hardware, accessories, and other components.

B. Install horizontal sliding aluminum-framed glass windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, for weather tight construction.

D. Install horizontal sliding aluminum -framed glass windows and components to drain condensation, water penetrating joints, and moisture migrating within sliding windows to the exterior.

E. Separate aluminum from dissimilar materials to prevent corrosion or electrolytic action at points of contact.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Upon request, provide manufacturer's field service consisting of site visit for inspection of product installation in accordance with manufacturer's instructions.

3.4 ADJUSTING AND CLEANING

A. Adjusting: Adjust horizonal sliding aluminum-framed glass windows for operation in accordance with manufacturer's recommendations.

B. Cleaning: The General Contractor shall clean installed products I accordance with manufacturer's instructions prior to owner's acceptance and remove construction debris from project site. Legally dispose of debris.

C. Protection: The General Contractor shall protect the installed product's finish surfaces from damage during construction.

END OF SECTION

SECTION 08 33 13 - COILING COUNTER DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Manual push up operated coiling counter doors.

B. Related Sections:
1. 05 50 00 Metal Fabrications.
2. 06 10 00 Rough Carpentry.
3. 09 91 13 Exterior Painting.
4. 09 91 23 Interior Painting.

1.2 SYSTEM DESCRIPTION

A. Design Requirements:
1. Wind Loading:
a. Supply door to withstand up to 40 psf design wind load, 50 feet per second large impact rating, Texas Department of Insurance approval per GDR-122.

1.3 SUBMITTALS

A. Reference Section 01 33 00 Submittal Procedures; submit the following items:
1. Product Data
2. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.
3. Quality Assurance/Control Submittals:
a. Provide manufacturer ISO 9001:2015 registration
b. Provide manufacturer and installer qualifications - see below
c. Provide manufacturer's installation instructions
4. Closeout Submittals:
a. Operation and Maintenance Manual
b. Certificate stating that installed materials comply with this specification

1.3 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five-years' experience in producing counter doors of the type specified
2. Installer Qualifications: Manufacturer's approval

1.4 DELIVERY STORAGE AND HANDLING

A. Follow manufacturer's instructions.

1.5 WARRANTY

A. Standard Warranty: Five (5) years from date of shipment against defects in material and workmanship

B. Maintenance: Submit for owner's consideration and acceptance of a maintenance service agreement for installed products.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Cornell/COOKSON: 24 Elmwood Ave., Mountain Top, PA 18707
Phone No.: 800-233-8366 or 570-474-6773

B. Overhead Door: 11533 South Main Street, Houston, Texas 77025
Phone No.: 713-667-1757

C. RAYNOR: 1101 East River Road, P.O. Box 448, Dixon, IL 61021-0048
Phone No.: 800-472-9667 or 815-288-1431

2.2 Base Product Manufacturer: Cornell/COOKSON or approved equal.

2.3 MATERIALS

A. Curtain:
1. Slat Configuration:
a. Insulated rolling push-up counter door curtain, galvanized steel factory finished with clear anodized extruded aluminum bottom bar with weather seal and manufacture center located mechanisms and rod pole operations function.

B. Centerlock Mechanism and Roll-Up Function:
1. Fabricate interlocking slat sections with high strength stamped steel centerlock/windlocks riveted to center of bottom curtain bar to include rod roll-up component.

C. Guides:
1. Fabrication:
a. Steel: 12 and 7 gauge formed shapes
2. Finish:
a. Steel: ASTM A 123, Grade 85 zinc coating, hot-dip galvanized.

D. Shaft Assembly:
1. Counterbalance Shaft Assembly:
a. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width
b. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs. (110 N). Provide wheel for applying and adjusting spring torque

2. Finish:
a. Steel pipe with corrosion resistant zinc rich gray powder coating; minimum 2.5 mils (0.065 mm) cured film thickness

E. Brackets:
1. Fabricate from reinforced steel plate with bearings at rotating support points to support counterbalance shaft assembly and form end closures
2. Finish:
a. Standard (Stock Color): Zirconium treatment followed by a gray baked-on polyester powder coat; minimum 2.5 mils (0.065 mm).

F. Hood:
   1. Minimum 24-gauge galvanized steel with reinforced top and bottom edges.
   2. Finish:
      a. GalvaNex™ Coating System (Stock Color):
         i. ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and gray baked-on polyester enamel finish coat

2.3 OPERATION

A. Manual Operation:
   1. Push-Up: Manual lift and rotation pole with hook operation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings
B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates
C. Commencement of work by installer is acceptance of substrate

3.2 INSTALLATION

A. Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports
B. Follow manufacturer's installation instructions

3.3 ADJUSTING

A. Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion

3.4 CLEANING

A. Clean surfaces soiled by work as recommended by manufacturer
B. Remove surplus materials and debris from the site

3.5 DEMONSTRATION

A. Demonstrate proper operation to Owner's Representative
B. Instruct Owner's Representative in maintenance procedures

END OF SECTION

SECTION 08 33 26- OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes coiling overhead door, as follows:

1. Overhead coiling doors.
2. Door Opening Steel Frame: Provide steel frame profile as per Drawings, thickness and/or steel gage as required for proper door and sectional guide support to insure proper door operation.

1.2 SUBMITTALS:

A. General: Submit the following according to Conditions of the Contract and Division 01 Specification Sections.

B. Product Data: Manufacturer's product data sheets.

C. Shop Drawings: Indicate size, materials, construction, finishes, rough-in data, operation and erection details.

D. Quality Control Submittals.

E. Manufacturer's installation instructions.

F. Contract Closeout Submittals:

1. Operating and maintenance data.
2. Owner instruction.

1.3 QUALITY ASSURANCE:

A. Manufacturer Qualifications: Provide each coiling overhead door as a complete unit produced by a single manufacturer, including frames, sections, brackets, guides, tracks, counterbalance mechanisms, hardware, operators and installation accessories.

B. Inserts and Anchorages: Furnish inserts and anchoring devices that must be set in concrete or built into masonry for unit installation. Provide setting drawings, templates and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

C. See concrete and masonry Sections for instruction on installing inserts and anchorage devices.

D. Wind Loading: Design and reinforce sectional overhead doors to withstand a 20-psf (950 Pa) wind-loading pressure. Comply with current applicable Building Codes.

E. Pre-Installation Conference: Schedule and convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in labeled protective packages. Store and handle in strict compliance with manufacturer’s instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

1.5 WARRANTY

A. Related Section 01: Warranties

1. Provide ten, (10)-year manufacturer’s warranty effective from date of substantial completion.

PART 2 - PRODUCTS

2.1 COILING OVERHEAD DOORS

A. Basis of Design: Overhead Door Model 429

B. Manufacturers

1. HALO COMMERICAL DOORS: 6758 Bourgeois Rd., Houston, Texas 77066
Phone No.: 713-224-3667

2. Overhead Commercial Door Company: 11533 South Main Street,
Houston, Texas 77025
Phone No.: 713-667-1757

3. Texas Commercial Overhead Door: 33211 Forest West St., Magnolia, Texas 77354
Phone No.: 1-800-715-8781

2.2 MATERIALS

A. Sheet Steel: ASTM A653/A653M galvanized to Z180 (G60), plain surface, precoated with silicone polyester finish.

2.3 PANEL CONSTRUTION

A. Door Panels: Sheet steel. Color to be selected by Architect.
B. Door Nominal Thickness: Nominal 2 inches thick.

2.4 DOOR HARDWARE COMPONENTS- CORROSION PACKAGE

A. Track:

1. Rolled steel with corrosion resistant powder coat finish, 12-gauge base metal thickness mounted to continuous one-piece powder coated angle, minimum 14-gauge thickness adjustable powder coated steel jamb brackets, minimum 11 gauge thick.

B. Hinge and Roller Assemblies:

1. Heavy duty powder coated hinges and adjustable roller holders.
2. Rollers, 3-inch floating bearing less nylon rollers with stainless steel shaft, located at top and bottom of each panel, each side.
3. Bottom Bracket: Powder coated steel, minimum 12 gauge thick with removable aluminum roller holder.
4. Lift Mechanism: Galvanized torsion springs fitted on zinc-plated 1-inch continuous hollow tube shaft/coupler, 14-gauge thickness, zinc plated cold rolled solid shaft, keyed and mounted on ball bearing, and supported by heavy gauge galvanized gusset plates: oil tempered with 10,000 standard cyclage.
5. Cable Drums: Suitable for lift type specified, with stainless steel aircraft grade lifting cables deigned to suit door weight at a safety factor of 5:1.
6. Fasteners: Stainless steel.

2.5 ACCESSORIES

A. Sill weatherstripping: Low temperature resilient vinyl astragal, one -piece; fitted to mechanically fastened retainer to bottom of door panel.
B. Jamb Weatherstripping: Roll formed end stile section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.

C. Head Weatherstripping: Low temperature, one-piece full length top retainer/seal.
D. Lock: Inside side mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior handle; lock keyed alike master keyed and coordinated with Section 08 71 00.

2.6 DOOR OPERATOR

A. Manufacturers: Reference

1. Corrosion resistant anodized aluminum operator with 1-1/2 - 2-inch pneumatic rod-less cylinders, sealed closed loop system with adjustable cushioning at end of cycle.
    a. Internally guided with only one (1) moving part; complete with mounting brackets, fittings, tubing and connecting arm.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify construction conditions before starting work.
B. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

3.2 PREPARATION

A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.
B. Apply primer to applicable surfaces.

3.3 INSTALLATION

A. Install door unit assembly to manufacture's written instructions.
B. Anchor assembly to wall construction and building framing without distortion or stress.
C. Securely brace door tracks attached to structure. Secure tracks to structural members only.
D. Fit and align door assembly including hardware.
E. Coordinate installation of sealants and backing materials at frame perimeter as Specified in Section 07 92 00.
F. Install perimeter trim and closures.

3.4 ERECTION TOLERANCES

1. Maximum Variation from plumb: 1/16”
2. Maximum Variation from level: 1/16”
3. Longitudinal or Diagonal warp: 1/8”
4. Maintain dimensional tolerances and alignment with adjacent work.

3.5 MANUFACTURE’S FIELD SERVICES

1. Ensure the operation and adjustments to door assembly for specified operation.

3.6 ADJUSTING

1. Lubricate and adjust door assembly to smooth operation and in full contact with weatherstripping.

3.7 CLEANING

1. Clean doors, frames and glazing panels.
2. Remove temporary labels and visible markings.

3.8 PROTECTION OF FINISHED WORK

1. Protect installed work from all other trades,
2. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 08 35 13 - ACCORDION FOLDING DOORS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies top supported, accordion folding doors.

1.2 RELATED WORK

A. Color and Texture of Fabric and Color of Enamel Finish on Steel Track to be selected by Architect.

1.3 MANUFACTURER'S QUALIFICATIONS

A. Provide accordion folding doors that are the product of a manufacturer who has provided door units as specified for a minimum of five (5) years.

1.4 PERFORMANCE REQUIREMENTS

A. Provide doors that, when fully extended and latched, completely close off opening in which installed.

1.5 SUBMITTALS

A. Submit in accordance with Section 01 33 00, Submittals.

B. Shop Drawings: Folding doors, showing each door location and size, and method of installation.

C. Samples: Fabric covering; 152 mm (6 inch) square samples of manufacture standard offerings.

D. Manufacturer's Literature and Data for door type specified to include Manufacture finish chart for standard offering to be selected by Architect.

E. Manufacturer’s qualifications.

1.6 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. ASTM International (ASTM):

A1008/A1008M-13	Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low Alloy with Improved Formability
E84-14	Surface Burning Characteristics of Building Materials

C. Wallcovering Association (WA):

W-101	Polymer Coated Fabric Wall Covering

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. DHPACE Texas (Operable Walls): 825 W. Sandy Lake Rd., Suite 100, Coppell, Texas 75019
Phone No.: 214-765-8355

B. ModernFold: 215 West New Road, Greenfield, Indiana 46140
Phone No.: 800-869-9685

C. HUFCOR: 2101 Kennedy Road, Janesville, WI 53545
Phone No.: 608-756-1241

2.2 Base Product Manufacturer: MODERNFOLD or approved equal.

2.2 MATERIALS

A. Description: Top supported, horizontal sliding, manually operated, accordion type folding doors with chain controlling the spacing and extension of the pantographic or “X” type accordion folding frames. Provide continuous inner and outer covers that cover the folding frames and pleat as the door retracts.

B. Fabric Cover: Fabric weighing not less than 208 grams per meter (6.7 oz. per linear yard) treated to resist stains.
   1. Provide fabric material with maximum flame spread of 25 and a maximum smoke developed rating of 50 when tested in accordance with ASTM E84.

C. Sheet Steel: ASTM A1008/A1008M, cold rolled, commercial quality for door tracks, load and jamb posts. The cast or heat analysis report mentioned in ASTM A1008/A1008M.

D. Sweep Seals: Manufacturer’s standard top and bottom sweep seals on both sides one side of door.

2.3 FABRICATION

A. General: Provide factory fabricated doors, designed to provide stability and uniform spacing of folds during operation.

B. Track, Jamb Post, Lead Post, Jamb Channel and Hinges: Rust resistant steel not less than 1.2 mm (0.0478 inch) thick.
   1. Provide zinc-coated hinges.
   2. Provide track with tread surface contoured for minimum friction.
   3. Limit track deflection independent of structural supporting system to no more than 80 percent of bottom clearance.

C. Trolley: Steel ball bearing type with nylon treads.

D. Hardware: On each side of door, provide latching device and pull handles and keeper on door frame.
   1. Provide manufacturer’s standard heavy duty, manually operated metal pulls and latches.

2.4 CONSTRUCTION

A. Support door frames at top, without floor guides.

B. Provide units that are recessed surface mounted.

C. Construct doors with collapsible and extendable hinge plates across top and bottom and weld them to interconnecting vertical steel rods to provide smooth, positive operation so that all sections extend and collapse equally and simultaneously.

D. Attach covers to frames with concealed fasteners that allow onsite removal and repair.

PART 3 – EXECUTION

3.1 SITE CONDITIONS

A. Verify field dimensions prior to fabrication.

3.2 INSTALLATION

A. Anchorage: Secure track to underside of head of door frame with fasteners of size and type as recommended or specified by the door manufacturer.
   1. Track is to be centered in door frame and be one (1) piece.

B. Adjustment: Provide shims or other means as required to make doors fit openings.
   1. Install doors so that strike edge member fits tight to jamb for full height of door.
   2. Make necessary adjustments to assure that hardware functions as designed.

END OF SECTION 08 35 13

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes**:**

1. Door hardware.
2. Cylinders for doors fabricated with locking hardware.

B. Related Divisions**:**

1. Division 07 – sealant at exterior thresholds
2. Division 08 – metal doors and frames, interior aluminum frames, wood doors, integrated security systems, specialty doors, storefront and glazed curtainwall systems.
3. Division 10 – operable partitions.
4. Division 21 – fire and life safety systems.

C. Specific Omissions**:** Hardware for the following is specified or indicated elsewhere.

1. Windows.
2. Cabinets, including open wall shelving and locks.
3. Signs, except where scheduled.
4. Toilet accessories, including grab bars.
5. Installation.
6. Rough hardware.
7. Folding partitions.
8. Access doors and panels, except cylinders where detailed.
9. Corner Guards.
10. Welded steel gates and supports.

1.2 REFERENCES**:**

A. Use date of standard in effect as of Bid date.

1. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
    a) ICC/ANSI A117.1 - 1998 – Specifications for making buildings and facilities usable by physically handicapped people.
    b) ANSI A156.18 Materials and Finishes
2. ADA – Americans with Disabilities Act of 1990 BHMA – Builders Hardware Manufacturers Association
3. DHI – Door and Hardware Institute
4. NFPA – National Fire Protection Association
5. UL – Underwriters Laboratories
    a) UL 305 – Panic Hardware
6. WHI – Warnock Hersey Incorporated
7. Local applicable codes
8. SDI – Steel Door Institute
9. NAAMM – National Association of Architectural Metal Manufacturers

B. Abbreviations

1. Manufacturers**:** see table at 2.1.A of this section
2. Finishes**:** see 2.7 of this section.

1.3 SUBMITTALS

A. SUBMITTALS**:** Submit six copies of schedule per Section 01330. Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Minimum 10pt font size. Include following information**:**

1. Type, style, function, size, quantity and finish of hardware items.
2. Use BHMA Finish codes per ANSI A156.18.
3. Name, part number and manufacturer of each item.
4. Fastenings and other pertinent information.
5. Location of hardware set coordinated with floor plans and door schedule.
6. Explanation of abbreviations, symbols, and codes contained in schedule.
7. Mounting locations for hardware.
8. Door and frame sizes, materials and degrees of swing.
9. List of manufacturers used and their nearest representative with address and phone number.
10. Catalog cuts.

B. Bid and submit manufacturer's updated/improved item if scheduled item is discontinued.
C. Deviations**:** Highlight, encircle or otherwise identify deviations from "Schedule of Finish Hardware" on submittal with notations clearly designating those portions as deviating from this section.
D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.
E. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

1.4 QUALITY ASSURANCE**:**

A. Qualifications**:**

1. Hardware supplier**:** direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to Owner, Architect and Contractor.

   a) Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.

B. Hardware**:** Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.
C. Exit Doors**:** Operable from inside with single motion without the use of a key or special knowledge or effort.
D. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions and code requirements.

E. Pre-Installation Meetings**:** Initiate and conduct with supplier, installer and related trades, coordinate materials and techniques, and sequence complex hardware items and systems installation. Include manufacturers' representatives of locks, panic hardware and door closers in the meetings. Convene prior to commencement of related work.

1.5 DELIVERY, STORAGE AND HANDLING**:**

A. Delivery**:** coordinate delivery to appropriate locations (shop or field).

1. Permanent keys and cores**:** secured delivery direct to Owner's representative.

B. Acceptance at Site**:** Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.

C. Storage**:** Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.6 PROJECT CONDITIONS AND COORDINATION**:**

A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.

B. Coordination**:** Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information**:**

1. Location of embedded and attached items to concrete.
2. Location of wall-mounted hardware, including wall stops.
3. Location of finish floor materials and floor-mounted hardware.
4. At masonry construction, coordinate with the anchoring and hollow metal supplier prior to frame installation by placing a strip of insulation, wood, or foam, on the back of the hollow metal frame behind the rabbet section for continuous hinges, as well as at rim panic hardware strike locations, silencers, coordinators, and door closer arm locations. When the frame is grouted in place, the backing will allow drilling and tapping without dulling or breaking the installer's bits.
5. Coordinate: flush top rails of doors at outswinging exteriors, and throughout where adhesive-mounted seals occur.
6. Manufacturers' templates to door and frame fabricators.

C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.

D. Environmental considerations**:** Segregate unused recyclable paper and paper product packaging, uninstalled metals, and plastics, and have these sent to a recycling center.

1.7 WARRANTY**:**

A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties**:**

1.	Locksets**:**	Three years
2.	Exit Devices**:**	Three years mechanical
3.	Closers**:**	Thirty years mechanical

PART 2 - PRODUCTS

2.1 MANUFACTURERS**:**

A. Manufacturers and their abbreviations used in this schedule**:**

IVE	H. B. Ives
LCN	LCN Closers
SCH	Schlage Lock Company
ZER	Zero International

2.2 HINGING METHODS:

A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.

B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.

C. Conventional Hinges**:** Steel or stainless-steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.

1. Outswinging exterior doors**:** non-ferrous with non-removable (NRP) pins and security studs.
2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

D. Continuous Hinges**:**

1. Geared-type aluminum.

a) Use wide-throw units where needed for maximum degree of swing, advise architect if commonly available hinges are insufficient.

2.3 LOCKSETS, LATCHSETS, DEADBOLTS:

A. Mortise Locksets and Latchsets**:** as scheduled.

1. Chassis**:** cold-rolled steel, handing field-changeable without disassembly.
2. Universal lock case – 10 functions in one case.
3. Floating mounting tabs automatically adjusts to fit a beveled door edge.
4. Latchbolts**:** 0.75 inch throw stainless steel anti-friction type.
5. Lever Trim**:** through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.

a) Spindles**:** security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
b) Inside lever applied by screwless shank mounting – no exposed trim mount screws.
c) Levers rotate up or down for ease of use.
d) Vandalgard locks**:** locked lever freely rotates down while remaining securely locked. This feature prevents damage to internal lock components when subjected to excessive force.

6. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
7. Thumbturns**:** accessible design not requiring pinching or twisting motions to operate.

8. Deadbolts**:** stainless steel 1-inch throw.
9. Strikes**:** 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
10. Scheduled Lock Series and Design**:** Schlage L series, 17A design.
11. Certifications**:**

    a) ANSI/ASTM F476-84 Grade 31 UL Listed.

2.4 EXIT DEVICES / PANIC HARDWARE

A. General features**:**

1. Independent lab-tested 1,000,000 cycles.
12. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
2. Deadlocking latchbolts, 0.75 inch projection.
3. End caps**:** impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
4. No exposed screws to show through glass doors.
5. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
6. Releasable in normal operation with 15-pound maximum operating force, and with 32-pound maximum pressure under 250-pound load to the door.
7. Exterior doors scheduled with XP-series devices**:** Static load force resistance of at least 2000 pounds.

B. Specific features**:**

1. Non-Fire Rated Devices**:** cylinder dogging.
2. Lever Trim**:** breakaway type, forged brass or bronze escutcheon min. 0.130 inch thickness, compression spring drive, match lockset lever design.
3. Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.

2.5 CLOSERS

A. Surface Closers**:**

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast-iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Independent lab-tested 10,000,000 cycles.
4. Non-sized, non-handed, and adjustable. Place closer inside building.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.

7. Extra-duty arms (EDA) solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers with parallel arm units at doors scheduled with parallel arm units.
8. Exterior door closers**:** tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
9. Exterior doors**:** seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
10. Non-flaming fluid, will not fuel door or floor covering fires.
11. Pressure Relief Valves (PRV) not permitted.
12. Closer meeting this specification: LCN 4040XP.

2.6 OTHER HARDWARE

A. Automatic Flush Bolts**:** Low operating force design.
B. Overhead Stops: Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
C. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
D. Door Stops: Provide stops to protect walls, casework or other hardware.

1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.

E. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.
F. Seals: Adhesive type at head & jambs. Inelastic, rigid back, not subject to stretching. Self-compensating for warp, thermal bow, door settling, and out-of-plumb. Adhesive warranted for life of installation.
G. Thresholds: As scheduled and per details.

1. Saddle thresholds: 0.200 inches minimum thickness.

H. Exteriors**:** Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Minimum 0.25-inch diameter fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
I. Thresholds, where scheduled, to extend full jamb depth.
J. Acoustic openings**:** Set units in full bed of Division-7-compliant, leave no air space between threshold and substrate.
K. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
L. Fasteners**:** Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws**:** full-thread. Sleeve nuts**:** full length to prevent door compression.
M. Silencers**:** Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Leave no unfilled/uncovered pre-punched silencer holes. Intent**:** door bears against silencers, seals make minimal contact with minimal compression – only enough to affect a seal.
N. Key Control Software**:** Same manufacturer as key cylinders, supply to Owner.

2.7 FINISH:

A. Generally: BHMA 626 Satin Chromium Steel OR BHMA 630 Satin Stainless Steel.

1. Areas using BHMA 626: furnish push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise scheduled.

B. Door closers: factory powder coated to match other hardware, unless otherwise noted.

1. Provide satin-chrome plated arms, tracks and covers where scheduled bright metallic powder coat (MTLPC) not available.

C. Finish designators used in appended hardware schedule:

ANSI	US	Description	Base Metal
600	USP	Primed For Painting	Steel
626	US26D	Satin Chromium Plated Over Nickel	Brass, Bronze
626AM	US26D	Satin Chromium Plated Over Nickel With Antimicrobial Coating	Brass, Bronze
628	US28	Satin Aluminum, Clear Anodized	Aluminum
630	US32D	Satin Stainless Steel	Stain. Steel 300 Ser
652	US26D	Satin Chromium Plated Over Nickel	Steel
689	US28	Aluminum Painted	Any
AL	US28	Aluminum Mill Finish	Aluminum
BLK		Black	Any
BRN		Dark Brown	Any
CL		Clear Anodized	Aluminum
GRY		Grey	Any

D. Seal color to be as selected by Architect.

2.8 KEYING REQUIREMENTS**:**

A. Key System: District's Existing Schlage Everest 29R patented keyway, small format interchangeable core. Key blanks available only from factory-direct sources, not available from after-market key blank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner to determine system keyway(s) and structure and keybow styles, furnish Owner's written approval of the system; do not order keys or cylinders without written confirmation of actual requirements from the Owner.

1. Existing factory registered master key system.

B. Construction keying: furnish brass keyed-alike temporary cores plus 10 operating keys and 2 construction control keys. Temporary cores and keys remain property of hardware supplier.

C. Contractor will install permanent cylinders/cores.

D. Interchangeable Cores: furnish utility patented, 7-pin solid brass construction.

E. Locksets and cores: keyed at factory of lock manufacturer where permanent records are maintained.

F. Permanent keys and cores: use secured shipment direct from point of origination to Owner.

1. For estimate**:** 2 keys per lockset, 5 master keys per group, 5 grand-master keys, 3 control keys.

G. For estimate: VKC stamping plus "DO NOT DUPLICATE".

H. Bitting List: use secured shipment direct from point of origination to Owners upon completion.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS**:**

A. Can read and understand manufacturers' templates, suppliers' hardware schedule and printed installation instructions. Can readily distinguish drywall screws from manufacturers' furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

3.2 PREPARATION:

A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation. Installation denotes acceptance of wall/frame condition.

B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.

1. Notify Architect of code conflicts before ordering material.
2. Locate latching hardware between 34 inches to 44 inches above the finished floor, per California Building Code, Section 1008.1.9.2 and 1133B.2.5.2.
3. Locate panic hardware between 36 inches to 44 inches above the finished floor.
4. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.

C. Overhead stops**:** before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

3.3 INSTALLATION

A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.

1. Gaskets**:** install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
3. Use manufacturers' fasteners furnished with hardware items or submit Request for Substitution with Architect.
4. Replace fasteners damaged by power-driven tools.

B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.

C. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.

D. Locate overhead stops for minimum 90 degrees at rest and for maximum allowable degree of swing.

3.4 ADJUSTING

A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.

1. Hardware damaged by improper installation or adjustment methods**:** repair or replace to Owner's satisfaction.
2. Adjust doors to fully latch with no more than 1 pound of pressure.
3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
4. Adjust door closers per 1.9 this section.

B. Adjust closers to meet ADA

C. Final inspection**:** Installer to provide letter to Owner that upon completion installer has visited the Project and has accomplished the following**:**

1. Has re-adjusted hardware.
2. Has evaluated maintenance procedures and recommend changes or additions and instructed Owner's personnel.
3. Has identified items that have deteriorated or failed.
4. Has submitted written report identifying problems.

3.5 DEMONSTRATION**:**

A. Demonstrate hardware systems, including adjustment and maintenance procedures.

3.6 PROTECTION/CLEANING:

A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.

B. Clean adjacent wall, frame and door surfaces soiled from installation / reinstallation process.

3.7 SCHEDULE OF FINISH HARDWARE

A. See door schedule in drawings for hardware set assignments.

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HARDWARE GROUP NO. 001

PROVIDE EACH RU DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R	626	SCH
1	EA	SFIC MORTISE CYL.	80-132 X CAM/COLLAR AS REQ'D	626	SCH
1	EA	NOTE	REMAINDER OF HARDWARE BY DOOR MFR.		

-Coordinate hardware with door MFR.

HARDWARE GROUP NO. 205

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142A DW + 4"	AA	ZER
1	EA	GASKETING	328AA H & J	AA	ZER
1	EA	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 205I

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	630	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ (MOUNT ON INT.)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA	GASKETING	328AA H & J	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 214

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
2	EA	MANUAL FLUSH BOLT	FB458	626	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R	626	SCH
1	EA	OH STOP	900S SERIES X SIZE & MOUNTING AS REQ (Inactive Leaf)	630	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ (Active Leaf)	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142A DW + 4"	AA	ZER
1	EA	GASKETING	328AA H & J	AA	ZER
1	EA	MEETING STILE	8193AA (2 PCS - 1 SET) HEIGHT AS REQ	AA	ZER
2	EA	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 301

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY W/COIN TURN	L9044 17A L583-363	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

HARDWARE GROUP NO. 501C

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	L9070HD 17A	626	SCH
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

HARDWARE GROUP NO. 715

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	99-NL LENGTH AS REQ	626	VON
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R	626	SCH
1	EA	SFIC RIM CYLINDER	80-159	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142A DW + 4"	AA	ZER
1	EA	GASKETING	328AA H & J	AA	ZER
1	EA	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 805IL

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	CLASSROOM DEADBOLT	B563HD	626	SCH
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R	626	SCH
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA	RAIN DRIP	142A DW + 4"	AA	ZER
1	EA	GASKETING	328AA H & J	AA	ZER
1	EA	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. J902

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PADLOCK L/CYL-SFIC	KS41F1200	606	SCH
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R	626	SCH
1			BALANCE OF HARDWARE BY GATE SUPPLIER		

- CANE BOLT BY GATE SUPPLIER.

END OF SECTION

SECTION 08 80 00 – GLAZING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Glass and glazing materials.

B. Glazing gasket and accessories.

1.2 REFERENCES

A. 16 CFR 1201 – Safety Standard for Architectural Glazing Materials, current edition.

B. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; current edition.

C. ASTM C 1193 - Standard Guide for Use of Joint Sealants; current edition.

D. ASTM E 1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; current edition.

E. GANA (GM) - GANA Glazing Manual; Glass Association of North America; current edition.

F. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; current edition.

1.3 PERFORMANCE REQUIREMENTS

A. Provide glass and glazing materials for continuity of building enclosure:
   1. To utilize the inner pane of multiple pane sealed units for the continuity of the wall assembly.
   2. Maintain a continuous seal throughout the glazed assembly from glass pane to heel bead of glazing sealant.

B. Select type and thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with applicable code.
   1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.

1.4 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics- size limitations, and special handling or installation requirements.

C. Product Data on Glazing Gaskets: Provide chemical, functional, and environmental-characteristics, limitations, special application requirements. Identify available colors.

D. Manufacturer's Certificate: Certify that glass meets or exceeds specified requirements.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and FGMA.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WARRANTY

A. See Division 1 sections for additional warranty requirements.

B. Provide a five (5) year warranty to include coverage for glass units from seal failure, interpane dusting or misting, and replacement of same.

C. The Warranties submitted under this Section shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the laws of governing jurisdictions and is in addition to and runs concurrently with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 GLASS MATERIALS

A. Manufacturers:

1. THERMOTEC GLASS: 878 Westinghouse Rd., BLDG. 2, Georgetown, Tx 78262
   Phone No.: 512-759-4527

2. PPG Industries, Inc. (VITRO): 400 Guys Run Rd., Cheswick, PA 15024
   Phone No.: 1-888-774-4332

3. OLDCASTLE Glass: 5334 Barthel Industries Dr. NE, Albertville, MN 55301
   Phone No.:763-497-3212

2.2 BASE PRODUCT MANUFACTURER:

A. PPG Industries (VITRO) Architectural Glass or approved equal.

2.3 SEALED INSULATING GLASS

A. Insulating Glass Units complying with ANSI/ASTM E330.

1. Glass thickness: 1” each unit.
2. Inter-cavity space: ½” inch.
3. Glass coating surface number two (2), inside surface of out light, Low E.
4. Inert gas Argon.
5. Light transmittance minimum 0.70.
6. Glass Placement: Horizontal sliding window units at concession building service window opening.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive Gaskets.

D. Install gaskets in accordance with ASTM C 1193 and FGMA Sealant Manual.

E. Comply with manufacturer's instructions.

3.3 INSTALLATION

A. Install glass in accordance with recommendations and procedures in GANA Glazing Manual and FGMA Sealant Manual.

B. Install glass with lines or waves horizontal.

3.4 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.5 PROTECTION OF FINISHED WORK

A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

SECTION 08 91 00 LOUVERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Louvers, frames, and accessories.

1.2 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); current edition.

B. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; current edition.

C. AMCA 511 - Certified Ratings Program for Air Control Devices; current edition.

D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; current edition.

E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); current edition.

1.3 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.

D. Samples: Submit two samples 2 by 2 inches in size illustrating finish and color of exterior and interior surfaces.

E. Test Reports: Independent agency reports showing compliance with specified performance criteria.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Maintenance Data: Include lubrication schedules, adjustment requirements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.5 WARRANTY

A. See Division 1 sections for additional warranty requirements.

B. Provide twenty (20)-year manufacturer warranty against distortion, metal degradation, and failure of connections.

1. Finish: Include coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Airolite Company, LLC: 2814 Silver Meadow Ln, Corinth, Texas 76210
Phone No.: 972-960-8726

B. Metallic Products Corporation: 7777 Hollister Street, Houston, Texas 77040
Phone No.: 713-856-9696

C. Architectural Louvers: 266 W. Mitchell Ave., Cincinnati, OH 45232
Phone No.: 888-568-8371

2.2 LOUVERS

A. Louvers Characteristics: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
   1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf without damage or permanent deformation.
   2. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
   3. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.

B. Louvers Make-up: Horizontal blade, extruded aluminum construction.
   1. Free Area: 50% minimum.
   2. Blades: Straight.
   3. 3.Frame: 4 inches deep, channel profile; corner joints mitered and, with continuous recessed caulking channel each side.
   4. Aluminum Thickness: Frame 12 gage, 0.0808 inch minimum; blades 12 gage, 0.0808 inch minimum.
   5. Aluminum Finish: Superior performing organic coatings; finish welded units after fabrication.

C. Wall Louvers Used in conjunction with HVAC Components: Specified in Division 23 31 00.

2.3 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

2.4 FINISHES

A. Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 0.9 mil.
   1. Color: To be selected by Architect.

2.5 ACCESSORIES

A. Blank-Off Panels: Same material as louver, painted black on exterior side; provide where duct connected to louver is smaller than louver frame, sealing off louver area outside duct.

B. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.

C. Insect Screen: Size to fit louver profile, aluminum mesh.

D. Fasteners and Anchors: Stainless steel.

E. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

F. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

3.2 INSTALLAT ION

A. Install louver assembly in accordance with manufacturer's instructions.

B. Install louvers level and plumb.

C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

D. Secure louver frames in openings with concealed fasteners.

E. Coordinate with installation of mechanical ductwork.

3.3 ADJUSTING

A. Adjust louvers for final placement.

3.4 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

END OF SECTION

SECTION 09 21 16 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.
B. Metal stud wall framing.
C. Metal channel ceiling framing.
D. Gypsum wallboard.
E. Gypsum Soffit Panels
F. Joint treatment and accessories.
G. Textured finish system.

1.2 REFERENCE STANDARDS

A. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2013.1.
B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc- Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2012.
D. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2014).
E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.
F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2011.
G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
H. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2011.
I. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2014a.
J. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
K. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
L. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
M. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2013.
N. GA-600 - Fire Resistance Design Manual; Gypsum Association; 2012.

1.3 SUBMITTALS

A. See Division 1 Sections for submittal procedures.
B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

D. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacing and deflection.

E. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches in size, illustrating finish color and texture.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum (5) five years of documented experience.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

A. Manufacturers:

1. United States Gypsum (USG) Co.:1201 Mayo Shell Rd, Galena Park, Tx 77547
Phone No.: 800-950-3839
2. National Gypsum Company: 2001 Rexford Road Charlotte, NC 28211
Phone No.:704-365-7300
3. American Gypsum Company: 3811 Turtle Creek Blvd., Suite 1200, Dallas, Texas 75219
Phone No.: 214-599-2186

2.1 METAL FRAMING MATERIALS

A. Metal Framing, Connectors, and Accessories:

B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf. Exception: Provide minimum 25-gauge studs at 16 inches on center for toilet rooms, shower areas, other wet area wells.

1. Studs: "C" shaped with flat or formed webs with knurled faces.
2. Runners: U shaped, sized to match studs.
3. Soffit and Ceiling Channels: C-shaped.

C. Loadbearing Studs for Application of Gypsum Board: As specified in Section 05 40 00 – Cold Formed Metal Framing.

B. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.

1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI SG02-1.
2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.

2.2 BOARD MATERIALS

A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
2. Thickness:
    a. Vertical Surfaces: 5/8 inch.
    b. Soffit and Ceilings: 5/8 inch.

B. Backing Board for Wet Areas: Walls and Ceilings for restrooms and janitorial areas.
1. Moisture resistant gypsum board (green board) meeting ASTM C 630.
    a. Thickness: 5/8 inch.

C. Backing Board for Non-Wet Areas: Gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
1. Application: Vertical surfaces above tile, except in wet areas.

D. Soffit and Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Soffits and Ceilings, unless otherwise indicated.
2. Thickness: 5/8 inch.

2.4 ACCESSORIES

A. Textured Finish Materials: Latex-based compound; plain.

B. Screws for Attachment to Steel Members Less Than 0.033 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium plated for exterior locations.

C. Screws for Attachment to Steel Members From 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

D. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.2 SHAFT WALL INSTALLATION

A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
2. Install studs at spacing required to meet performance requirements.

3.3 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Soffit and Ceilings: Space framing as indicated.
1. Level soffit ceiling system to a tolerance of 1/1200.
2. Laterally brace as required.

C. Studs: Space studs at 16 inches on center.
1. Extend partition framing as detailed on the drawings.
2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance

between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Standard Wall Furring: Install at concrete, masonry, and exterior column walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.

F. Blocking: Install mechanically fastened steel sheet for support of:
1. Framed openings.
2. Plumbing fixtures.
3. Toilet partitions.
4. Toilet accessories.
5. Wall mounted door hardware.

3.4 BOARD INSTALLATION

A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board perpendicular to framing, with ends and edges occurring over firm bearing.

C. Cementitious Backing Board: Install over steel framing members where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

D. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.5 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.6 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
2. Level 3: Equipment rooms and service areas.
3. Level 1: Concealed areas.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.

C. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.7 TEXTURE FINISH

A. Apply finish texture coating by means that are in accordance with manufacturer's instructions and to match approved sample.

3.8 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 51 00 ACOUSTICAL CEILING

PART 1 GENERAL

1.1 SUMMARY

A. This section includes requirements for suspended acoustical ceiling system constructed of exposed steel tee grid and lay-in acoustical panels.

B. Related Work: Coordinate acoustical panel ceiling requirements of this section and drawings with related work to properly execute the Work in accordance with the Project Schedule. Sections which contain requirements that relate to acoustical panel ceiling work include but are not limited to the following:
1. Section 06 10 00 - Rough Carpentry
2. Section 09 21 16 - Interior Gypsum Board
3. Section 09 91 23 – Interior Painting

C. Related Documents: Drawings and general provisions of Contract including Houston ISD Contracting Requirements.

D. Coordination of Work: All Work shall be closely coordinated with security and Contracting requirements established by Fort Bend County.

1.2 REFERENCE STANDARDS

A. Requirements for reference standards are specified in Section 01090.

B. American Society for Testing and Materials:
1. ASTM A641 - Zinc-Coated (Galvanized) Carbon Steel Wire.
2. ASTM A653/A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. ASTM B164 - Nickel-Copper Alloy Rod, Bar and Wire.
4. ASTM C635 - The Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
5. ASTM C636 - Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
6. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
7. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
8. ASTM E1190 - Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members.
9. ASTM E1264 - Classification for Acoustical Ceiling Products.
10. ASTM F593 - Stainless Steel Bolts, Hex Cap Screws and Studs.
11. ASTM F594 - Stainless Steel Nuts.

C. Ceiling and Interior Systems Construction Association:
1. CISCA - Ceiling Systems Handbook.

D. Underwriters' Laboratories, Inc:
1. UL - Fire Resistance Directory, Latest Edition.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be regularly engaged in manufacturing and marketing the types of suspended grid system and ceiling panels required for this project and have the facilities capable of meeting all requirements of Contract Documents and warranty.
1. Products and materials used in manufacturing grids and ceiling panels shall be free of lead,

asbestos, polychlorinated biphenyls (PCB) or other types of hazardous materials.

B. Installer Qualifications: Acoustical panel ceiling work shall be performed by a company which specializes in the types of acoustical ceilings required to meet Project requirements using products, materials and method of installation which do not contain lead, asbestos, PCB or other types of hazardous materials.

C. Source Limitations for Ceiling System:
1. Ceiling Units: Obtain each acoustical ceiling panel from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
2. Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1.4 PROJECT CONDITIONS

A. General: Do not install suspended acoustical ceilings until building is enclosed and weatherproof, sufficient heat is provided, dust generating activities have stopped, and overhead mechanical and electrical work are completed, tested and approved.
1. Coordinate ceiling system with manufacturer's requirements and recommendations.

B. Temperature: Ambient temperature and humidity conditions shall be maintained at levels required for Project when occupied for its intended use.

1.5 SUBMITTALS

A. Shop Drawings: Submit to include but not be limited to:
1. All information and details indicating full compliance with Contract Documents.
2. Reflected ceiling plan including type of suspended grid system, edge trim and grid layout for each room and area including dimensions and relationship to other work.
3. Method of securing grid system to building structure.
4. Finishes of all grid components.
5. Type and size of ceiling panels.
6. Mechanical and electrical items relating to ceiling finish.

B. Manufacturer's Product Data: Submit all technical information specified in this section shall be clearly marked in data. Information and manufacturer's published recommendations required to meet Contract Documents shall be clearly marked and identified to indicate full compliance with contract requirements. Submit data for the following:
1. Suspended grid system including edge trim and accessories.
2. Ceiling panel.

D. Grid Samples:
1. Submit samples of the selected grid with edge trim and moldings for Architect's Verification and approval.

E. Ceiling Panel Samples:
1. Submit the manufacturer's full range of available designs and colors for Architect's selection.

1.6 DELIVERY, STORAGE, HANDLING

A. Ceiling grid components, acoustical panels and accessories shall be delivered, stored and handled in accordance with manufacturer's recommendations.
1. Materials shall be delivered to Project site in manufacturer's original, unopened containers with contents clearly identified.

2. Store materials in clean, dry location and protect against damage by water and excessive moisture. Leave in unopened containers until ready for installation.
3. Carefully handle metal suspension system to prevent warping, twisting and bending of members.
4. Handle acoustical ceiling panels carefully to prevent breaking corners and edges and to prevent soiling exposed surfaces.

B. Damaged materials or finish shall be replaced as required and approved by Architect and Owner at no additional cost to Owner. Remove damaged materials from Project site.

1.7 WARRANTY

A. General: Warranty for acoustical ceiling system installation shall not deprive Owner of other rights the Owner may have under other provisions of the Contract Documents. Acoustical ceiling system warranty shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty for acoustical ceiling system shall include but not limited to warping, buckling, shrinking, or cracking, discoloration and loose or missing parts.

1.8 EXTRA MATERIALS

A. Quantity: Provide extra material required for maintenance purposes, deliver the types and number of materials determined by Architect and approved by Owner.
1. Deliver extra materials in manufacturer's original sealed protective covering for storage clearly identifying the materials.

B. Extra materials delivered to Owner for maintenance purposes shall be from the same lot delivered to Project site for installation.

C. Location of Storage: Coordinate with Architect and verify with Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Armstrong World Industries, Inc.:2500 Columbia Ave., Lancaster, PA 17603
Phone No.: 717-396-4761

B. USG Corporation: 7059 Pipestone, Schertz, Texas 78154
Phone No.: 713-308-5400

C. ROCKFON (Ceiling Systems): 4849 S. Austin Ave., Chicago, IL 60638
Phone No.: 708-563-4600

2.2 SUSPENDED GRID SYSTEM

A. Grid Type: Intermediate duty of steel construction complying with ASTM C635, maximum deflection 1/360".
1. Grid Size: 1-1/2" tee with 15/16" face dimension, as required to match ceiling panel size.
2. Finish: Electro-galvanized for entire system, and exposed surfaces finished with factory-baked polyester paint.
3. Finish and Texture: To be selected by Architect.

B. Perimeter Edge Trim: Designed for use with selected suspended ceiling system.
   1. Finish & Color: To be selected by Architect.

C. Grid Accessories: Provide each type of accessory required to complete the ceiling work including but not limited to the following:
   1. Hanger Wires: Galvanized carbon steel, ASTM A641, soft temper, prestretched, yield-stress load of at least 3 times design load, but not less than 12 gauge. Wire size shall be coordinated with recommendations of ASTM C635.
   2. Trim & Edge Moldings: Complete with finish and color to match grid.
   3. For circular penetrations in ceilings, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.3 CEILING PANELS

A. Type: Fissured acoustical mineral fiber ceiling panels, Type III, Class “A”
FS SS –S- 118B, to be verified with Architect.
   1. NRC Range: .50-.60
   2. STC Range: 35-39
   3. Light Reflectance: LR-1 (75% or over)
   4. Flame Resistive Rating: Flamespread 0-25 ASTM E84, Class A, FS SS-S-118B, 25 or under
   5. UL label.

B. Panel Finish & Color: Factory-applied white vinyl latex.

C. Edge and Size Profile: 24”x 24” x 5/8” square edge lay in for exposed 15/16" grid.

PART 3 EXECUTION

3.1 PREPARATION

A. General: Examine Project conditions and structural framing to which acoustical panel ceilings attach or abutt, with Installer present, for compliance with requirements specified in this and other sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.

B. Ceiling Layout: Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling.
   1. Avoid using less-than-half-width panels at borders and comply with layout shown on reflected ceiling plans.

C. Notify Architect in writing of any unsatisfactory conditions. Do not proceed with acoustical panel ceiling work until unsatisfactory conditions detrimental to the proper completion of the work have been corrected and reviewed with Architect.
   1. Beginning of ceiling work implies General Contractor and Installer have inspected and accept the Project conditions as being properly prepared in accordance with ceiling manufacturer's published installation specifications for compliance with Contract Documents.

D. Hazardous Material: Products, materials and methods used in the installation of ceiling system shall be free of hazardous materials.

3.2 GRID INSTALLATION

A. General: Install acoustical panel ceilings in accordance with approved shop drawings, ASTM C636 recommendations manufacturer's published recommendations and Contract Documents.
1. Perform ceiling grid work after major work above ceiling is complete and approved.
2. Install ceiling system capable of supporting imposed loads to a deflection of 1/360 maximum.
3. Variation from Flat to Level: 1/8" in 10 ft.
4. Ceiling system shall be capable of supporting a lay-in light fixture in either direction. Additional cross tees shall be furnished as required by tenant layouts to frame light fixtures.
5. Ceiling system shall be capable of supporting lay-in HVAC distribution fixtures as required.
6. Do not eccentrically load ceiling system or produce rotation of runners.

B. Hanger Installation: Coordinate the locations of hangers with other work.
1. Where ductwork and other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related channels to span the extra distance.
2. Do not support ceiling grid from ductwork above.

C. Main & Cross Tees: Install at 48" on centers or as shown on Architectural Drawings. Cross tees are required, spacer bars are not acceptable.
1. Hang grid system independent of walls, columns ducts, pipes and conduit.
2. Spliced Carrying Members: Avoid visible displacement of face plane of adjacent members in carrying members.
3. Install edge moldings at intersection of ceiling, vertical surfaces and at junctions with other interruptions, using longest practical lengths; miter all corners.

D. Light Fixture Support: Do not support fixtures or other components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
1. Support fixture loads by supplementary hangers located within 6" of each corner of fixture.
2. If fixtures or components are too heavy to be supported from ceiling grid, support directly from building structure.

3.3 PANEL INSTALLATION

A. General: Install ceiling panels with pattern running in one direction.
1. Panels shall be free from twist, warp, dents, damaged edges and other defects detrimental to appearance and function.
2. Fit border panels neatly against abutting surfaces.

B. Damaged panels shall be replaced at no additional cost to Owner.

3.4 ADJUSTMENTS, CLEANING, PROTECTION

A. Adjustments: Adjust sags or twists which develop in grid system. Replace parts which are damaged or faulty. Coordinate with manufacturer's recommendations.

B. Cleaning: Clean exposed surfaces of grid and ceiling panels including trim, and edge moldings of dust, dirt and other contaminants. Comply with manufacturer's published instructions for cleaning. Do not use abrasive cleaning methods and solutions.
1. Remove debris and leave areas neat and clean.

C. Protection: Provide protection for completed ceiling system installation from damage for duration of construction activities. Damaged grid system and ceiling panels shall be repaired or replaced as required and approved by Architect and Owner at no additional cost to Owner.

END OF SECTION

SECTION 09 65 00 RESILIENT FLOORING, BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Resilient base.

B. Installation accessories.

C. Vinyl Composition Tile

1.2 REFERENCE STANDARDS

A. ASTM F1861 - Standard Specification for Resilient Wall Base; 2016.

B. ASTM F1066 – Standard Specification for Vinyl Composition Floor Tile; 2004, with Editorial Revision (2017).

C. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring;2017.

D. ASTM F1861 – Standard Specification for Resilient Wall Base; 2016.

1.3 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Shop Drawings: Indicate seaming plans and floor patterns.

D. Concrete Testing Standard: Submit a copy of ASTM F170.

E. Certification: Prior to installation of flooring, submit written certification by flooring manufacture and adhesive manufacturer that condition of sub-floor is acceptable.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.4 DELIVERY, STORAGE AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

D. Do not double stack pallets.

1.5 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Tarkett USA, Inc.: 1705 Oliver St., Houston, Texas 77007
Phone No.:713-869-5811

B. Roppe Corp., USA: 9855 Genard, Houston, Texas 77041
Phone No.:713-957-8282

C. Viking Vinyl Flooring Solutions: 1422 Brook Drive, Dowers Grove, IL 60515
Phone No.:630-796-1205

2.2 MATERIALS- VINYL COMPOSITION TILE FLOORING

A. Manufacturers to comply with the minimum levels of material and detailing indicated on the Drawings and in conformance with provisions of applicable Division 1 sections.

B. Color and Pattern: To be selected from Manufacturer standard offerings by Architect.

C. Floor Pattern and Tile Type: Reference Floor Plans and Finish Schedule.

2.3 MATERIALS – RESILIENT WALL BASE

A. Drawings and specifications are based on manufacturer's literature from the manufacturers shown on the drawings Finish Schedule.

B. Resilient Base: ASTM F 1861, Type TS rubber, vulcanized thermoset; top set, style as indicated on the drawings, as follows:

1. Product: As indicated in drawing finish schedules.
2. Height: As indicated in drawing finish schedules.
3. Thickness: Standard manufactures offering for specific wall application.
4. Finish: To be selected by Architect.
5. Length: Full length as available.
6. Color: To be selected by Architect.

2.4 ACCESSORIES:

A. Primers, Fillers, Adhesives, Transition, Edge Strips and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subfloor and wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

3.2 PREPARATION

A. Clean substrate.

B. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION – VINYL COMPOSITION FLOOR TILE, RESILIENT WALL BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between wall base joints. Lay vinyl tile uniform and patterns as indicated.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.4 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.5 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 66 23 - RESINOUS FLOORING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes resinous flooring systems.

1.3 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

A. Product Data: For each type of product. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.

B. Samples for Initial Selection: For exposed finish required.

C. Samples for Verification: For resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.

D. Maintenance Data: For resinous flooring to include maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

PART 2 – PRODUCTS

2.0 MANUFACTURERS:

1. Kelley-Moore Paint Company: 11585 FM 1960 Rd., W., Houston, Texas 77065
   Phone No.: 281-894-0542
2. PPG Industries, Inc.:3526 Lang Road Houston, Texas 77020
   Phone No.: 713-672-8140
3. Sherwin Williams Company: 101 W. Prospect Ave. Cleveland, OH 44115-1027
   Phone No.: 216- 566-2000
4. Everlast Epoxy Systems, Inc: 1616 Westgate Circle, Brentwood, TN 37027
   Phone No.: 805-824-0902

2.1 RESINOUS FLOORING

A. Manufacturer's standard industrial-type floor surfacing system consisting of primer; topping, including high-build resinous coatings resin, hardener, coloring agent and selected fine aggregates; and finish coat or coats.

B. System Characteristics:

1. Color and Pattern: As selected by Architect from manufacturer's full range.
2. Wearing Surface: Manufacturer's standard wearing surface.
3. Overall System Thickness: 3mm to 6mm.

C. Primer: Type recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated.

D. Reinforcing Membrane: Flexible resin formulation that is recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated and that inhibits substrate cracks from reflecting through resinous flooring.

E. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

F. Body Coats:
1. Resin: Epoxy mortar.
2. Formulation Description: [100 percent solids] [High solids] [Water based] <Insert requirements>.
3. Type: Pigmented.
4. Application Method: Troweled.
5. Number of Coats: One.
6. Thickness of Coats: 3.2 mm.
7. Aggregates: Manufacturer's standard.

G. Topcoats: Sealing or finish coats.
1. Resin: Epoxy
2. Type: Clear Gloss
3. Finish: Gloss

H. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Compressive Strength: 10,000 psi after 7 days minimum according to ASTM C 579.
2. Tensile Strength: 1,750 psi minimum according to ASTM C 307.
3. Flexural Modulus of Elasticity: 4,000 psi minimum according to ASTM C 580.
4. Water Absorption: 0.2 percent maximum according to ASTM C 413.
5. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch (1.6-mm) permanent indentation according to MIL-D-3134J.
6. Abrasion Resistance: 0.1 gm maximum weight loss according to ASTM D 4060.
7. Hardness: 85 - 90, Shore D according to ASTM D 2240.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.

B. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

3.2 APPLICATION

A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate adhesion.
2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Reinforcing Membrane: Apply reinforcing membrane to substrate cracks.

D. Troweled Body Coats: Apply troweled body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.

E. Grout Coat: Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat.

F. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.

3.3 FIELD QUALITY CONTROL

A. Material Sampling: Owner may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.

1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.4 PROTECTION

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION

SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on exterior substrates.
   1. Steel.
   2. Galvanized metal.
   3. Gypsum Board Soffit Panels
   4. Concrete masonry units.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523, a matte flat finish.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, a high-side sheen flat, velvet-like finish.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, an eggshell finish.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523, a satin-like finish.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, a semi-gloss finish.

F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, a gloss finish.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

   1. Submit Samples on rigid backing, 8 inches (200 mm) square.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content.

1.5 CLOSEOUT SUBMITTALS

A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.7 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacture’s label with the following information:

1. Product name and type (description).
2. Batch date.
3. Color number.
4. VOC content.
5. Environmental handling requirements.
6. Surface preparation requirements.
7. Application instructions.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.9 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. Kelley-Moore Paint Company: 11585 FM 1960 Rd., W., Houston, Texas 77065
Phone No.: 281-894-0542

2.PPG Industries, Inc.:3526 Lang Road Houston, Texas 77020-USA
Phone No.: 713-672-8140

3.Sherwin Williams Company: 101 W. Prospect Ave. Cleveland, OH 44115-1027
Phone No.: 216- 566-2000

A. Source Limitations: Obtain paint materials from single source from single listed manufacturer.

1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 MATERIAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another, and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by

manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

C. Colors: To be selected by Architect.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.

1. Report, in writing, conditions that may affect application, appearance, or performance of paint.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

C. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

F. Aluminum Substrates: Remove loose surface oxidation.

G. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.

c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Ferrous Metal, Galvanized-Metal, and Aluminum Substrates:

1. Water-Based Light Industrial Coating System:

a. Prime Coat: (unless shop primed) Primer, water-based, anti-corrosive for metal: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, 5.0 to 10.0 mils wet, 2.0 to 4.0 mils dry.
b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
c. Topcoat: Light industrial coating, exterior, water based, gloss, (Gloss Level 6): S-W Pro Industrial Acrylic Gloss Coating, B66-600 Series, at 2.5 to 4.0 mils dry, per coat.

B. CMU Substrates:

1. Latex System:

a. Block Filler: Block filler, latex, interior/exterior: S-W PrepRite Block Filler, B25W25, at 75 to 125 sq. ft. per gal (1.8 to 3.1 sq. m per l) or approved equal.
b. Intermediate Coat: Latex, exterior, matching topcoat.
c. Topcoat: Latex, exterior, satin, (Gloss Level 3-4): S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils dry, per coat or approved equal.

END OF SECTION

SECTION 09 91 23 INTERIOR PAINTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

1.2 RELATED SECTIONS

A. Division 09 - Finish

1.3 REFERENCES

A. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; current edition.

1.4 DEFINITIONS

A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.5 SUBMITTALS

A. See Section 01 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on paint products.

C. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

D. Samples: Provide approval samples 24-inch x 24-inch of required specialty or “faux” finishes for Architect approval.

1.6 MOCK-UPS

A. Provide mockups of all painted surfaces. Mock-up may remain in place following approval of the Architect.

B. Provide adequate lighting for mockup review.

C. Notify Owner and Architect minimum 72 hours prior to mock-up review.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years’ experience.

1.8 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.9 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors, unless required otherwise by manufacturer's instructions.

C. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.11 EXTRA MATERIALS

A. Supply one gallons of each color; store where directed.

B. Label each container with color in addition to the manufacturer's label.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Kelley-Moore Paint Company: 11585 FM 1960 Rd., W., Houston, Texas 77065
Phone No.: 281-894-0542

B. PPG Industries, Inc.:3526 Lang Road Houston, Texas 77020-USA
Phone No.: 713-672-8140

C. Sherwin Williams Company: 101 W. Prospect Ave. Cleveland, OH 44115-1027
Phone No.: 216- 566-2000

2.2 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, except field-catalyzed coatings. Prepare pigments:
1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
2. For good flow and brushing properties.
3. Capable of drying or curing free of streaks or sags.
4. Low-VOC as defined design criteria.
5. Pre-determine existing painted surface is able to properly receive applicable primers and paints. Specifications shall require contractor to confirm during submittal phase.

2.3 PAINT SYSTEMS - INTERIOR

A. Concrete Surfaces & Unglazed Brick:
1. Semi-Gloss Finish 3 Coat Latex System
2. Semi-Gloss Finish 2 Coat System (Water/Wet Areas)

B. Concrete Masonry
1. Semi-Gloss Finish 3 Coat Latex System
2. Semi-Gloss Finish 3 Coat System (Water/Wet Areas)

C. Metals
1. Semi-Gloss Finish 3 Coat Enamel System 2.5. Metal (Structural)
2. Semi-Gloss Finish 3 Coat Industrial Enamel System 2.6.

D. Drywall Walls
1. Semi-Gloss Finish 3 Coat Enamel System w/Light Sand Texture
2. Semi-Gloss Finish 3 Coat Enamel System Primer and Light Sand Texture (All wet areas surfaces)

2.4 ACCESSORY MATERIALS

A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials

not specifically indicated but required to achieve the finishes specified; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

3.2 PREPARATION

A. Surfaces: Correct defects and clean surfaces which affect work of this section.

B. Marks: Seal with shellac those which may bleed through surface finishes.

C. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

D. Concrete and Unit Masonry Surfaces to be painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

E. Gypsum Board Surfaces to be painted: Fill minor defects with filler compound. Spot prime defects after repair.

F. Sheet Metal Surfaces to be painted: Remove surface contamination by steam or high-pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

G. Uncoated Steel and Iron Surfaces to be painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

H. Metal Doors and frames to be painted prep as required.

3.3 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Touch-up painting to be conducted full height, from corner to corner. Spot touch-up is not allowed.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Prepare and pint all exposed, duct work, piping, and conduit.

B. Paint shop-primed equipment as field determined by Architect and/or Owner.

3.5 FIELD QUALITY CONTROL

A. See applicable Division 1 sections for general requirements for field inspection.

3.6 CLEANING

A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.7 PRE-FINISED SURFACES

A. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically noted.
   2. Fire rating labels, equipment serial number and capacity labels.
   3. Stainless steel items.

B. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
   1. Paint all insulated and exposed pipes occurring in finished areas to match background surfaces, unless otherwise indicated.
   2. Paint exposed surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of Eggshell black paint to visible surfaces.
   3. Paint dampers exposed behind louvers, grilles.

C. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

END OF SECTION

SECTION 09 97 25 - CONCRETE FLOOR SEALER

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete floor sealer. Specialized reactive chemicals that penetrate concrete to seal, densify and harden the concrete.

1.2 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Submit manufacturer's product data, including surface preparation and application instructions.

C. Maintenance Instructions: Submit manufacturer's maintenance and cleaning instructions.

1.3 PERFORMANCE REQUIREMENT

A. Provide product that utilizes specialized reactive chemicals that penetrate concrete to seal, densify and harden the concrete.

B. General Contractor is to protect all concrete floors which are to have sealant applied. Areas should be free of stains, oils, cleaning agents, debris and dust prior to sealing.

1.4 QUALITY ASSURANCE

A. Installer's Qualifications:
   1. Successful experience in application of similar concrete floor sealers.
   2. Employ persons trained for application of concrete floor sealers.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name.

B. Storage: Store materials in a clean, dry area indoors in accordance with manufacturer's instructions. Keep containers sealed until ready for use.
   3. Concrete Floor Sealer: Keep away from ignition sources. Do not allow to freeze.

C. Handling: Protect materials during handling and application to prevent damage or contamination.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not apply concrete floor sealer when air or surface temperature is below 40 degrees F.

B. Exterior Surfaces: Do not apply materials in wet weather.

1.7 SEQUENCING

A. Prepare surface and apply concrete floor sealer after interior finish work is completed and before baseboards are installed.

1.8 APPLICATION LIMITATIONS

A. Do not apply sealer where other floor finish materials are scheduled.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Kelley-Moore Paint Company: 11585 FM 1960 Rd., W., Houston, Texas 77065
Phone No.: 281-894-0542

B. PPG Industries, Inc.:3526 Lang Road Houston, Texas 77020-USA
Phone No.: 713-672-8140

C. Sherwin Williams Company: 101 W. Prospect Ave. Cleveland, OH 44115-1027
Phone No.: 216- 566-2000

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive concrete floor sealer. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.2 SURFACE PREPARATION

A. Protection:
1. Protect walls and surrounding surfaces not to receive concrete sealer.
2. Do not allow sealer to come in contact with wood, glass or metal surfaces.

B. Prepare concrete surface in accordance with manufacturer's instructions.

C. Ensure concrete is a minimum of 7 days old.

D. Ensure concrete surface is clean, dry, structurally sound, and free from dirt, dust, oil, grease, solvents, paint, wax, asphalt, concrete curing compounds, sealing compounds, surface hardeners, bond breakers, adhesive residue, and other surface contaminants.

E. Do not acid wash or use heavy alkali cleaners.

3.3 APPLICATION

A. Concrete Floor Sealer: Apply concrete floor sealer over concrete floor in accordance with manufacturer's instructions.

B. Keep material containers closed when not in use to avoid contamination.

C. Do not apply sealer where other floor finish materials are scheduled.

3.4 PROTECTION

A. Protect concrete surfaces from foot traffic for a minimum of 24 hours.

B. Avoid washing concrete surfaces for a minimum of 48 hours.

END OF SECTION

SECTION 10 14 00 – EXTERIOR WAYFINDING SIGNAGE KIOSK

PART 1 - GENERAL

1.0 DESCRIPTION

A. This section specifies Exterior Wayfinding Signage Kiosk.

1.1 RELATED WORK

A. Section 03 30 53-MISCELLANEOUS CAST-IN-PLACE CONCRETE.

B. Section 05 50 00-METAL FABRICATIONS.

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Provide signage that is the product of one manufacturer, who has provided signage as specified for a minimum of three (5) years. Submit manufacturer's qualifications.

B. Installer's Qualifications: Minimum three (5) years' experience in the installation of signage of the type as specified in this Section. Submit installer's qualifications.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 00, SUBMITTALS.

1. Fabrication Submittals, as described below

B. Manufacturer's Literature:

1. Showing the methods and procedures proposed for the anchorage of each location.
2. Manufacturer's printed specifications and maintenance instructions.

C. Location Plan, showing location, type.

D. Shop Drawings: Scaled for manufacture and fabrication of sign types. Identify materials, show joints, welds, anchorage, accessory items, mounting and finishes.

E. Full size layout.

F. Manufacturer's qualifications'

G. Installer's qualifications.

H. Structural calculations.

1.4 DELIVERY AND STORAGE

A. Deliver materials to job in manufacturer's original packaging. Protect materials from damage.

B. Package to prevent damage or deterioration during shipment, handling, storage and installation. Maintain protective covering in place and in good repair until removal is necessary.

C. Store products in dry condition inside enclosed facilities.

1.5 WARRANTY

A. Construction Warranty: Comply with FAR clause 52.246-21, "Warranty of Construction".

B. Provide written installation and product warranty for period of ten (10)- years.

1.6 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Architectural Manufacturers Association (AAMA):

611-14 ..... Anodized Architectural Aluminum

2603-13 ..... Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

C. ASTM International (ASTM):

A36/A36M-19 ..... Carbon Structural Steel

A240/A240M-20 ..... Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

A666-15..... Annealed or Cold-Worked Austenitic Stainless-Steel Sheet, Strip, Plate and Flat Bar

A1011/A1011M-18a ..... Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

B36/B36M-18 ..... Brass Plate, Sheet, Strip, and Rolled Bar

B152/B152M-19 ..... Copper Sheet, Strip, Plate, and Rolled Bar

B209-14..... Aluminum and Aluminum-Alloy Sheet and Plate

B209M-14..... Aluminum and Aluminum-Alloy Sheet and Plate (Metric)

B221-14..... Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes

B221M-13..... Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes (Metric).

D1003-13 ..... Test Method for Haze and Luminous Transmittance of Transparent Plastics

D4802-16 ..... Poly (Methyl Methacrylate) Acrylic Plastic Sheet

D. Code of Federal Regulation (CFR):

40 CFR 59..... Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating

1.7 EXTERIOR SIGNAGE PERFORMANCE REQUIREMENTS

A. Structural Calculations: Engage a Professional Engineer (PE) who is registered in the State of Texas where the work is located to design sign structure and anchorage to withstand design loads.

B. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes 67 degrees C (120 degrees F) ambient and 100 degrees C (180 degrees F) material surfaces.

PART 2 PRODUCTS

2.0 MANUFACTURERS

A. Gemini Inc: 103 Mensing Way, Cannon Falls, MN 55009
Phone No.: 800-538-8377

B. Signs Visual Of Houston Texas Corp: 8564 Katy FWY, Houston, Texas 77024
Phone No.: 713-340-8633

C. ASI Sign Systems, Inc: 8181 Jetstar Drive, Suite 100, Irving, Texas 75063
Phone No.: 1-800-274-7732

2.1 EXTERIOR KIOSK SIGN MATERIALS

A. Aluminum Sheet and Plate: ASTM B209M (B209).
B. Aluminum Extrusions: ASTM B221M (B221).
C. Brass Sheet (Yellow Brass): ASTM B36/B36M.
D. Bronze Plate: ASTM B36/B36M.
E. Copper Sheet: ASTM B152/B152M.
F. Steel Products: Structural steel products that conform to ASTM A36/A36M. Sheet and strip steel products that conform to ASTM A1011/A1011M.
G. Stainless Steel Sheet: ASTM A240/A240M, stretcher leveled standard of flatness. .
H. Finish:
    1. Aluminum Finishes:
        a. Anodized Finish: AAMA 611. Color to be selected from Manufacturer's standard offerings.
        b. Provide sign KIOSK configurations as indicated on construction documents.
I. Do not manufacture signs until final sign message schedule and location review has been submitted and reviewed.
J. Drill holes for bolts and screws. Mill smooth exposed ends and edges with corners slightly rounded.
K. Form joints exposed to weather to exclude water.
    1. Align contact surfaces fit tight and even without forcing or warping components.

L. Pre-assemble items in shop to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

M. Prime painted surfaces as required. Apply finish coating of paint for complete coverage with no light or thin applications allowing substrate or primer to show.

1. Finish surface smooth, free of scratches, gouges, drips, bubbles, thickness variations, foreign matter and other imperfections.

PART 3 - EXECUTION

3.0 INSTALLATION

A. Locate signs as shown on the // construction documents. //.

B. At each sign location there are no utility lines behind each sign location that will be affected by installation of signs.

C. Provide inserts and anchoring devices which must be set in concrete for installation of signs. Submit setting drawings, templates, instructions and directions for installation of anchorage devices, which may involve other trades.

D. Touch up exposed fasteners and connecting hardware to match color and finish of surrounding surface.

E. At completion of sign installation, clean exposed sign surfaces. Clean and repair adjoining or adjacent surfaces that became soiled or damaged as a result of installation of signs.

END OF SECTION

SECTION 10 14 14 - WAYFINDING SIGNAGE TEXT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Text of the following type:

1. Flat Cut Metal Letters.
2. Raised uniform stroke.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

1.3 REFERENCES

A. NAVY G 88-0-4 (C90300) - Alloy Specification for Tin.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's illustrated product literature and specifications to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods to apply to specified and detailed substrates.

C. Shop Drawings: Submit detailed drawings of products and assemblies to comply with design drawing details, profiles and notes.

D. Selection Samples: For each finish product specified, two complete sets of color chips mounting: A mounting template designating stud locations shall be provided. Stud size and type shall be as required by manufacturer for application and design intent.

1.5 PRE-INSTALLATION MEETING

A. Convene minimum two weeks prior to starting work of this section.

1.6 DELEVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer’s unopened packing bearing the brand name and manufacturer’s identifica*tion until ready for installation.*

B. Handle materials to avoid damage.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer’s limits.

1.8 SEQUENCING

A. Ensure that products of this section are applied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty against defects in materials and workmanship. Letters shall be guaranteed for the life of the business against all defects.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Gemini Inc.: 103 Mensing Way, Cannon Falls, MN 55009

Phone No.: 800-538-8377

B. ASI SIGN SYSTEMS, Inc.: 8181 Jetstar Drive, Suite 100, Irving, Texas 75063

Phone No.: 1-800-274-7732

C. UNITY SIGNS: 9046 Long Point Rd., Houston, Texas 77053

Phone No.: 281-679-5252

2.2 FLAT CUT METAL LETTERS: Wayfinding Signage Kiosk Text

A. Flat Cut Metal Letters:
1. Material: Aluminum - 5052 Alloy/5083 Alloy.
2. Aerial Font.

B. Mounting:
1. Metal letters are to be drilled & tapped for concealed fasteners. Letters are to be ½-inch thick and are to have threaded stud bosses.

C. Fabrication:
1. Size: 4 inches in height.
2. Material Thickness: ½-inch in depth.
3. Edges: Single Line Bevel.
4. Background Colors:
    a. Color: Standard Black.

5.Coating: Semi-Gloss.

2.3 RAISED METAL LETTERS: Stone Monumental Entry Text

A. Raised Metal Letters:

1. Material Aluminum-5052 Alloy/5083 Alloy.
2. Aerial Font.

B. Mounting:

1. Metal letters are to be drilled & tapped for concealed fasteners. Letters are to be 1-inch thick and are to have threaded stud boss anchors as required to secure components.

C. Fabrication:

1. Size in Height: Reference Construction Drawings.
2. Material Thickness: 1- inch in depth.
3. Edges: Single Line Bevel.
4. Background Colors:
   a. Color: Same as front face.
5. Coating: Semi-Gloss.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions and in proper relationship to adjacent construction.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 10 14 16 SIGNAGE –ROOM PLAQUES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Room and door signs.

B. Interior directional and informational signs.

1.2 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessibility Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.4 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.

D. When room numbers to appear on signs differ from those on the drawings, include the drawing room number on schedule.

E. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.

1. Submit for approval by Owner through Architect prior to fabrication.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

C. Store tape adhesive at normal room temperature.

1.6 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. SAIFEE SIGNS & GRAPHICS: 5829 West Sam Houston Parkwy North
   Suite 1011, Houston, Texas 77041
   Phone No.: 713-263-9900
2. ASI Sign Systems, Inc: 419 Century Plaza Dr, Suite 230, Houston, Texas 77373
   Phone No.: 713-462-7222
3. UNITY SIGNS: 9046 Long Point Rd., Houston, Texas 77053
   Phone No.: 281-679-5252

2.2 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.

1. Sign Type: Flat signs with engraved panel media as specified.
2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
3. Character Height: 1 inch.
4. Sign Height: 2 inches, unless otherwise indicated.
5. Office Doors: Identify with room numbers to be determined later, not the numbers shown on the drawings; in addition, provide "window" section for replaceable occupant name.
6. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers shown on the drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
7. Service Rooms: Identify with room names and numbers to be determined later, not those shown on the drawings.
8. Restrooms: Identify with pictograms, the names "MEN" and "WOMEN", “BOYS” and “GIRLS”, “STAFF” or “FACULTY”, and room numbers to be determined later, and braille.

C. Interior Directional and Informational Signs:

1. Sign Type: Same as room and door signs.
2. Sizes: As indicated on the drawings.
3. Where suspended, ceiling mounted, or projecting from wall signs are indicated, provide two-sided signs with same information on both sides.

2.3 SIGN TYPES

A. Flat Signs: Signage media without frame. Melamine plastic laminate or engineered plastic, Thermoplastic alloy with raised text and character coloring and stipple or matte textures

1. Edges: Square.
2. Corners: Square.
3. Wall Mounting of One-Sided Signs: Two faced 3M type tape acceptable when mounted on glass.
4. Mounting: Stainless steel vandal resistant mounting countersunk mounting holes,

holes at each corner. Stainless steel suspension cables, cable clamps, and ceiling fastener suitable for attachment to ceiling construction indicated.

B. Color and Font: Unless otherwise indicated:
   1. Character Font: Helvetica, Arial, or other sans serif font.
   2. Character Case: Upper case only.
   3. Background Color: Selected by Architect.
   4. Character Color: Contrasting color.

C. Use back plates when signage is installed on glass.

2.4 TACTILE SIGNAGE MEDIA

A. Engraved Panels: Laminated colored plastic engraved through face to expose core as a background color:
   1. Total Thickness: 1/16 inch.

2.5 NON-TACTILE SIGNAGE MEDIA

A. Silk Screened Plastic Panels: Letters and graphics silk screened onto reverse side of plastic surface:
   1. Sign Color: Color as selected.
   2. Total Thickness: 1/8 inch.

2.6 ACCESSORIES

A. Exposed Screws: Stainless steel.

B. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

D. Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION

SECTION 10 14 23 – SIGNAGE – PLAQUE & DIMENSIONAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Plaques.
2. Cutout dimensional letters.

1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.4 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, and graphic elements, including tactile characters and Braille, and layout for each sign.

C. Samples: For each sign type and for each color and texture.

D. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable provisions in accessibility standards.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 SIGN MATERIALS

A. Aluminum Sheet and Plate: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

B. Aluminum Castings: ASTM B 26/B 26/M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.

2.2 CAST PLAQUES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Southwell Company: 502 S Staples St, Corpus Christi, TX 78401
   Phone: 210-223-1831
2. Matthews International Corp: Bronze Division. 1315 W. Liberty Ave, Pittsburgh, PA 15226
   Phone: 800-950-1317
3. A.R.K. Ramos Architectural Signage: 1321 South Walker, Oklahoma City, OK 73109
   Phone: 800-725-7266
4. Nelson-Harkins Industries: 5301 N Kedzie Ave, Chicago, IL 60625
   Phone: 800-882-8989

B. Cast Plaques: Provide castings free of pits, scale, sand holes, and other defects, as follows:

1. Plaque Material: Aluminum.
2. Size: As shown on Drawings.
3. Background Texture: Manufacturer's standard stipple texture.
4. Border Style: Raised flat band.
5. Mounting: Concealed studs, noncorroding for substrates encountered.

2.3 DIMENSIONAL CHARACTERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Southwell Company: 502 S Staples St, Corpus Christi, TX 78401
   Phone: 210-223-1831
2. ASI-Modulex, Inc.: 10661 Haddington Dr #160, Houston, Tx 77040
   Phone: 713-462-7222
3. Innerface Sign Systems, Inc: 5849 Peachtree Rd #100, Chamblee, GA 30341
   Phone: 770-921-5566
4. Nelson-Harkins Industries: 5301 N Kedzie Ave, Chicago, IL 60625
   Phone: 800-882-8989

A. Cutout Characters: Characters with uniform faces; smooth, eased edges; precisely formed lines and profiles; and as follows:

1. Character Material: Sheet or plate aluminum.
2. Character Height: As indicated.
3. Thickness: Manufacturer's standard for size of character.
4. Aluminum Finish: Clear anodized.
5. Letters pre-assembled to rails to ensure fit.
6. Provide manufacturer's hardware for top rail mounting of cutout characters.

2.4 ACCESSORIES

A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.5 FABRICATION

A. General: Provide manufacturer's standard signs of configurations indicated.
   1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
   2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
   3. Conceal fasteners if possible; otherwise locate fasteners where they will be inconspicuous.

2.6 ALUMINUM FINISHES

A. Clear Anodized Finish: Manufacturer's standard Class 1 clear anodized anodic coating, 0.018 mm or thicker, over a polished (buffed) mechanical finish, complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.

B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

C. Verify that anchor inserts are correctly sized and located to accommodate signs.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

   1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
   2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.

B. Top Rail-Mounted Signs:

1. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

C. Bracket-Mounted Signs: Provide manufacturer's standard brackets, fittings, and hardware for mounting signs that project at right angles from walls and ceilings. Attach brackets and fittings securely to walls and ceilings with concealed fasteners and anchoring devices to comply with manufacturer's written instructions.

D. Dimensional Characters: Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.

1. Projected Mounting: Mount characters at projection distance from wall surface indicated.

E. Cast-Metal Plaques: Mount plaques using standard fastening methods to comply with manufacturer's written instructions for type of wall surface indicated.

1. Concealed Mounting: Mount plaques by inserting threaded studs into tapped lugs on back of plaque. Set in predrilled holes filled with quick-setting cement.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION

SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Section Includes: Solid Plastic (HDPE) toilet compartments configured as toilet enclosures and privacy screens as follows:

1. Compartment Style: Floor Mounted; overhead braced to wall.
2. Privacy Screen: Wall mounted

B. Related Sections include the following:

1. Division 5 Section “Metal Fabrications” for supports to wall framing.
2. Division 10 “Toilet Accessories” for toilet paper holders and similar accessories.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles and finishes.

B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of cutouts for compartment-mounted toilet accessories.
2. Show locations of reinforcements for compartment-mounted grab bars.
3. Show locations of centerlines of toilet fixtures.
4. Show ceiling grid and overhead support or bracing locations.

C. Samples for Initial Selection: For each type of unit indicated. Include Samples of hardware and accessories involving material and color selection.

D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

1. Each type of material, color, and finish required for units, prepared on 6-inch square Samples of same thickness and material indicated for Work.
2. Each type of hardware and accessory.

E. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" for toilet compartments designated as accessible.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. ASI Accurate Partitions (Black Tough Texture #9205): 160 Tower Dr, Burr Ridge, IL 60527
Phone No: 708-442-6800

B. Scranton Products (Black EX): 801 East Corey St: Scranton, PA 18505
Phone No.: 866-753-4959

2.2 BASE PRODUCT MANUFACTURER:

A. ASI Accurate Partitions “Black Tough Texture #9205”.

2.3 MATERIALS

A. Stainless Steel Sheet ASTM A 666, Type 304, stretcher-leveled standard of flatness.

B. Stainless-Steel Castings: ASTM A 743/A 743M

2.4 Solid Plastic (HDPE) CORE UNITS

A. Toilet Partition Construction

1. 1” solid plastic (HDPE)
2. Pilasters secured to floor and walls.
3. Panels to be wall mounted and supported by a pilaster.
4. Color/Finish – Black EX Dimpled Finish

B. Door, Panel and Pilaster Construction: Solid 1” premium HDPE resin throughout – no glue or seams. Provide minimum 1”-inch thick doors and pilasters minimum 1”-inch thick panels.

C. Pilasters: Fabricated from stainless-steel sheet, not less than 0.031-inch (0.79-mm) nominal thickness and 3 –inches (76mm) high, finished to match hardware.

D. Solid Plastic (HDPE) - Panel Finish: Black EX Dimpled Finish

2.5 PRIVACY SCREENS

A. Provide plastic privacy screens in urinal and entry toilet room applications as indicated or scheduled.

B. Panels and pilasters, 1 inch (25 mm) thick with edges rounded to a radius. Screens to be mounted at 12 inches (356 mm) above the finished floor.

C. Color/Finish – Black EX Dimpled Finish

2.6 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy duty operating Hardware and accessories.

1. Material: Stainless steel.

B. Hinges: Continuous piano, stainless steel.

C. Latch and Keeper: Manufacturer's standard recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

D. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.

E. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.

F. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

G. Door Hardware: Continuous HELIX (Self-Closing)

H. Wall Brackets: Continuous.

I. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

PART 3 – EXECUTION

3.0 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install unit's rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:
   a. Panels and Walls: 1 inch (25 mm).

2. Continuous Wall Brackets:
   a. Heavy Duty Aluminum - T5 Alloy Anodized Finish with Stainless Steel Tamper Resistant Torx Head Sex Bolts (U-Shaped not approved).

3.1 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

SECTION 10 26 00 WALL PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes corner guards.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For each impact-resistant wall protection unit. Include sections, details, and attachments to other work.

C. Samples: For each exposed product and for each color and texture specified, 12 inches long.

1.3 INFORMATIONAL SUBMITTALS

A. Material certificates.

B. Material test reports.

C. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Surface-Burning Characteristics: As determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.

C. Preinstallation Conference: Conduct conference at Project site.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to the following:
   a. Structural failures.
2. Deterioration of plastic and other materials beyond normal use.
3. Warranty Period: Fire (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. GOBAL INDUSTRIAL: 2119 North 1-35E, Building 3, DeSosto, Texas 5115
Phone No.: 888-978-7759

B. INPRO: 580 W. 18766, Apollo Dr., Muskego, WI 60604
Phone No. 800-22-5556

C. WALLprotex: 3750 OHIO Ave., Saint Charles, IL 60174
Phone No.: 877-880-8115

2.2 CORNER GUARDS

A. Polycarbonate Plastic Sheet: ASTM D 6098, S-PC0I, Class I or 2, abrasion resistant; with a minimum impact-resistance rating of 15 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.

B. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

C. Surface-Mounted, Clear-Plastic Corner Guards: Fabricated from clear polycarbonate sheet; back painted with formed edges; fabricated with 90- or 135-degree turn to match wall condition; each leg to be 3 inches wide and each corner guard to be 48 inches in length.

D. Mounting: Countersunk screws through factory-drilled mounting holes.

E. Color and Texture: Clear back painted with color selected by Architect.

F. Height: Six (6) feet.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install impact-resistant wall protection unit's level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

1. Install impact-resistant wall protection units in locations and at mounting heights indicated on Drawings.
2. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.

B. Install the work of this section in strict accordance with the manufacturer's recommendations, using only approved mounting hardware and locating all components firmly into position.

C. Immediately after completion of installation, clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.

END OF SECTION

SECTION 10 28 00 TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Concession accessories.
3. Custodial accessories.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

C. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

D. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

A. Manufacturer’s Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: Fifteen (15)- years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. BOBRICK: 633 112TH St., Arlington, Texas 76011
Phone No.: (817) – 701- 4200

B. BRADLEY Corporation: 3617 W. Lawrence Ave., Chicago, IL 60625
Phone No.: 773-463-2425

C. Specialties Direct, Inc.: 6200 Tri County Parkwy, Houston, Texas 77008
Phone No.:713-861-4213

D. Excel Dryer Inc: 357 Chestnut St, East Longmeadow, MA 01028
Phone No.:713-861-4213

2.2 TOILET ACCESSORIES SCHEDULE

A. Paper Towel Dispenser: (Provided by Owner; Installed by Contractor)
1. Touchless (Note: Verify electrical requirements)
2. Decking to be 3” extruded flat soffit .078 decking
3. Description: Dispenser unit for paper towels.
4. Mounting: Surface mounted.
5. Material and Finish: 22 ga. Type 304 stainless steel welded construction with exposed surfaces satin finish.
6. Door to have full-length stainless-steel piano hinge and equipped with tumbler lock.

B. Toilet Tissue Dispenser: (Provided by Owner; Installed by Contractor)
1. Double Roll Toilet Tissue Dispenser
2. Material and Finish: Heavy-duty cast aluminum with satin finish.

C. Soap Dispenser (Provided by Owner; Installed by Contractor)
1. Touchless (Note: Verify electrical requirements)

D. Sanitary Napkin Disposal (Adult & Girls Restrooms – Provided by Contractor)

E. Grab Bar:
1. Mounting: Flanges with concealed fasteners.
2. Material: Stainless steel, 0.05 inch (1.3 mm) thick.
3. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
4. Configuration and Length: As indicated on Drawings.

F. Mirror Glass:
1. Float glass, Type I, Class 1, Quality q2 (ASTM C 1036), with silvering, copper coating, and suitable protective organic coating to copper backing in accordance with GSA CID A-A-3002.
2. Stainless steel welded frame.

G. Baby Changer:
1. “BOBRICK” Model KB-200-01SS horizontal, wall mounted baby changing station or approved equal.

H. Mop and Broom Holder:

1. "BOBRICK" Model B-239 X 34" X 13" shelf with mop, broom holders and hooks or approved equal

I. Electrical Hand Dryer

1. Excel Model Xlerator Hand Dryer wall mounted with ADA Compliant Recess Kit or approved equal.
2. 16 3/8" wide x 26" high x 3 3/8" deep overall
3. Wall box is 22 ga 18-8 type 304 stainless steel with #4 satin finish with 16 ga 18-8 type 304 stainless steel dryer mounting plate. All welded construction.

2.2 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and- theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, stainless steel mirrors, nominal 6.0 mm thick.

2.3 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units' level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

SECTION 10 44 16 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fire extinguishers - wall mounted and cabinet enclosed. See drawings for locations.

B. Fire extinguisher cabinets.

C. Accessories.

1.2 REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.

B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.3 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, and location.

C. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.

D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.4 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. ANSUL (Tyco Fire Protection Products): One Stanton Street Marinette, WI 54143
Phone No.: 715-735- 7411

B. Nystrom, Inc.:2855 Marquis Dr., Ste.190, Garland, Texas 75042
Phone No.: 1-800-547-2635

C. Strike First Corp. of America: 1330 Progress Dr, Front Royal, VA 22630
Phone No.:800-255-5515

2.2 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
1. Provide extinguishers labeled by UL.

B. Dry Chemical Type Fire Extinguishers: Carbon steel tank with pressure gage.
1. Class: A: B: C.
2. Size: 10-pound wall hung bracket mounted units were indicated on drawings.
3. Size: 10-pound cabinet mounted units where indicated on drawings.
4. Finish: Baked polyester powder coat; color selected by Architect.

2.3 FIRE EXTINGUISHER CABINETS

A. Metal: Formed primed steel sheet; 0.036-inch-thick base metal.

B. Cabinet Configuration: Semi-Recessed.
   1. Sized to accommodate accessories.
   2. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim and door stiles.

C. Door: Reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with two butt hinges. Provide nylon catch.

D. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.

E. Weld, fill, and grind components smooth.

F. Finish of Cabinet Exterior Trim and Door: Baked enamel, Architect selected color.

G. Finish of Cabinet Interior: White enamel.

H. Decal: Red.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings.

C. Secure rigidly in place.

D. Place extinguishers and accessories in cabinets.

E. Wall mounted units where indicated with recommended Manufacturer’s metal brackets.

END OF SECTION

SECTION 10 53 00 - AUTOMATED EXTERNAL DEFIBRILLATOR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.2 RELATED WORK

A. Section 04 20 00: Unit Masonry
B. Section 10 44 00: Fire Protection Specialties

1.3 SUBMITTALS

A. Submit manufacturer's catalog data indicating type, weight and rating of Automated External Defibrillator, type of cabinet, fastenings, supports and anchorage in wall, clearances and connections to adjacent construction.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. HEARTSINE: 121 Friends LN Ste. 400, Newtown, PA 18940
Phone No.: 215-860-8100
B. Cardiac Science: 500 Burdick Pkwy, Deerfield, WI 53531
Phone No.: 608-764-1919
C. Defibtech Lifeline: 741 Boston Post Rd., Guilford, CT 06437
Phone No.:866-333-4248

2.2 AUTOMATED EXTERNAL DEFIBRILLATORS

A. Infant/Childcare application
B. Fast Response Kit
C. Fully Auto AED

1. Provide at locations as indicated on Drawings.

2.3 AUTOMATED EXTERNAL DEFIBRILLATOR CABINETS

A. Refer to Section 10 14 16 for Interior Signs requirement.

1. Provide Semi-recessed Cabinets to be ADA compliant for projection into corridors and/or accessible path of travel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Deliver Automated External Defibrillators and accessories to Owner's Representative for installation in cabinets after substantial completion.

B. Mounting height shall be as follows:

1. Mount: 48" from finish floor to center line of access door latch of cabinet.

END OF SECTION

SECTION 10 74 40 - EMERGENCY KEY BOX

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Fire Department Key Box.

1.2 SUBMITTALS

A. See Division 1 Sections for submittal procedures.

B. Product Data: Provide manufacturer's product literature.

C. Shop Drawings: Indicate installation instructions and key box location.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver key boxes to project site in manufacturer's original shipping container.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Knox Company: 1601 W. Deer Valley Road, Phoenix, AZ 85027
Phone No: 800-552-5669

B. GLOBAL INDUSTRIAL: 2119 North I-35E Building 3, DeSoto, Texas 75115
Phone No.: 888-978-77569

C. RAMSET Fire Access Box: 7613 Katy FRWY Houston, Texas 77024
Phone No.: 713-330-3333

2.2 APPLICATIONS

A. Emergency key box located for use of the Fire Department.

1. Base Product: KNOX BOX; Eagle M-2010 Fire Emergency lock box prepared Knox key ready or approved equal model.
2. Location: Locate on front entry gate as instructed by Architect.
3. Warranty: Minimum two (2)- years manufactures coverage.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that surrounding components are complete and are acceptable for installation of emergency key boxes.

3.2 INSTALLAT ION

A. Install in accordance with manufacturer's instructions.

3.3 TOLERANCES

A. Maximum Variation from true position: 1/8 inch in any direction.

3.4 ADJUSTING

A. Adjust hinged door for smooth operation.

3.5 CLEANING

A. Clean emergency key box after installation.

3.6 PROTECTION

A. Protect installed emergency key box from subsequent construction operations.

END OF SECTION

SECTION 10 75 00 - FLAGPOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

A. This Section includes ground-set flagpoles made from aluminum.

1.3 RELATED WORK OF OTHER SECTIONS

A. Coordinate work of this Section with work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the work of other Sections.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide flagpole assemblies, including anchorages and supports, capable of withstanding the effects of wind loads, determined according to NAAMM FP 1001, "Guide Specifications for Design of Metal Flagpoles."

1. Base flagpole design on nylon or cotton flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.
2. Basic Wind Speed: Refer to Drawings at 33 feet (10 m) aboveground.

1.5 SUBMITTALS

A. Product Data: For each type of flagpole required.

B. Shop Drawings: Include elevations and details showing general arrangement, jointing, fittings and accessories, grounding, and anchoring and supporting systems.

1. Include details of foundation system for ground-set flagpoles.

C. Structural Calculations: For flagpoles indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Finish Samples for Verification: For each finished material used for flagpoles and accessories.

E. Qualification Data: For professional engineer.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain flagpole as a complete unit, including fittings, accessories, bases, and anchorage devices, from a single manufacturer.

1. Obtain flagpoles through one source from a single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General: Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. LONE STAR Flags and Flagpoles: 13110 Mula Ct., Stafford, Texas 77477
   Phone No.: 281- 495-2900
2. Concord American Flagpole: 4155 Patriot Dr, Suite 100, Grapevine, TX 76051
   Phone No.: 800-527-3902
3. Kronberg's Flags and Flagpoles: 7106 Mapleridge St., Houston, Texas 77081
   Phone No.: 713-661-9222

2.2 FLAGPOLES

A. Flagpole Construction, General: Construct flagpoles in one piece if possible. If more than one piece is necessary, comply with the following:

1. Fabricate shop and field joints without using fasteners, screw collars, or lead calking.
2. For tapered flagpoles, provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.

B. Height: See Drawings.

C. Flagpole Field Accessory: Provide pole mounted SOLAR FLAGPOLE DISC light as described:
   a. Model: FLAGPOLES ETC Model JY8-899 (Solar Flagpole Dis Light) color to be selected from manufacture standard offering by Architect, approved equal product may be submitted for approval.
   b. Material: ABS Body, PC lampshade, PET panel.
   c. Battery: 3.7V, 10000mAh Lithium-Ion battery.
   d. Solar Panel: 5.5V, 8.5W
   e. LED Quantity: 266pcs,1w, ultra-bright, SMD 2835 LEDs.
   f. Lumen: 4200Lm.
   g. Switch: Automatically switch on and off at dusk/dawn (with button switch).
   h. Working Time: Up to 20 hours after fully charge.
   i. Package: Color box manufacture formatted.
   j. Application: Installed on the flagpole to light down flag and pole area.
   k. IP Rate: IP65.

D. Aluminum Flagpoles: Provide cone-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/ (B 241M), Alloy 6063, with a minimum wall thickness of 3/16 inch (4.8 mm). Heat treat after fabrication to comply with ASTM B 597, Temper T6.

E. Foundation Tube: Galvanized corrugated-steel foundation tube, 0.064-inch- (1.6-mm-) minimum nominal wall thickness. Provide with 3/16-inch (4.8-mm) steel bottom plate and support plate; 3/4-inch- (19-mm-) diameter, steel ground spike; and steel centering wedges all welded together. Galvanize steel parts, including foundation tube, after assembly. Provide loose hardwood wedges at top of foundation tube for plumbing pole.

1. Provide flashing collar of same material and finish as flagpole.
2. Provide steel ground protectors extending 12 inches (300 mm) aboveground and 6 inches (150

mm) belowground for steel flagpoles where flashing collars are not provided.

2.3 FITTINGS

A. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.

1. 0.063-inch (1.6-mm) spun aluminum, finished to match flagpole.

B. Internal Winch System: Manually operated winch with control stop device and removable handle, stainless-steel cable halyard, and concealed revolving truck assembly with plastic-coated counterweight and sling. Provide flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

C. Flag Snaps: Provide two aluminum swivel snap hooks as recommended by Manufacture.

1. Provide with neoprene or vinyl covers.

2.4 MISCELLANEOUS MATERIALS

A. Concrete: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa, unless otherwise indicated.)

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

C. Sand: ASTM C 33, fine aggregate.

D. Elastomeric Joint Sealant: Single-component neutral-curing silicone joint sealant complying with requirements in Division 7 Section "Joint Sealants" for Use NT (nontraffic) and for Use M, G, A, and, as applicable to joint substrates indicated, O joint substrates.

2.5 FINISHES

A. Metal Finishes, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Aluminum: Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

1. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete.

C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms and foundation tube, sleeve, or anchor bolts in position, to prevent

displacement during concreting.

D. Place concrete immediately after mixing. Compact concrete in place by using vibrators. Moist-cure exposed concrete for not less than seven days or use nonstaining curing compound.

E. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

A. General: Install flagpoles where shown and according to Shop Drawings and manufacturer's written instructions.

B. Foundation-Tube Installation: Install flagpole in foundation tube, seated on bottom plate between steel centering wedges. Plumb flagpole and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch (50-mm) layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION

SECTION 11 40 00 – COMMERICAL KITCHEN APPLIANCES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Commercial appliances of the following types:

1. Electric Restaurant Range with Oven.
2. Freezer & Refrigerator Combination.
3. Free Standing Electric Fryer.
4. Free Standing Icemaker.

1.2 RELATED DIVISIONS AND SECTIONS

A. Section 06 20 00 – Finish Carpentry.

1.3 REFERENCES

A. ANSI A117.1 - Guidelines for Accessible and Useable Buildings and Facilities.

B. EPA - Energy Star Appliances.

C. Public Law 101-336 - Americans with Disabilities Act.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Model number and selected options for each appliance.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation methods.
5. List of maintenance parts.

C. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with referenced standards and the Americans with Disabilities Act as applicable for fixtures for the disabled.

B. Coordinate rough-in requirements with adjacent construction. Coordinate components and

fittings to ensure compatible parts are installed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Provide manufacturer's standard written warranty for each type of appliance specified.

PART 2 PRODUCTS

2.1 MANUFACTURERS

1. Royal Range of California, Inc: 54 03 Kirby Dr., Houston, Texas 77005
   Phone No.: 713-526-1491

2. Everest Refrigeration: 1950 Hurd Dr., Irving, Texas 75038
   Phone No.: 214-792-9133

3. Vulcan (division of ITW Food Equipment Group LLC): 12922 Hempstead HWY,
   Houston, Texas 77040
   Phone No.: 713-690-1231

4. Atosa: 407 113th St., Arlington, Texas 76011
   Phone No.: 817-385-0894

B. AHAM Standards: Provide appliance that comply with AHAM Standards.

2.2 APPLIANCES

A. Electric Restaurant Range with Oven:
- Royal Range: RRE-4GT12
- Dimensions: 36” W x 32” D x 56 1/2”H
- Motor Power Consumption –
- Voltage Wires / Circuit Breaker –
- Color: Stainless Steel

1. Base Product: Royal Range of California, Inc (Reference local location above).

2. Manufacturers:

   a. BOSCH: 840 Airport FWY, Hurst, Texas 76054
      Phone No.: 1-800-803-9202
   b. GE Company:1011 Isuzu PKWY Ste. 200, Grand Prairie, Texas 75050
      Phone No.: 972-623-4600

B. Freezer – Refrigerator Combination:
- Everest EBRF2 (Dual Doors)
- Freezer Capacity: 22 Cu. Ft.
- Refrigerator Capacity: 22 Cu. Ft.
- Dimensions: 54-1/8" W x 33-1/8" D x 82"H (Electric)
- Outlet: 9 ft long NEMA 5-15P plug
- Power: 115V-60Hz-Ph1
- Horsepower: 1/4+ (R), 1/2 (F)

1. Base Product: Everest Refrigeration (Reference local location above).

2. Manufacturers:

   a. Beverage Air: P.O. Box 1148 Lake Dallas, Texas 75065
      Phone No.: 940-321-2588
   b. Kitchen Aid: 4901 Alpha Rd., Ste 100, Dallas, Texas 75244
      Phone No.: 214-306-6900

C. Free Standing Electric Fryer:
- Vulcan Model 1ER85AF, Solid state analog knob controls.
- Dimensions: 21" w x 34 3/8" d x 39 7/16 h, working height is 35 3/4"
- Stainless Steel
- Built-In filter system

1. Base Product: Vulcan (Reference local location above).

2. Manufacturers:

   a. Frymaster, LLC.: 8700 Line Avenue, Shreveport Louisiana 71106
      Phone No.: 1-318-865-1711
   b. Kitchen Aid: 1401 Shepard Dr., Houston, Texas 77007
      Phone No.: 868-36-11

D. Free Standing Icemaker:
- Atosa Model YR450-AP-161, 460 lbs production capacity (per 24 hrs)
- Built-in storage bin capacity of 395 lbs
- Stainless Steel Exterior
- Refrigerant: R-290
- Slanted black plastic bin door
- Air cooled condenser
- Requires use of a drain.
- Water Filter recommended
- NSF listed
- Removable air filter

1. Base Product: Atosa (Reference local location above).

2. Manufacturers:

   a. Texas Ice Machine Company: 729 3rd Ave., Dallas, Texas 75226
      Phone No.: 214-826-1887
   b. Commercial Ice Maker: 501 E 2nd St., Odessa, Texas 79761
      Phone No.: 1-800-592-4545

PART 3 EXECUTION

3.1 EXAMINATION

1. Do not begin installation until substrates have been properly prepared. Coordinate rough-in with appliance sizes and utility requirements.

2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

1. Clean surfaces thoroughly prior to installation.

2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

1. Assemble appliances and trim and install in accordance with manufacturer's instructions and the following:

    1. Securely mount to substrate.

    2. Install appliances plumb and level and in proper relationship to adjacent construction.

    3. Connect appliances to building utility, supply and waste systems as applicable.

    4. Test for proper operation and drainage. Adjust until proper operation is achieved.

3.4 PROTECTION

1. Protect installed products until completion of project.

2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 11 40 11 STAINLESS STEEL FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies custom-fabricated food service equipment as follows:

1. Prep and scullery sinks.
2. Tables.
3. Shelving.

1.2 RELATED WORK

A. Section 22 13 00, FACILITY SANITARY SEWERAGE.

1.3 QUALITY CONTROL

A. Manufacturer Qualifications: Approved by NSF International (NSF) for manufacturing items indicated.

B. Installer Qualifications: Experienced in food service equipment installation or supervised by an experienced food service equipment installer.

1. Where required to complete equipment installation, plumber shall be licensed in jurisdiction where project is located.

C. NSF Compliance: Equipment bears NSF Certification Mark or UL Classification Mark indicating compliance with NSF/ANSI 2.

D. Plumbing Fixture Fittings: Comply with ASME A112.18.1.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Shop Drawings: Show dimensions, method of assembly, installation and conditions relating to adjoining work which requires cutting or close fitting, reinforcement, anchorage, and other work required for complete installation.

C. Operating Instructions: In accordance with requirements in Section 01 00 00, GENERAL REQUIREMENTS.

1.5 WARRANTY

A. Warrant food service equipment to be free from defects in materials and workmanship in accordance with requirements of "Warranty of Construction".

1.6 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. ASME International (ASME):
A112.18.1-11 Plumbing Fixture Fittings

C. ASTM International (ASTM):
A554-16 Welded Stainless Steel Mechanical Tubing
A666-15 Annealed or Cold-Worked Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar

D. National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500-06 Metal Finishes Manual

E. NSF International/American National Standards Institute (NSF/ANSI):
2-10 Food Equipment

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. ADVANCE TABCO: 200 Heartland Boulevard, Edgewood, NY 11717-8380
Phone No.: 800-645-3166

B. TEXAS RESTURANT EQUIPMENT: 12922 Hempstead Rd., Houston, Texas 77040
Phone No.: 713-690-1231

C. STAINLESS STEEL CUSTOM FABRICATORS, Inc.: 2116 Almeda – Genoa
Houston, Texas 77047
Phone No.: 713-433-0495

2.2 **STAINLESS STEEL EXTERIOR (ADA) COUNTER, WALL MOUNTED SHELVING**

A. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304, stretcher leveled.

B. Tube: ASTM A 554, Grade MT-304.

C. Finishes: Comply with NAAMM's AMP 500-505, Metal Finishes Manual. Grind and polish surfaces to produce uniform, directional textured, polished, free of cross scratches. Run grain with long dimension of each piece.
1. Exposed Surfaces: No. 4 finish (bright, directional polish).
2. Concealed Surfaces: No. 2B finish (bright, cold-rolled, unpolished finish).

2.3 **TABLES**

A. Stainless Steel Work Table: Base Product- “SAUBER”; ITEM #PA0372 or approved equal.
a. Size: 72” W X 30” D X 36” H work table.
b. Top: 18 Gauge 430 series stainless steel top.
c. Galvanized adjustable undershelf and hat channel, 18 gauge
d. Galvanized 1-5/8” diameter leg and socket with lockable wheel casters.
e. NSF approved.

2.4 SINKS

A. Prep and Scullery Sinks: Base Product- “ADVANCE TABCO”; MODEL #93-3-54-18RL or approved equal.
   a. Size: 16-gauge 304 stainless steel 91” W X 27” D X 42” H 3-Compartment sink.
   b. 3- tub, 20” x 16” x 14”, 18” left and 18” right drainboards.
   c. 18-gauge 1 5/8” Dia. stainless steel legs stainless steel socket, stainless steel bullet foot with “H” shape 20-gauge leg bracing.
   d. 3.5” drain basket included.
   e. Sink and bowel,16gauge, 304 stainless steel.
   f. Top backsplash 16-gauge, 304 stainless steel.
   g. 1-1/2” faucet holes on 8” centers.
   h. NSF approved.

2.5 WALL MOUNTED SHELVING**:** REFERENCE DRAWINGS AND SPECIFICATIONS, CLAUSE PART 2.2 STAINLESS STEEL GENERAL.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install custom-fabricated equipment level and plumb; arranged for safe and convenient operation; with access clearances required for maintenance and cleaning.
B. Interconnect equipment to service utilities.

3.2 CLEAN-UP

A. At completion of the installation, clean and adjust custom-fabricated equipment as required to produce ready-for-use condition.
B. Where stainless-steel surfaces are damaged during installation procedures, repair finishes to match adjoining undamaged surfaces.

3.3 INSTRUCTIONS

A. Instruct personnel and transmit operating instructions in accordance with requirements in Division 01 GENERAL REQUIREMENTS.

END OF SECTION

SECTION 11 66 23 - GYMNASIUM RETRACTABLE SPORTS CAGE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Indoor Gymnasium bottom lift retractable sports cage

1.2 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Secondary structural members supporting gymnasium equipment.
B. Section 26 27 26 - Wiring Connections.

1.3 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
B. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and supplements.
C. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Large Components: Ensure the large components can be moved into final position without damage to other construction.
B. Electrically Operated Equipment: Coordinate location and electrical characteristics of service connection.

1.5 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's data showing configuration, sizes, materials, finishes, hardware, and accessories; include:
    1. Electrical characteristics and connection locations.
    2. Fire rating certifications.
    3. Manufacturer's installation instructions.
C. Shop Drawings: For custom fabricated equipment indicate, in large scale detail, construction methods; method of attachment or installation; type and gage of metal, hardware, and fittings; plan front elevation; elevations and dimensions; minimum one cross section; utility requirements as to types, sizes, and locations.
D. Erection Drawings: Detailed dimensional requirements for proper location of equipment.
E. Samples: Submit samples of curtain materials in manufacturer's available range of colors.

F. Operating and maintenance data, foreach operating equipment item.
G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
B. Installer Qualifications: Company specializing in performing work ofthe type specified with minimum two years of experience.

1.7 WORK BY OTHERS

A. Electric conduits, wiring, and disconnect. Boxes to connect topower supply and remote mount key switches at hand height within unobstructed line of site to curtain. Permanent connections from disconnect to control box and from control box to motor.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the project site in manufacturer's original packaging with factory original labels attached.
B. Store products indoors and elevated above the floor; prevent warping, twisting, or sagging.
C. Store products in accordance with manufacturer's instructions; protect from extremes of weather, temperature, moisture, and other damage.

1.9 WARRANTY

A. Gymnasium retractable sports cage netting shall be warranted free of defects in material and workmanship for a period of one (1) year.
B. Gymnasium retractable sports cage motor and hardware shall be warranted for a period of three (3) years against all defects of material and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. Grand Slam Safety, LLC: 9793 Bridge St., Croghan, NY 13327
   Phone No.: 315-301-4039
2. NETS OF TEXAS: P.O. Box 1776 Cypress, Texas 77410
   Phone No.: 281-374-0506
3. Lone Star Nets: 220 W. Jefferson Blvd., Ste A, Dallas, Texas 75208
   Phone No.: 817-521-3495

2.2 GYMNASIUM RETRACTABLE SPORTS CAGE

A. Supply and install one electrically operated **GSS BC101** bottom lift retractable sports cage as manufactured by ***Grand Slam Safety, LLC.*** or an approved equal to be complete in all respects with operating motor and controls.

B. Other suppliers or manufacturers wishing to bid products other than product specified herein shall submit to the Architect 7 days prior to the bidding a list of 3 past installations similar to the proposal, complete catalogue data along with deviations from the product specified. The manufacturer guarantees the proposed substitute product to comply with the product specified and as detailed on the drawings unless the deviations are so noted in the submittal for approval.

2.3 MATERIAL AND FABRICATION

A. The cage shall be formed of 4 walls and a ceiling panel. All edges to be rope bound with a continuous bottom pocket on 4 sides to be sewn with hook and loop end closures and spur grommets for take up locations. Fullness in the netting is added for height and width to accommodate the size and allow for natural stretch of the netting.

B. The top of the cage has rope bound edges to attach to support the frame via straps, and the bottom pocket to accommodate 1-¼" diameter pipe. There are to be grommet tabs on 10'-0" centers spaced not greater than 48" apart vertically to allow routing of lifting cables. The manufacturer may decide to alter these dimensions to best suit cage size.

C. The bottom pipe shall be flexible to allow the cage to form to the shape of the building structure.

2.4 DESIGN CRITERIA

A. The cage shall have the following material options and characteristics: White or black in color
   1. #42 Knotted nylon netting with NFPA 701 FR rating 1-¾" mesh or #36 Knotted nylon netting with NFPA 701 FR rating 1-¾" mesh or #21 Knotted nylon netting with NFPA 701 FR rating 7/8" mesh or Custom netting options are available.
   2. Rope edges to be ¼" twisted sash cord.
   3. Vinyl pockets to be 18oz vinyl coated nylon with NFPA 701 FR rating. Additional color options are available for the vinyl. See manufacturer's color options.

B. Access doors will be 4' wide flap (overlap) style doors. 2 doors will be supplied at opposite corners with flaps extending along the side walls.

C. Grommet tabs will be installed on the ceiling netting panel to reduce pillowing of the netting and also to eliminate direct contact between metal surfaces and the netting.

D. Grommet tabs will be used in lieu of d-ring or o-rings for the take up cables to eliminate the direct contact between metal components and the netting and to maintain the cable lift points outside the netting system away from harm.

E. The cage shall be bottom lift, i.e., the lifting cables shall be attached to the bottom frame. As the batting cage system is raised the netting shall stack between the bottom and top frames. This relieves added time, hassle, tears, and catch points from draping the netting over the top frame required for storing most vertical lift or retractable batting cages.

2.5 RAISING AND LOWERING MECHANISM

A. The 2HP-208v-3 phase, centrally located motor drive unit shall be equipped with magnetic contactors and overload that can stop, start and reverse from any position and electric brake and travel limit switches. The manufacturer may substitute alternative HP to suit cage size. Other voltages and phase motors available, contact manufacturer.
B. Drive shaft shall measure 1" equipped with individual pulleys for each take up line. The pulleys range from 25 times the cable diameter and increase according to accommodate the desired stacked profile.
C. Operating control shall be spring loaded type key switch mounted within eyesight of the cage system.
D. Lifting cables to be ⅛" 7x19 aircraft cable.
E. All exposed hardware is to be zinc plated, powder coated, or painted to color match as required by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION AND MEASUREMENT

A. When the job is sufficiently advanced to permit the installation of the gymnasium sports cage, visit the site and check the actual conditions where the partition is to be installed, to ascertain whether the preparation work by the preceding trades is acceptable.
B. Check and record all dimensions that affect the manufacture and installation of the units. Incorporate these dimensions into the Shop Drawings.
C. Delivery to the job site shall be coordinated by the Contractor. Proper storage of the cage before installation and continued protection during and after installation shall be the responsibility of the Contractor.

3.2 INSTALLATION

A. Install bottom lift retractable sports cage straight and level and adjust movable parts for smooth operation. Follow manufacturer's drawings for sloped, peaked, or arched installations.
B. Clean soiled surfaces with cleaners compatible with finished surfaces.
C. A factory trained installer shall carry out this installation.
D. Electrical Contractor will provide electrical connections and power.

3.3 OPERATION

A. The bottom lift retractable sports cage shall be capable of being stacked at the top of the opening between joists or under joists as required.
B. A single person shall easily operate the bottom lift retractable sports cage system.

END OF SECTION

SECTION 11 68 00 – ATHLETIC FIELD EQUIPMENT

PART 1 GENERAL

1.1 WORK INCLUDED

A. Provide all equipment and materials and do all work necessary to furnish and install the athletic equipment, as indicated on the drawings and as specified herein. Athletic equipment shall include, but not be limited to:

1. Light Pole Protective Padding

1.2 RELATED WORK

A. Examine contract documents for requirements that affect work of this section. Other specification divisions and sections that directly relate to the work of this section include, but are not limited to:

1. Division 03 – Concrete; Sections: Cast-in-Place Concrete
2. Division 31 – Earthwork; Sections: Excavation and Backfill and Establishment of Sub-Grade Elevations
3. Division 32 – Exterior Improvements; Sections: Athletic and Recreational Surfacing, Concrete, and other Site Improvements.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. National Federation of State High School Associations (NFHS)
2. ASTM International
3. American Sports Builders Association (ASBA)
4. Manufacturers Data and Recommended Installation Requirements

1.4 SUBMITTALS

A. Manufacturers Product Data

1. Provide manufacturers product data prior to actual field installation work, for Architects or Owners representatives review.

B. Shop Drawings

1. Provide drawings of the manufacturers recommended installation and foundation requirements prior to actual field installation work, for Architects or Owners representatives review.

1.5 QUALITY ASSURANCE

A. Manufacturers warranties shall pass to the Owner and certification made that the product materials meet all applicable grade trademarks or conform to industry standards and inspection requirements.

1. Warranty: General Contractor to provide one (1)- year performance coverage period.
2. Manufacture: Manufacture to provide two (2)-year product coverage.

1.6 PRODUCT DELIVERY AND STORAGE

A. Materials delivered to the site shall be examined for damage or defects in shipping. Any defects shall be noted and reported to the Owners representative. Replacements, if necessary, shall be immediately re-ordered, so as to minimize any conflict with the construction schedule. Sound materials shall be stored above ground under protective cover or indoors so as to provide proper protection.

PART 2 PRODUCTS

2.1 LIGHT POLE PROTECTIVE PADDING

A. Base Product: Light Pole Protective Padding as Manufactured by: Sportsfield Specialties, Inc.

2.2 MANUFACTUERS

1. BSN Sports: 14460 Varsity Brands Way, Farmers Branch, Texas 75244
Phone No.: 866-661-0944
2. Sportsfield Specialties, Inc.: 155 Boyce Dr., Mocksville, NC 27028
Phone No.: 704-637-2140
3. Post Guard: 37525 Interchange Dr., Farmington Hills, MI 48335
Phone No.: 866-737-8900

2.3 COMPONENTS:

A. Light Pole Protective Padding
1. Hexagonal Dimensions: Diameter varies x 6’-0” Height x 2” Thick
2. Outdoor Vinyl Encasement:
a. High UV Resistance
b. Total Weight: 18 oz./yd^2 (ASTM D3776)
c. Construction: 84% Vinyl Coating, 16% Polyester Fabric (ASTM D751)
d. Tongue Tear: Warp 93 lbs., Fill 68 lbs. (ASTM D751)
e. Grab Tensile: Warp 232 lbs., Fill 213 lbs. (ASTM D751)
f. Adhesion: Warp 28 lbs/in, Fill 40 lbs/in (ASTM D751)
g. Abrasion: > 1000 Cycles (ASTM D3389-94)
h. Cold Crack: -49° F (ASTM D2136)
i. Rot, Mildew and Fungus Resistant
j. Flame Resistant
k. Various Standard Colors to be submitted.
3. 2” Thick High Density Polyethylene Cross-Link Closed Cell Foam
a. Density: 1.7 pcf

b. Tensile Strength: 20 psi
c. Elongation: 95%
d. Tear Resistance: 7 lb/in
e. Compression Strength:
    1. @ 25% psi: 4 psi
    2. @ 50% psi: 7 psi
f. Compression Set: 29% of Original Thickness
g. Thermal Stability: < 0.5% of Change @ 158°F for 22 hrs.
h. Thermal Conductivity: 0.20 btu/hr/inch ft/°F
i. Working Temperature Range: -70 °F to 175 °F
j. Water Absorption: <0.06 lb/ft2/°F
k. Flammability: Pass (MVSS302)

4. Factory Sewn Hook and Loop Vertical Closure

PART 3 EXECUTION

3.1 INSTALLATION OF EQUIPMENT

A. All Light Pole Protective Padding shall be installed as recommended per manufacturer's written instructions and as indicated on the drawings. Installer should have a minimum of five (5) protective padding project installations.

END OF SECTION 11 68 00

SECTION 11 68 33 – BASEBALL FIELD EQUIPMENT

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:

1. Exterior Baseball Field Equipment.

a. Baseball Bases
b. Home Plate
c. Pitching Rubber
d. Pitching Machines
e. Pitcher's Safety L-shape Screen
f. Green 6'x12' Home Plate Batting Stance Mat
g. Foul Poles
h. Distance Markers
i. Privacy Slats

1.2 SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Submittal Procedures:

1. List of proposed products and product data
2. Shop drawings showing dimensions, construction and connection details, and foundations
3. Copy of Warranty
4. Manufacturer's Installation Instructions
5. Operation and Maintenance Manual
6. Manufacturers standard color offering finish charts.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. Baseball bases, Home Plate and Pitcher's/Pitching Rubber:

1. Baseball Express: 1003 E Nakoma St. Ste 104, San Antonio, Texas 78216
Phone No.:210-525-9161
2. BSN Sports:14460 Varsity Brands Way, Framers Branch, Tx 75244
Phone No.:866-661-0944
3. Beacon Athletics: 8233 Forsythia St., Suite #120, Middleton, WI 53562
Phone No.:800-747-5985

B. Pitching Machine, Pitcher's Safety Screen (L-shape), Green 6'x12' Home Plate Batting Stance Mat:

1. JUDS SPORTS: P.O. Box 365, Tualatin, Oregon 97062
Phone No: 1-800-547-8843
2. OAKS BATTER UP: 320 W. Tidwell Rd., Houston, Texas 77091
Phone No: 713-959-2323

3. Beacon Athletics: 8233 Forsythia St, Suite #120, Middleton, WI 53562
   Phone No.: 1-800-747-5985

C. Foul Poles:
   1. PYT Sports: 9015 Odell Avenue, Bridgeview, IL 60455
      Phone No.:708-634-2099
   2. BSN Sports:14460 Varsity Brands Way, Framers Branch, Texas 75244
      Phone No.: 866-661-0944
   3. NETS OF TEXAS: P.O. Box 1776 Cypress, Texas 77410
      Phone No.: 281-374-0506

D. Distance Markers:
   1. PYT Sports: 9015 Odell Avenue, Bridgeview, IL 60455
      Phone No.: 708-634-2099
   2. US Games: P.O. Box 7726, Dallas, Texas 75209
      Phone No.: 1-800-405-3490
   3. BSN Sports:14460 Varsity Brands Way, Framers Branch, Texas 75244
      Phone No.: 866-661-0944

E. Privacy Slats:
   1. Your Fence Store: 130 W 700 S, Smithfield, UT 84335
      Phone No.: 435-563-0259
   2. Fence Screen: 2880 113th – Bldg. #200, Grand Prairie, Tx (Distribution Center)
      Phone No.: 877-480-6030
   3. Western Fence Company: 16221 Aldine Westfield Rd., Houston, Texas 77032-1307
      Phone No.: 713-688-3435

2.2 PRODUCTS

A. Baseball Bases:Base Product: Rogers Break Away Base set for adult level players.
   1. 3 Break Away Base systems per field
   2. Base Plates
   3. Base Tops
   4. Anchor kits & hardware

B. Home Plate: Base Product; Rogers One Time Home Plate
   1. Replaceable top Plate
   2. Beveled Collar
   3. Home Base Anchor
   4. Steel Pin & Rubber Plug

C. Pitching Rubber: Base Product; Rogers 4-Sided Pitching Rubbers
   1. Four-sided pitcher’s rubber made of high quality, skid resistant rubber and UV inhibitors.

2. Hollow aluminum interior cores can be filled with concrete or dirt to maximize strength, support and longevity.

D. Pitching Machine Types: Base Products
   1. JUGS MVP Combo Baseball/Soft Ball pitching machine.
   2. Bata-2 Baseball/Softball pitching machine with following operational features or approved equal apparatus's:
      a. Throws at 25 – 100 mph
      b. Portable set up.
      c. Throws Pop-Up and Fly Balls.
      d. 3-way swivel head
      e. Digital Speed readout for quick and easy speed adjustments.
      f. Heavy-duty steel construction.
      g. Motor-1/4 horsepower, 3 amps function.
      h. Operational standard 110-volt.
      i. Provide performance Warranty 10-year written guarantee parts and operating components.
      j. Activity function available for age groups 6 year –18-year-old.

2.3 FOUL POLES.

A. Provide heavy-wall 3 ½" OD steel tubing, 20'-0" above ground (1'-6" x 12'-0" steel wing panel) with zinc undercoating and powder coat finish. Color to be selected from Manufacture standard offerings.

2.4 OUTFIELD DISTANCE MARKERS (METAL).

A. Base Product: PYT Sports

B. Provide horizontal distance markers, heavy-duty metal, predrilled holes, 16" height letters using Rockwell Extra Bold font applied to metal panel 18" x 36" in size.

2.5 PRIVACY SLATS.

A. Provide chain link fence privacy slats for 85% privacy factor and wind load. Field verify size of existing chain link fence diamonds and existing fence height. Slats to be High Density Polyethylene (HDPE) and have UV inhibitors to add color protection and guard against cracking, chalking and fading in the sunlight. Slats shall be resistant to severe weather conditions, salt water, sand, alcohol, alkaline, ammonia and common environmental pollutants. Provide Manufacturer's 25-year limited pro- rata warranty.
   1. Your Fence Store – Model: Feather Lock Fence Slat, Green
   2. Fence Screen: Model: 3000 Series W Slat, Bottom Lock, Emerald Green

PART 3 - EXECUTION

3.1 INSTALLATION

A. Field assemble and install equipment in accordance with manufacturer's written instructions.

B. Coordinate installation

C. Remove protective wrappings, wash surfaces, and attach.

END OF SECTION

SECTION 11 68 43 NEVCO, INC. MODEL 1610 W SCOREBOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Exterior, electronic scoreboard[s] including control center and other accessories for complete functional installation.

1. Section 03 30 00 Cast-in-Place Concrete: Concrete footings for posts supporting scoreboards.
2. Section 05 12 00 Structural Steel: Steel posts and other structural framing to support scoreboards.
3. Section 26 05 26 Grounding and Bonding: Grounding of scoreboard and support structure.
4. Section 26 20 00 Low Voltage Electrical Distribution
5. Section 27 41 16 Integrated Audio-Video Systems

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Publications:

1. ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
2. ASTM A6 – Steel Shapes

B. National Electrical Code (NEC).
C. Federal Communications Commission, Part 15 Rules & Regulations, EN60950-1, EN55022 & EN55024.
D. UL and C-UL Standard for Electric Signs

1.3 SUBMITTALS

A. Provide in accordance with Section 01 33 00 - Submittal Procedures:

1. To minimize the environmental impact of multiple paper copies, product installation prints, instructions and diagrams of manufacturer will be submitted in a paperless fashion. The end user shall receive all pertinent hard-copy documentation at delivery.
2. Product data for scoreboards, controls, and accessories shall include descriptions of control functions etc.
3. Installation drawings, face layout, dimensions, construction, electrical wiring diagrams, and method of anchorage. (Paperless when applicable).
4. Copy of guarantee required by Paragraph 1.5 for review by Architect. (Paperless when applicable).
5. Manufacturer's installation instructions. (Paperless when applicable).
6. Finish Samples.

1.4 QUALITY ASSURANCE

A. Source limitation: All components including scoreboard, control center, control cable, and other accessories and installation hardware shall be products of a single manufacturer.
B. Manufacturer qualifications: Company specializing in manufacturing electronic scoreboards with 10 years minimum successful world-wide experience.
C. Scoreboards shall be designed for exterior installation with weatherproof housing and optical isolation circuitry to reduce potential damage from electrical storms.
D. Should service be necessary, specialized personnel shall not be required. Modular “plug and play” components will be housed in an internal protective enclosure.
E. Scoreboards and other electrical components shall be certified for use in United States and Canada by Underwriter Laboratories, (UL) Inc. and shall bear either UL or C-UL label only.

F. Scoreboards and other electrical components shall be electrically grounded in accordance with National Electrical Code (NEC), Article 600.
G. Scoreboard cabinetry and attachment shall meet or exceed the 2009 IBC standard of 150 mph wind loading.

1.5 GUARANTEE

A. Provide under provisions of Section 01 78 00 - Closeout Submittals: Guarantee to cover defects in materials and workmanship.

1. Scoreboards, scoring tables, marquees, message centers, video boards* and Stadium Pro loudspeaker enclosures are guaranteed for a period of five (5) years from the date of invoice against defects in workmanship or materials. **Video Board exclusions include 8815, 8825, 8835, 8845.

2. Wireless components, portable scoreboards and solar power kit carry a two (2) year guarantee from date of invoice. Hand-held controls and switches carry a one (1) year guarantee from date of invoice. The Stadium Pro loudspeaker front printed scrim is guaranteed for one (1) year from the date of invoice. Video Board Models 8815, 8825, 8835, and 8845 are guaranteed for one (1) year from date of invoice, unless additional years of warranty is purchased. For products supplied by third-party suppliers (i.e. cameras, computers, computer monitors, radar guns, loudspeakers, amplifiers and associated electronics), Purchaser agrees to accept the manufacturer's warranty, if any, in lieu of any warranty by Nevco.

3. Lifetime telephone support.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Nevco, Inc., 301 East Harris Avenue, Greenville, Illinois 62246; 800-851-4040; www.nevco.com.
B. No Product Substitution.

2.2 MATERIALS

A. Aluminum faces and perimeter frame: Fabricated from .050 minimum thickness, ASTM B221 aluminum sheet with reinforcement and slotted mounting brackets top and bottom.
B. Finish: Acrylic polyurethane paint. Color as selected by Architect from manufacturer's standard range.
1. Provide striping, colors as selected by Architect from manufacturer's standard range, to separate scoreboard features.
C. Brackets: Integrated universal bracket system.
D. Fasteners, anchors, and other exposed hardware: Corrosion resistant.
E. Electronics: Low voltage, solid state, 2-wire cable, multiplex system, quartz crystal controlled.
F. Provide gold plated electrical contacts on interconnecting wiring to reduce corrosion and improve reliability.
G. Provide optical communication circuitry to reduce threat of damage from electrical storms and ESD.
H. LED (light emitting diode) units: Seven-bar, segmented digits with protective aluminum cover, rated typical life 100,000 hours and be designed to provide excellent visibility from all angles and sides.
I. Junction boxes where required: Sheet metal box and cover, 4-1/2 x 2-1/8 x 2-1/8 inches min. complying with NEMA standards.
J. Gasketed Digits: Digit faces shall contain an integrated seal to guard against moisture intrusion.

2.3 SCOREBOARD

A. **Type**: **Exterior**, electronic baseball scoreboard with LED displays for inning and scores and LED indicators for balls, strikes, and outs; Model 1610 as manufactured by Nevco.

1. Size: 10 feet long x 4 feet high x 8 inches deep.
2. Approximate weight: 115 pounds
3. White on black captions: 8 inches high "HOME", "GUESTS", "INNING", "BALL", "STRIKE", and "OUT".
4. High Intensity Translucent White LED displays, 18 inches high digits: Inning and team Scores.
5. High Intensity Translucent White LED circular indicators: 3 for balls, 2 for strikes, and 2 for outs.
6. Power requirement:
    a. POWER (Translucent White): 120 VAC, 1.2 Amps, 50/60 Hz. / 240 VAC, 0.6 Amps, 50/60 Hz. Requires earth ground.

2.4 ACCESSORIES

A. Additional available accessories include but are not limited to; please specify if required.

1. Protective Nets.
2. ETN Electronic Team Names
3. Nevco “A”, “ADO”, or “ADL” signs including Artwork.
4. Nevco 9605 Time display.
5. Nevco Full Color, Red or Amber Message Centers.
6. Pitch Count Display.
7. Pitch Timer.
8. Nevco Video Displays.

2.5 CONTROL CENTER

A. **Type: Wireless**, microprocessor based operator's control center designed to operate different models of scoreboard by interchange of keyboard overlay; Model MPCW7 as manufactured by Nevco Inc. Console will operate earlier scoreboards from Nevco Inc.

1. Console: High impact, break-resistant black plastic with improved UV resistance. 11 x 9-1/2 x 4-1/8 inches
2. Features:
    a. Provide with LED displays, lithium cell battery backup to maintain scoreboard memory and time of day, self-test mode, power on-off switch, alternate time control, and multiple scoreboard operation.
    b. Split and raised 40 key soft touch keyboard.
    c. Keyboard shall be spill resistant.
    d. Internal beeper acknowledging each entry
    e. System Profiles feature set all parameters of operation including choice of controlled accessories and scoreboards.
    f. Colorful graphic rich keyboard overlays for scoreboard or accessory.
    g. Remote hand-held main time switch with programmable integral horn button.
    h. 25 feet control cable with connectors.
    i. Timer features: Time of day display, multiple time out timers with warning, interval horn, up-count auto stop with horn, 1/10th second display during last minute, changeable horn tone on scoreboards with the feature.
    j. Segment timing for practice and workout.
    k. Dimmer control for scoreboard.

l. MPC features shall be accessed through yes/no abbreviated questions in a drop down menu format.
m. Multiple receiver management shall be accomplished through direct keyboard input.
n. Electronic Team Names and automatic Electronic Caption Plates shall be controlled from MPC control without need to change overlays.

3. Power requirements: 120 volts, 12 watts, 50/60 Hz.
4. Provide option of battery supply for control operation if utility power not available.
5. Provide carrying case for control center, cable, and hand-held switch; Model CC-3 as manufactured by Nevco Inc.
   a. Size: 18-1/2 x 14-1/2 x 6 inches
   b. Construction: Double wall, high density black polyethylene with padded interior, mechanical latches, and hinges.
6. Receiver WHEN ORDERED SEPARATELY;
   a. Sturdy impact resistant construction, 6 x 4 x 1.5 inches
   b. Integrated antenna, mounted flush in scoreboard face. Protruding antennas shall not be used.
7. Maximum range: 1,000 feet from control center to receiver.
8. Receiver shall require no additional source of power or separate control cable.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify exact scoreboard and control center quantities and junction box locations with Architect.
B. Coordinate requirements for electrical power, concrete, steel erection, auxiliary framing and supports, suspension cables, and other components to be provided under other Specification Sections to ensure adequate provisions are made for complete, functional installation of scoreboards.
C. Coordinate scoreboard electrical requirements to ensure proper power source, conduit, wiring, and boxes are provided. Prior to installation, verify type and location of power supply.

3.2 INSTALLATION

A. Install scoreboards and accessories in accordance with manufacturer's instructions and approved installation drawings.
B. Before installation, field test scoreboards and accessories for operating functions. Ensure that scoreboards accurately perform all operations. Correct deficiencies.
C. Rigidly mount scoreboards and accessories level and plumb with brackets and fasteners.
D. Clean exposed surfaces.
E. Protect scoreboards and finishes from other construction operations.

3.3 DEMONSTRATING AND TRAINING

A. In accordance with Section 01 75 00 - Starting, Adjusting, and Demonstrating, provide demonstration and training session for Owner's representative covering operation and maintenance of electronic scoreboard.

END OF SECTION

SECTION 12 93 00 SITE FURNISHINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site furnishings of the following types:
1. Benches.
2. Bike racks.
3. Trash Receptacles.

1.2 RELATED SECTIONS

A. Section 31 20 00 - Earth Moving.

B. Section 32 90 00 - Planting.

C. Section 03 30 00 - Cast-in-Place Concrete

1.3 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Detail drawings.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation methods.

C. Shop Drawings: Indicate materials, dimensions, tolerances, welding, fasteners, hardware, mounting, finish, and accessories. Include manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum five years' experience in producing site furnishings of the type specified.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handle materials to avoid damage.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty against defects in materials and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Kay Park Recreation Corp:1301 Pine St.; Janesville, IA 50647
Phone No.: 800-553-2476

B. Belson Outdoors: 627 Amersale Dr, Naperville, IL 60563
Phone No.:800-323-5664

C. WABASH VALLEY Manufacturing:2580 Esters Blvd., Suite 100, DFW, Texas 75261
Phone No.: 800-253-8619

2.2 SITE FURNISHINGS

A. Benches:
1. Stationary Bench with Back, Mounted in Ground:
a. 62SG-RRP, 6 feet, 2 3/8-inch O.D. Tube, Recycled Plastic, 2 x 10 inch.
Kay Park Recreation Corp., - Base Product.
b. Belson Outdoors: Recycled Plastic Madison Park Bench, Model PB6-MAD-INGR, galvanized industrial grade steel base.

B. Bike Racks:
1. Bike Racks Loop Style, In-Ground Mount:
a. 611GIG, 64-inch length, 7 Spaces, 1 5/8-inch Pipe O.D.
Kay Park Recreation Corp., - Base Product.
b. Belson Outdoors: 7 Bike, 1 7/8” O.D. Steel Tube, Wave Bike Rack Model CBBR-7UR

C. Trash Receptacles:
1. Pedestal mounted trash receptacle with recycled plastic slats. In-Ground Mount. 36 gallons
a. Model TR3, 36 gallons with flat top lid
Belson Outdoors – Base Product.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

A. Install site furnishings in accordance with manufacturer's installation instructions and in proper relationship with adjacent construction. Adjust until satisfactory results are achieved.

B. Install site furnishings level, plumb, square, accurately aligned, correctly located per drawings, and without warp. Use hardware and fasteners acceptable to manufacturer.

3.3 CLEANING AND PROTECTION

A. Clean in accordance with manufacturer's recommendations.

B. Protect installed products until completion of project.

C. Touch-up, repair or replace damaged products and finishes in accordance with manufacturer's instructions before Substantial Completion.

END OF SECTION

SECTION 13 12 10 PRE-ENGINEERED BUILDING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes requirements for pre-engineered building system of steel construction complete with the following:

1. Roofing and Wall insulation.
2. Gutters and downspouts.
3. Pre-Engineered Steel Frame

B. Related Work: Coordinate the pre-engineered building requirements of this section and drawings with related work to properly execute the Work in accordance with the Project Schedule. Sections and drawings which contain requirements that relate to pre-engineered building work.

1. Section 01 -Summary of Work
2. Sitework requirements.
3. Structural Engineer's design requirements.
4. Section 03 30 00 - Cast-In-Place Concrete
5. Section 05 40 00 - Cold-Formed Steel Framing
6. Section 06 10 00 - Rough Carpentry
7. Section 07 21 00 - Thermal Insulation
8. Section 08 11 13 - Hollow Metal Doors and Frames
9. Section 08 71 00 - Door Hardware
10. Section 09 91 13 – Exterior Painting
11. Section 09 91 23 – Interior Painting

C. Related Documents: Drawings and general provisions of Contract including General Conditions, Supplementary Conditions, to comply with Fort Bend County Procurement Guidelines.

1.2 REFERENCE STANDARDS

A. Requirements for reference standards are specified in Division 01.

B. American Society for Testing and Materials:

1. ASTM A36 -Structural Steel.
2. ASTM A53 -Pipe, Steel Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A307 -Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
4. ASTM A325 -High-Strength Bolts for Structural Steel Joints.
5. ASTM A446 -Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Structural Physical Quality.
6. ASTM A475 -Zinc-Coated Steel Wire Strand.
7. ASTM A500 -Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
8. ASTM A529/A529M -High-Strength Carbon-Manganese Steel of Structural Quality.
9. ASTM A570/A570M -Steel, Steel and Strip, Carbon, Hot-Rolled, Structural Quality.
10. ASTM A572/A572M -High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

C. American Architectural Manufacturers Association:

1. AAMA 2605: Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.

D. American Institute of Steel Construction, Inc.

1. AISC -Structural Steel Buildings -Allowable
2. AISC -Design of Cold-Formed Steel Struct
3. AISC -Code of Standard Practice for Steel Buildings and Bridges.

E. American Welding Society (AWS).

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be regularly engaged in designing, manufacturing, installation and marketing the type of pre-engineered building system required for this Project and have the facilities capable of meeting all requirements of Contract Document and warranty as a single- source responsibility.

1. Products and materials used in manufacturing pre-engineered building system shall not contain lead, asbestos, polychlorinated biphenyls (PCB) or other types of hazardous materials.
2. To be assured of a single-source responsibility and warranty, all components and accessories required to complete the pre-engineered building design and construction must be of types recommended by the Building System Manufacturer.

B. Building System Certification: Submit written certification prepared and signed by a Structural Engineer registered to practice in the State of Texas, verifying that building system design and metal roof system (including panels, clips and support system components) meets loading requirements and codes of authorities having jurisdiction.

1. The certification must reference required dead loads, snow loads, wind loads/speeds, tributary area load reductions (if applicable), concentrated loads, end use categories, governing bodies including year and load applications.

C. Material Testing Certification: In addition to mill certifications of structural steel, the Building System Manufacturer shall provide, upon request, evidence of compliance with specifications through testing independent of the manufacturer's suppliers.

1. This quality assurance testing shall include structural bolts, nuts, screw fasteners, mastics and metal coatings including primers, metallic coated products and painted coil products.

1.4 DESIGN REQUIREMENTS

A. General: Design for pre-engineered building system shall include requirements indicating compliance with regulations established in the Locality and State of Illinois, Project conditions and Architect's design requirements. Design shall comply with IBC as modified by City of Houston, Texas.

B. Structural steel sections and welded plate members shall be designed in accordance with ASIC "Allowable Stress Design and Plastic Design".

C. Light gauge cold-formed structural members and exterior covering shall be designed in accordance with AISC "Design of Cold-Formed Steel Structural Members".

D. Design loads, including roof live load, wind load, and collateral load shall be as specified in Contract Documents and applicable building code. Collateral loads shall include mechanical loads, ceiling weights, etc. that are shown on Structural, Architectural, and approval.

1.5 SUBMITTALS

A. Shop Drawings: Submit in accordance with Division 01 to include but not be limited to:

1. Details and information indicating full coordination and compliance with building structure design prepared by the Metal Building's Engineer of Record for this Project.
2. Roof plan including ventilation accessories, wall elevations.
3. Type of structural framing system, profiles, sizes, spacings and locations of structural members, connections, attachments, anchorages, framed openings, size and type of fasteners and loads. Structural plans to be sealed by Metal Building Manufacturer's Structural Engineer.
4. Type of shop coating and mil thickness for structural components.
5. Welded connections using standard AWS welding symbols including net weld lengths.
6. Types of metal wall and roof panels, including panel profiles and finish.
7. Types of insulation for roof and walls.
8. Details and information indicating the pre-engineered building system is prepared for compliance with Architect's design requirements.
9. Structural calculations that are sealed by Metal Building Manufacturer's Structural Engineer.
10. Dimensioned anchor bolt plans that list load reactions to foundation and diameter of anchor bolts.

Note: Before submitting to Architect, shop drawings must be prepared, sealed and signed by a Structural Engineer licensed in the State of Texas.

B. Manufacturer's Product Data: Submit in accordance with Division 01. Technical information specified in this section shall be clearly marked in data required for this work. Information and manufacturer's published recommendations required to meet Contract Documents shall be clearly marked and identified to indicate full compliance with contract requirements. Submit data for the following:

1. Structural framing system and accessories.

C. Letters of Certification: Submit "Building System Certification" and "Material Testing Certification" specified in Quality Assurance. Each certification shall be complete as specified.

1.6 DELIVERY, STORAGE, HANDLING

A. Materials and accessories required for pre-engineered building system shall be delivered, stored and handled in accordance with Division 01, and manufacturer's recommendations.

1. Store materials to permit easy access for inspection and identification.
2. Do not store materials on building structure in a manner which may cause distortion or damage to members of supporting structures.

B. Protect steel members and packaged materials from corrosion and deterioration.

1. Keep steel members off the ground, using pallets, platforms or other types of supports.

C. Damaged materials or finish shall be replaced as required and approved by Architect and Owner at no additional cost to Owner. Remove damaged materials from Project site.

1.7 WARRANTY

A. General: Warranty for pre-engineered building system shall not deprive Owner of other rights the Owner may have under other provisions of the Contract Documents. Building system warranty

shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty for pre-engineered building system shall be in accordance with Division 01.

C. Coating manufacturer's twenty (20)-year warranty for fluoropolymer coating shall be part of the building system warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Rigid Global Buildings: 18933 Aldine Westfield Rd, Houston, Tx 77073
Phone No: 888-467-4443

B. Metallic Bldg Co / Mid-West Steel Bldg Co: 7301 Fairview St, Houston, Tx 77041
Phone No: 800-777-9378

C. American Western Steel – Metal Bldgs Houston: 5750 N Sam Houston Pkwy E, Suite 512, Houston, Tx 77032
Phone No: 713-550-4792

D. Allied Buildings Co: 6451 N. Federal Highway, Suite 411, Ft. Lauderdale, FL 33308 (Texas)
Phone No: 877-997-8335

2.2 STRUCTURAL FRAMING

A. General: Structural framing system shall be complete with materials and accessories required for compliance with applicable building code and the following:
1. Architect's building design requirements and Project conditions.
2. Building design prepared by Metal Building Manufacture's Structural Engineer.

B. Primary Structural Framing: Includes transverse rigid frames, lean-to columns and rafters, canopy rafters, intermediate columns, bearing-end frames, and wind bracing.

C. Hot-Rolled Steel Plates & Flat Bars: ASTM A529, Grade 50 or ASTM A572 Grade 50, minimum yield strength 50 ksi.

D. Hot-Rolled Steel Sheet: 1°gauge and heavier, ASTM A570, Grade 50, minimum yield strength 50 ksi.

E. Structural Shapes: Hot-rolled, ASTM A36, minimum yield strength 30 ksi.

F. Steel Sheets:
1. 10 Gauge & Heavier: Hot-rolled ASTM A570, Grade 50, minimum yield strength 55 ksi.
2. Painted Steel 16, 14 & 12 Gauge: Hot-rolled, ASTM A570, Grade 55, minimum yield strength 55 ksi.
3. Galvanized Steel 16, 14, & 12 Gauge: ASTM A446, Grade 0, Coating Class G-90, minimum yield strength 50 ksi.
4. Flange-To-Web Connections: Continuous welds.
5. Butt-Welds: Shall be full penetrations welds in flange plates and webs.

G. High-Strength Bolts: ASTM A325, black.

H. Machine Bolts: ASTM A307, electro-zinc plated.

I. Rigid Frames, Lean-To Frames & Canopy Rafters: Built-up "I" shapes, welded.

J. Bearing-End Frames: Shall consist of columns at building corners, intermediate columns, and a continuous rafter beam supported by end wall columns. Intermediate frames may be substituted for bearing frames.

K. Purlins: Cold-formed "Z" sections with unequal and stiffening lips. Stiffening lips shall be formed at an angle of 50° with flanges to permit nesting during shipping when overlapping connections.

L. Girts: Cold-formed “Z” sections or cold-formed “C” sections.

M. Eave Struts: Cold-formed, unequal flange "C" sections formed to provide adequate backup for roof and wall panels at building eave.

N. Wind Bracing: Building shall be designed to resist wind loads by diaphragm action at roof and wall panels, diagonal bracing consisting of either rods, cables angles, structural wind bents, fixed base columns or a combination of these methods.

O. Flange Bracing: Inside flange of frames shall be braced to provide allowable compressive stress which is adequate for the design load combination.

P. Sill Support: Continuous member at base of wall secured to concrete floor, coated with manufacturer’s standard red-oxide paint.

Q. Framed Openings: Shall be framed with structural framing members which meet design load requirements, coated with red oxide paint.

R. Steel Finish: All structural framing members shall be cleaned in accordance with the AISC Code of Standard Practice, and shop-coated with 1.0 mil thick red-oxide primer which meets FS STTP-636D.

S. Metal Building expansion connection as per the Design intent as Detailed on Drawings.

2.3 ROOF PANELS: SPECIFICATION SECTION 07 41 13

A. Coordinate with Pre-Engineered Building supplier.

2.4 WALL PANELS: SPECIFICATION SECTION 07 42 00

A. Coordinate with Pre-Engineered Building supplier

2.5 ACCESSORIES FOR ROOF AND WALL PANELS

A. Coordinate with Pre-Engineered Building supplier
   1. Specification Section: 07 72 00
   2. Specification Section: 07 42 00

2.6 GUTTERS AND DOWNSPOUTS

A. Gutters: Roll-formed 26-gauge minimum Galvalume to a profile, free of waviness and other imperfections. Confirm design profiles as detailed in construction documents.

1.Size: 6”-inch x 8”-inch as to comply with Local applicable Building Codes.

B. Downspouts: Roll-formed box sections fabricated from 26-gauge minimum Galvalume complete with 26-gauge steel straps. Kickouts shall be provided on each downspout.

1. Size: 5” -inch x 5” -inch as to comply with Local applicable Building Codes.

C. Color Finish: To be selected by Architect from Manufacture standard offerings.

2.7 STEEL DOORS AND FRAMES: SPECIFICATION SECTION 08 11 13 and 08 71 00

A. Coordinate with Pre-Engineered Building supplier.

2.8 INSULATION FOR WALLS AND ROOF CAVITY

A. Type: Fiberglass blankets laminated to a white taffeta 4 mils thick vinyl vapor barrier with a 2" tab on each side.
   1. Flame Spread Rating: 25 or less.
   2. Density: 0.60 pounds per cubic foot.
   3. R-Value & Thickness: Must be verified with design and Project requirements.
      a. Roof: R-30 Min.
      b. Walls R-19 Min.

B. Wire Mesh: 20-gauge galvanized wire with 2" hexagonal mesh complete with accessories for installing insulation.

2.9 ROOF VENTILATORS: REFERENCE MEP

A. Coordinate with Pre-Engineered Building supplier.

2.10 WALL LOUVERS: SPECIFICATION SECTION 08 91 00

A. Coordinate with Pre-Engineered Building supplier.

PART 3 EXECUTION

3.1 PREPARATION

A. General: Examine Project conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting the installation and performance of pre-engineered building system.

B. Unsatisfactory conditions shall be reported in writing to Architect. Do not proceed with building system work until unsatisfactory conditions detrimental to the proper completion of the work have been corrected and reviewed with Architect. Beginning of building system work implies General Contractor and Installer have inspected and accept the substrate and Project conditions as being properly prepared in accordance with Building System Manufacturer's published installation specifications for compliance with Contract Documents.

C. Hazardous Material: Products, materials and methods used in the installation of pre-engineered building system shall be free of lead, asbestos, PCB or other types of hazardous materials.

3.2 FRAMING SYSTEM INSTALLATION

A. General: Perform pre-engineered building construction in accordance with approved shop drawings, Contract Documents and as recommended and required by AISC.
   1. Do not field cut or alter structural members without the written approval of the Structural Engineer.
   2. Do not use gas cutting torches for correcting fabrication errors in structural framing.
   3. Finish the cut sections equal to a sheared appearance.

B. Erection Tolerances: Install individual framing component plumb, level and align in accordance with requirements of the "AISC Code of Standard Practice for Steel Buildings and Bridges".
   1. Set structural frames accurately to lines and elevations indicated.

2. Align and adjust framing members to form a part of a complete frame or structure before permanently fastening members together.
3. Establish required leveling and plumbing measurements on the mean operating temperature of the structure. Make allowances for differences between temperature at time of erection and mean temperature at which the structure will be maintained when completed and in service.

3.3 ROOF PANEL INSTALLATION: SPECIFICATION SECTION 07 41 13

A. Coordinate with Pre-Engineered Building supplier.

3.4 WALL PANEL INSTALLATION: SPECIFICATION SECTION 07 42 00

A. Coordinate with Pre-Engineered Building supplier.

3.5 FRAME AND DOOR INSTALLATION: SPECIFICATION SECTION 08 11 13

A. Coordinate with Pre-Engineered Building supplier.

3.6 WALL LOUVER INSTALLATION: SPECIFICATION SECTION 08 91 00

A. Coordinate with Pre-Engineered Building supplier.

3.7 CLEANING AND PROTECTION

A. Cleaning: Clean the completed metal roof and wall panels of grease, finger marks, stains, dirt and other contaminants in accordance with manufacturer's published recommendations.
   1. Remove excess materials and construction debris from Project site.
   2. Carefully remove metal shavings from metal roof using a method which will not scratch or damage metal finish.
   3. Do not use abrasive cleaners and cleaning methods.

B. Protection: Provide protection for completed roof and wall panel work from damage for duration of construction activities.
   1. Touch-up minor scratches and abrasions. Touch-ups or replacements shall be acceptable to Architect and Owner at no additional cost to Owner.
   2. Damaged or deteriorated materials or finish shall be repaired or replaced as required and approved by Architect and Owner at 'no additional cost to Owner.

C. Removal of Strippable Film: Remove manufacturer's temporary protective coverings and strippable films from roof and wall panel as recommended by manufacturer.
   1. On completion of panel installation, clean the finished surfaces as recommended by Panel Manufacturer.
   2. Maintain temporary protective coverings and strippable film in a clean and undamaged condition during construction activities.
   3. Do not use abrasive cleaners and cleaning method.

END OF SECTION

13 34 16 PRE-ENGINEERED PRESSBOX STRUCTURE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Section Includes: Design, fabrication and erection of a permanent-press box system of size and features as indicated on the drawings and specified.

1.2 RELATED SECTIONS

A. Section 05 12 00 - Structural Steel Framing
B. Section 05 50 00 – Metal Fabrications

1.3 REFERENCES

A. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength; 2004.
B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel
C. ASTM A 123 / A 123M - Standard Specification for Zinc (Hot-Dip) Coatings on Iron and Steel Products
D. ASTM A 153 / A 153M - Standard Specification for Zinc Coating (Hot-Dip Galvanized) on Iron and Steel hardware.
E. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Robs, Wire, Shapes and Tubes
F. AWS D1.1 - Structural Welding Code - Steel
G. AWS D1.2 - Structural Welding Code - Aluminum

1.4 SUBMITTALS

A. See Section 016000 - Product Requirements, for submittal procedures.
B. Product Data: Manufacturer's color selections for painted components
C. Shop Drawings: Complete layouts with dimensions for fabrication and erection, including plans, elevations and large-scale details of typical sections and connections.
    1. Provide layout, dimensions and identification of each unit corresponding to sequence of installation and erection procedures.
    2. Provide location and details of anchorage devices to be embedded in or fastened to other construction. Furnish templates if required for accurate placement.
    3. Samples: physical sample of sheeting color selections

1.5 QUALITY ASSURANCE / QUALIFICATIONS

A. AISC Certification: All structural steel shall be fabricated in an AISC certified plant that is certified “BU” – Certified Building Fabricator at the time of bid. The manufacturer bidding the project shall be listed on the AISC website as a certified fabricator prior to bidding. Non-AISC certified fabricators will not be accepted as alternates.
B. Manufacturer Qualifications: Obtain required products from a single manufacturing company with a minimum of 20 years in the design and manufacture of permanent grandstands / press boxes.
C. Installer Qualifications: Installer must be acceptable to or licensed by the manufacturer of products being installed.
D. Professional Structural Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing

engineering services of the kind required. Engineering services are defined as those performed for installations that are similar to those required for this Project in material, design and extent.

E. Pre-installation Conference: Prior to installation of work of this section, conduct a meeting to discuss quality assurance requirements. In addition to the Contractor and the installer, arrange for the attendance of the following:

1. Other installers affected by the work of this section.
2. Manufacturer's representative.

F. Welders: AWS certified.

G. All material and workmanship shall be in accordance with AISC Manual of Steel Construction, Load & Resistance factor Design, 2nd Edition.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.8 MAINTENANCE

A. Owner is to conduct annual inspection and required maintenance of press box to assure safe conditions. It is also recommended that a professional engineer or registered architect perform inspections biennially.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Basis of Design: Southern Bleacher Company, Inc: 801 Fifth St, Graham, Tx 76450
Phone No.: 800-433- 0912

B. Porta-King Building Systems: 4133 Shoreline Dr, Earth City, MO 63045
Phone No: 888-481-1671

C. Sturdisteel: 131 Ava Dr, Hewitt, TX 76643
Phone No.: 800-433-3116

2.2 PRESS BOX WITH METAL STRUCTURE

A. Product Description:

1. Press Box Support Structure: Independently supported.
2. Press Box Dimensions: Reference Construction Drawings.
3. Provide Landings as indicated on Construction Drawings.
4. Press Box to be of open construction, allowing inspection of electrical wiring, switches and other components without destructive disassembly.
5. Room Layout: Reference Construction Drawings.

6. All Welded Steel Frame Construction with steel doors/frames.

7. Provide 26 ga Steel R-Panel Siding. Choice of standard manufacturers colors

8. Provide operable windows to the rear of the press box for ventilation

9. Interlocking anodized aluminum counters

10. Sloped front windows as shown

11. Three electric PTAC units

B. Materials/Finishes

1. Press Box Support Structure:

   a. Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.

   b. Shop connections are seal welds.

   c. After fabrication, all steel is hot-dipped galvanized to ASTM-A-123 specifications.

2. Press Box: All materials shall be new and shall comply with ASTM specifications.

   a. Floor
      (1) Main support to be a galvanized steel floor frame sized to support structure and metal belly pan for support of insulation.
      (2) Floor to be INTERLOCK Aluminum Decking System, extruded aluminum alloy 6063-T6, mill finish. Attach Decking System to steel floor frame with mechanical fasteners at end of plank and at intermediate supports. (Tongue & Groove or Standard extrusion is not acceptable.) Vinyl tile from manufacturer's standard selection.
      (3) Insulation: Kraft faced fiberglass building insulation R-11, 3 1/2 inches thick. Batt or roll as manufactured by Owens-Corning Fiberglass Corp., or equal.

   b. Wall Structure
      (1) 4-inch x 4-inch x 11-gauge square tubing with maximum span of 14 feet on front wall and maximum span of 6 feet on back wall and 4-inch x 2 1/2-inch x 14-gauge steel "cees" with maximum spacing of 5 feet for all walls with siding. Spans greater than these require engineered calculations for design.
      (2) Insulation: Kraft faced fiberglass building insulation R-11, 3 1/2 inches thick. Batt or roll as manufactured by Owens-Corning Fiberglass Corp., or equal.
      (3) Interior Finish
         (a) 1/2-inch vinyl coated gypsum panels, Gold Bond vinyl-surfaced Durasan- Harvest Cotton.
         (b) Cove Base: Vinyl 4 inches x .080 equal to PRO CB-35 Nubian.
      (4) Exterior Finish
         (a) 26-gauge pre-finished R-Panel paneling as manufactured by MBCI, Signature 200 color series, or equal.

(b) Wall panels are attached with #12 TEK screws - 6" O.C. at the top and bottom of the panels.
(c) Lap screws are placed at each end of the panels, at the intermediate supports, and at the midpoint between supports (TEK #14).
(d) All fasteners to be painted same color as exterior paneling.

c. Roof Structure
(1) 4-inch x 4-inch x 11-gauge square tubing with maximum spacing of 6 feet on center and 4 inches x 2 1/2 inches x 14-gauge steel "cees" with maximum spacing of 2 feet on center.
(2) Roof: 1/8-inch four-way steel plate roof, continuous welded seams coated with acrylic metal primer as manufactured by Coronado and 36 mils of acrylic roof coating as manufactured by Isothermal Protective Coatings, or equal. Plate is welded on both sides of rafters with 1-1/2-inch long 1/8-inch fillet welds on 12-inch centers.
(3) Insulation: Kraft faced fiberglass building insulation; R-19 (minimum) 6 inches thick. Batt or roll as manufactured by Owens-Corning Fiberglas Corp., or equal.
(4) Cornice: 26-gauge steel pre-finished to match metal siding.
(5) Ceiling: 24-inch x 24-inch x 5/8-inch acoustical ceiling tile (model #- USG Fissured 560) with USG grid main tee (model # DXL24), cross tee (model # DXL 216), wall angle (model # M7), wind clips and other components as manufactured by USG, or equal.

d. Exterior Door(s)
(1) Full flush steel construction with honeycomb core. 18 gauge skin sheets. Dimensions: 3 feet 0 inches x 6 feet 8 inches. Color: White.
(2) Steel door frame (16 gauge) complete with 1/2-inch threshold and weather-stripping.
(3) Exterior Hardware: Yale 546F Exterior Trim, or equal. Handles shall be lever type that allow operation without tight grasping or twisting of the wrist. Keyed alike locks.
(4) Interior Hardware: Yale 2100 Exit Device, or equal. Handle shall be panic bar that allows for opening without any grasping, twisting or turning.

e. Interior Walls as shown
(1) Framing to be steel galvanized studs (25 gauge) 1 1/4-inch x 3 5/8 inch at maximum 2 feet on center.
(2) Finishes to be consistent with all other interior finishes.
(3) Provide fixed windows at front counter of each wall (see drawing)

f. Windows
(1) Frame: Extruded aluminum single hung, vertical sliding unit**,** thermal break.
(2) Glazing: Clear tempered panes.
(3) Dimensions of each unit: Dependent on compartment size. At interior wall locations or structural support locations the dimension between windows shall be no greater than 6 inches.
(4) Finish: Electrostatically applied acrylic enamel.

g. Work Bench
(1) 18-inch-wide work bench constructed of 4-inch x 2 1/2-inch x 14-gauge steel with interlocking anodized aluminum surface. Countertop's heights shall be constructed to allow wheelchair usage at all locations.

h. Roof camera deck with perimeter rails, Black vinyl clad chain link fence. Exterior access stairs

i. Painting: Materials equal to. Coronado, or equal.
   (1) Surfaces: Exterior Door(s), Door Frame(s)
      (a) Primer: Applied by Door Manufacturer.
      (b) Finish: 2 coats acrylic latex semi-gloss enamel applied by press box manufacturer.
   (2) Surfaces: Interior Doors (if applicable)
      (a) Primer: Jones Blair Interior Exterior Oil Primer, or equal.
      (b) Finish: 2 coats acrylic latex semi-gloss enamel.
   (3) Surfaces: Exterior Siding
      (a) Primer: Applied by Siding Manufacturer.
      (b) Finish: Applied by Siding Manufacturer.
      (c) Touchup: If applicable
   (4) Surfaces: Wall and Roof Structure
      (a) Primer: Coronado DTM Industrial 180-11 acrylic metal primer applied after welding, or equal.

j. Caulking: Sonneborn NP1 – Polyurethane sealant, All temperature, UV resistant, or equal. Silicone products are not acceptable.

k. Electrical: Provide for all electrical as detailed in architects' drawings as shown. Includes 200 AMP service panel

2.2 WARRANTY

A. The Press Box is warranted to be free from defect in materials and workmanship in the course of manufacture. This warranty excludes any other defects resulting from abnormal use in service, accidental or intentional damage or any occurrences beyond manufacturer's control.

PART 3 EXECUTION

3.1 INSTALLATION

A. All work performed by technicians experienced in bleacher seating installation.

B. Project as per approved shop drawings.

3.2 FIELD QUALITY CONTROL

A. Foundation: Footings for the grandstand shall provide sufficient bearing area at bottom to support all loads of the press box. Depth and design of footings shall be determined by Owner supplied soil test. Hot-dipped galvanized anchor bolts shall be secured in the concrete footings. Concrete shall attain working strength of 3,000 psi. Any over excavation or soils preparation work will be the responsibility of the owners grading contractor.

END OF SECTION

PROJECT MANUAL

Project Number 6001-02

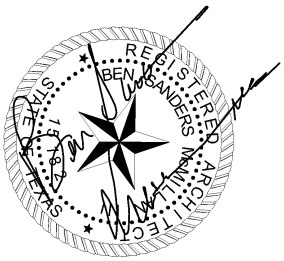
VOLUME II

For

Fort Bend County
South Post Oak Sportsplex
Baseball Fields Upgrades – Phase II

Houston, Texas 77053

Fort Bend Co. Bid 23-012



ISSUED FOR BID & CONSTRUCTION
7 September 2022

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IDG ARCHITECTS, Inc.
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Houston, Texas 77060

PROJECT DIRECTORY

OWNER

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Contact: Darren McCarthy, Director Parks & Fairgrounds
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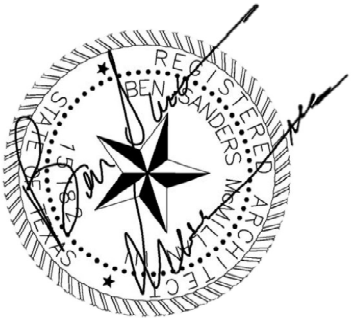
ARCHITECT



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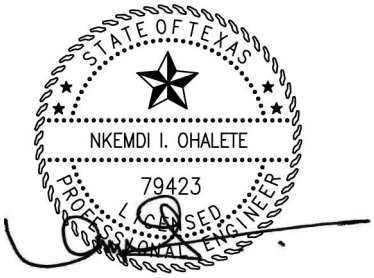
CIVIL



Nedu Engineering Services, Inc.
6776 Southwest Frwy., Suite 320
Houston, Texas 77074
832-541-7784
713-268-1667 Fax
Contact: N. Innocent Ohalete
Email: nkemdi@neduengineers.com

STRUCTURAL

RDP Engineers, Inc.
104 Industrial Blvd., suite 111
Sugar Land, Texas 77478
281-276-1555
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Email: raj@rdpengineers.com

MEP

Marshall Engineering Corporation
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Humble, Texas 77338
281-852-4131
281-852-4631 Fax
Contact: Tony Marshall
Email: tony@marshallengineeringco.com

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LANDSCAPE

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ARCHITECTURAL

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SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Transition fittings.
3. Dielectric fittings.
4. Mechanical sleeve seals.
5. Sleeves.
6. Escutcheons.
7. Grout.
8. Equipment installation requirements common to equipment sections.
9. Painting and finishing.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:

1. ABS: Acrylonitrile-butadiene-styrene plastic.
2. CPVC: Chlorinated polyvinyl chloride plastic.
3. PE: Polyethylene plastic.
4. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Transition fittings.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Escutcheons.

B. Welding certificates.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.6 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

    a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

G. Solvent Cements for Joining Plastic Piping:

1. ABS Piping: ASTM D 2235.
2. CPVC Piping: ASTM F 493.
3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
4. PVC to ABS Piping Transition: ASTM D 3138.

2.4 TRANSITION FITTINGS

A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

1. Available Manufacturers:

    a. Cascade Waterworks Mfg. Co.
    b. Dresser Industries, Inc.; DMD Div.
    c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
    d. JCM Industries.
    e. Smith-Blair, Inc.
    f. Viking Johnson.

2. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
3. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.

4. Aboveground Pressure Piping: Pipe fitting.

B. Plastic-to-Metal Transition Fittings: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

1. Available Manufacturers:

a. Eslon Thermoplastics.

C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

1. Manufacturers:

a. Thompson Plastics, Inc.

D. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.

1. Available Manufacturers:

a. Cascade Waterworks Mfg. Co.
b. Fernco, Inc.
c. Mission Rubber Company.
d. Plastic Oddities, Inc.

2.5 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

1. Available Manufacturers:

a. Capitol Manufacturing Co.
b. Central Plastics Company.
c. Eclipse, Inc.
d. Epco Sales, Inc.
e. Hart Industries, International, Inc.
f. Watts Industries, Inc.; Water Products Div.
g. Zurn Industries, Inc.; Wilkins Div.

2.6 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Available Manufacturers:

    a. Advance Products & Systems, Inc.
    b. Calpico, Inc.
    c. Metraflex Co.
    d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Plastic . Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

    1. Underdeck Clamp: Clamping ring with set screws.

E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.

F. PVC Pipe: ASTM D 1785, Schedule 40.

G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.8 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.

    1. Finish: Polished chrome-plated .

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

    1. Finish: Polished chrome-plated .

E. One-Piece, Stamped-Steel Type: With set screw and chrome-plated finish.

F. One-Piece, Floor-Plate Type: Cast-iron floor plate.

2.9 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.

b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
c. Insulated Piping: One-piece, stamped-steel type with spring clips.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
f. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-plate, stamped-steel type with concealed hinge and set screw.
g. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough-brass finish.
h. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with concealed or exposed-rivet hinge and set screw .
i. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
j. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw or spring clips.
k. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

M. Sleeves are not required for core-drilled holes.

N. Permanent sleeves are not required for holes formed by removable PE sleeves.

O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. PVC Pipe Sleeves: For pipes smaller than NPS 6.
b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Install steel pipe for sleeves smaller than 6 inches in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.

T. Verify final equipment locations for roughing-in.

U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.

2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
5. PVC Nonpressure Piping: Join according to ASTM D 2855.
6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.

J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.

L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.

1. Plain-End Pipe and Fittings: Use butt fusion.
2. Plain-End Pipe and Socket Fittings: Use socket fusion.

M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.3 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.5 PAINTING

A. Painting of plumbing systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use 3000-psi , 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete ."

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.9 GROUTING

A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION 220500

SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Bronze ball valves.
2. Bronze swing check valves.
3. Bronze gate valves.

B. Related Sections:
1. Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.3 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene copolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

D. RS: Rising stem.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:
1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set angle, gate, and globe valves closed to prevent rattling.

4. Set ball and plug valves open to minimize exposure of functional surfaces.

B. Use the following precautions during storage:
1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Refer to valve schedule articles for applications of valves.

B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

C. Valve Sizes: Same as upstream piping unless otherwise indicated.

D. Valve Actuator Types:
1. Gear Actuator: For quarter-turn valves NPS 8 and larger.
2. Handwheel: For valves other than quarter-turn types.
3. Handlever: For quarter-turn valves NPS 6 and smaller except plug valves.

E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
1. Gate Valves: With rising stem.
2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
3. Butterfly Valves: With extended neck.

F. Valve-End Connections:
1. Flanged: With flanges according to ASME B16.1 for iron valves.
2. Grooved: With grooves according to AWWA C606.
3. Solder Joint: With sockets according to ASME B16.18.
4. Threaded: With threads according to ASME B1.20.1.

G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE BALL VALVES

A. Three-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Conbraco Industries, Inc.; Apollo Valves.
b. DynaQuip Controls.
c. Hammond Valve.
d. Milwaukee Valve Company.
e. NIBCO INC.

f. Red-White Valve Corporation.

2. Description:
   a. Standard: MSS SP-110.
   b. SWP Rating: 150 psig.
   c. CWP Rating: 600 psig.
   d. Body Design: Three piece.
   e. Body Material: Bronze.
   f. Ends: Threaded.
   g. Seats: PTFE or TFE.
   h. Stem: Bronze.
   i. Ball: Chrome-plated brass.
   j. Port: Full.

2.3 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. American Valve, Inc.
      b. Crane Co.; Crane Valve Group; Crane Valves.
      c. Crane Co.; Crane Valve Group; Jenkins Valves.
      d. Crane Co.; Crane Valve Group; Stockham Division.
      e. Hammond Valve.
      f. Kitz Corporation.
      g. Milwaukee Valve Company.
      h. NIBCO INC.
      i. Powell Valves.
      j. Red-White Valve Corporation.
      k. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
      l. Zy-Tech Global Industries, Inc.
      m. .
   2. Description:
      a. Standard: MSS SP-80, Type 3.
      b. CWP Rating: 200 psig.
      c. Body Design: Horizontal flow.
      d. Body Material: ASTM B 62, bronze.
      e. Ends: Threaded.
      f. Disc: Bronze.

B. Class 125, Bronze Swing Check Valves with Nonmetallic Disc:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Crane Co.; Crane Valve Group; Crane Valves.
      b. Crane Co.; Crane Valve Group; Jenkins Valves.
      c. Crane Co.; Crane Valve Group; Stockham Division.
      d. Hammond Valve.
      e. Kitz Corporation.
      f. Milwaukee Valve Company.
      g. NIBCO INC.
      h. Red-White Valve Corporation.
      i. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
      j. .
   2. Description:

a. Standard: MSS SP-80, Type 4.
b. CWP Rating: 200 psig.
c. Body Design: Horizontal flow.
d. Body Material: ASTM B 62, bronze.
e. Ends: Threaded.
f. Disc: PTFE or TFE.

C. Class 150, Bronze Swing Check Valves with Nonmetallic Disc:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Crane Co.; Crane Valve Group; Crane Valves.
b. Crane Co.; Crane Valve Group; Jenkins Valves.
c. Hammond Valve.
d. Milwaukee Valve Company.
e. NIBCO INC.
f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
g. .
2. Description:
a. Standard: MSS SP-80, Type 4.
b. CWP Rating: 300 psig.
c. Body Design: Horizontal flow.
d. Body Material: ASTM B 62, bronze.
e. Ends: Threaded.
f. Disc: PTFE or TFE.

2.4 BRONZE GATE VALVES

A. Class 125, NRS Bronze Gate Valves:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. American Valve, Inc.
b. Crane Co.; Crane Valve Group; Crane Valves.
c. Crane Co.; Crane Valve Group; Jenkins Valves.
d. Crane Co.; Crane Valve Group; Stockham Division.
e. Hammond Valve.
f. Kitz Corporation.
g. Milwaukee Valve Company.
h. NIBCO INC.
i. Powell Valves.
j. Red-White Valve Corporation.
k. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
l. Zy-Tech Global Industries, Inc.
m. .
2. Description:
a. Standard: MSS SP-80, Type 1.
b. CWP Rating: 200 psig.
c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
d. Ends: Threaded or solder joint.
e. Stem: Bronze.
f. Disc: Solid wedge; bronze.
g. Packing: Asbestos free.
h. Handwheel: Malleable iron.

B. Class 125, RS Bronze Gate Valves:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. American Valve, Inc.
      b. Crane Co.; Crane Valve Group; Crane Valves.
      c. Crane Co.; Crane Valve Group; Jenkins Valves.
      d. Crane Co.; Crane Valve Group; Stockham Division.
      e. Hammond Valve.
      f. Kitz Corporation.
      g. Milwaukee Valve Company.
      h. NIBCO INC.
      i. Powell Valves.
      j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
      k. Zy-Tech Global Industries, Inc.
      l. .
   2. Description:
      a. Standard: MSS SP-80, Type 2.
      b. CWP Rating: 200 psig.
      c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
      d. Ends: Threaded or solder joint.
      e. Stem: Bronze.
      f. Disc: Solid wedge; bronze.
      g. Packing: Asbestos free.
      h. Handwheel: Malleable iron.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install check valves for proper direction of flow and as follows:
   1. Swing Check Valves: In horizontal position with hinge pin level.

3.3 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:
   1. Shutoff Service: Ball, or gate valves.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:
   1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
   2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
   3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
   4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
   5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
   6. For Steel Piping, NPS 5 and Larger: Flanged ends.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:
   1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
   2. Ball Valves: Three piece, full port, bronze with bronze trim.
   3. Bronze Swing Check Valves: Class 125 , nonmetallic disc.
   4. Bronze Gate Valves: Class 125 , RS.

B. Pipe NPS 2-1/2 and Larger:
   1. Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.
   2. Iron Ball Valves: Class 150.
   3. Iron Gate Valves: Class 125 , OS&Y.

END OF SECTION 220523

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Fastener systems.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.6 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pre-galvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.

4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel Insert material.

2.2 FASTENER SYSTEMS

A. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

C. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

D. Install lateral bracing with pipe hangers and supports to prevent swaying.

E. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

F. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

H. Insulated Piping:

1. Attach clamps and spacers to piping.

a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.

b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3.2 METAL FABRICATIONS

A. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

B. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.3 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches .

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.5 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports and attachments for general service applications.

F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal-hanger shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated, stationary pipes NPS 1/2 to NPS 30.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

N. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

O. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

P. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 220529

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Stencils.
5. Valve tags.
6. Warning tags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick and having predrilled holes for attachment hardware.
2. Letter Color: Black .
3. Background Color: White .
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws .
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick and having predrilled holes for attachment hardware.

B. Letter Color: Red .

C. Background Color: White .

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws .

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Pre-coiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.4 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook .

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.5 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches minimum .
2. Fasteners: Reinforced grommet and wire or string.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles , complying with ASME A13.1, on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 25 along each run. Reduce intervals to 10 in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

C. Pipe Label Color Schedule:

1. Domestic Water Piping:

   a. Background Color: White .
   b. Letter Color: Blue .

2. Sanitary Waste Piping:

   a. Background Color: Black .
   b. Letter Color: Yellow Insert color.

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:

a. Cold Water: 1-1/2 inches , round .
b. Hot Water: 1-1/2 inches , round .

2. Valve-Tag Color:

a. Cold Water: Green .
b. Hot Water: Green .

3. Letter Color:

a. Cold Water: Black .
b. Hot Water: Black .

3.5 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 220553

SECTION 22 07 00 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Insulation Materials:
   a. Flexible elastomeric.
   b. Mineral fiber.
2. Adhesives.
3. Sealants.
4. Factory-applied jackets.
5. Field-applied jackets.
6. Tapes.
7. Securements.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

B. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:

1. Sample Sizes:

   a. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
   b. Jacket Materials for Pipe: 12 inches long by NPS 2.
   c. Sheet Jacket Materials: 12 inches square.
   d. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

C. Qualification Data: For qualified Installer.

D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

E. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

2.1 INSULATION MATERIALS

A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Aeroflex USA Inc.; Aerocel.
b. Armacell LLC; AP Armaflex.
c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. CertainTeed Corp.; Duct Wrap.
b. Johns Manville; Microlite.
c. Knauf Insulation; Duct Wrap.
d. Manson Insulation Inc.; Alley Wrap.
e. Owens Corning; All-Service Duct Wrap.

H. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Fibrex Insulations Inc.; Coreplus 1200.
b. Johns Manville; Micro-Lok.
c. Knauf Insulation; 1000(Pipe Insulation.
d. Manson Insulation Inc.; Alley-K.
e. Owens Corning; Fiberglas Pipe Insulation.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Aeroflex USA Inc.; Aeroseal.
b. Armacell LCC; 520 Adhesive.
c. Foster Products Corporation, H. B. Fuller Company; 85-75.
d. RBX Corporation; Rubatex Contact Adhesive.

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Products, Division of ITW; CP-82.
b. Foster Products Corporation, H. B. Fuller Company; 85-20.
c. ITW TACC, Division of Illinois Tool Works; S-90/80.
d. Marathon Industries, Inc.; 225.
e. Mon-Eco Industries, Inc.; 22-25.

D. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Products, Division of ITW; CP-82.
b. Foster Products Corporation, H. B. Fuller Company; 85-20.
c. ITW TACC, Division of Illinois Tool Works; S-90/80.
d. Marathon Industries, Inc.; 225.
e. Mon-Eco Industries, Inc.; 22-25.

2.3 SEALANTS

A. Joint Sealants:

B. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Products, Division of ITW; CP-76-8.
b. Foster Products Corporation, H. B. Fuller Company; 95-44.
c. Marathon Industries, Inc.; 405.
d. Mon-Eco Industries, Inc.; 44-05.

e. Vimasco Corporation; 750.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.

C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Products, Division of ITW; CP-76.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.

2.4 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2. PVDC Jacket for Outdoor Applications: 6-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

2.5 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Johns Manville; Zeston.
b. P.I.C. Plastics, Inc.; FG Series.
c. Proto PVC Corporation; LoSmoke.

d. Speedline Corporation; SmokeSafe.

2. Adhesive: As recommended by jacket material manufacturer.
3. Color: White .
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.

   a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

5. Factory-fabricated tank heads and tank side panels.

2.6 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
   b. Compac Corp.; 104 and 105.
   c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
   d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
   b. Compac Corp.; 110 and 111.
   c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
   d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.

2. Width: 3 inches.
3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
   b. Compac Corp.; 130.
   c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
   d. Venture Tape; 1506 CW NS.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

2.7 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Childers Products; Bands.
   b. PABCO Metals Corporation; Bands.
   c. RPR Products, Inc.; Bands.

2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 ; 0.015 inch thick, wide with wing or closed seal.
3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

C. Wire: 0.080-inch nickel-copper alloy .

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. C & F Wire.
   b. Childers Products.
   c. PABCO Metals Corporation.
   d. RPR Products, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

1. Verify that systems and equipment to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.

2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

E. Where PVDC jackets are indicated, install as follows:

1. Apply three separate wraps of filament tape per insulation section to secure pipe insulation to pipe prior to installation of PVDC jacket.
2. Wrap factory-presized jackets around individual pipe insulation sections with one end overlapping the previously installed sheet. Install presized jacket with an approximate overlap at butt joint of 2 inches over the previous section. Adhere lap seal using adhesive or SSL, and then apply 1-1/4 circumferences of appropriate PVDC tape around overlapped butt joint.
3. Continuous jacket can be spiral wrapped around a length of pipe insulation. Apply adhesive or PVDC tape at overlapped spiral edge. When electing to use adhesives, refer to manufacturer's written instructions for application of adhesives along this spiral edge to maintain a permanent bond.
4. Jacket can be wrapped in cigarette fashion along length of roll for insulation systems with an outer circumference of 33-1/2 inches or less. The 33-1/2-inch- circumference limit allows for 2-inch- overlap seal. Using the length of roll allows for longer sections of jacket to be installed at one time. Use adhesive on the lap seal. Visually inspect lap seal for "fishmouthing," and use PVDC tape along lap seal to secure joint.
5. Repair holes or tears in PVDC jacket by placing PVDC tape over the hole or tear and wrapping a minimum of 1-1/4 circumferences to avoid damage to tape edges.

3.9 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. NPS 1 and Smaller: Insulation shall be one of the following:
   a. Flexible Elastomeric: 1 inch thick.
   b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

2. NPS 1-1/4 and Larger: Insulation shall be one of the following:
   a. Flexible Elastomeric: 1 inch thick.
   b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

B. Domestic Hot Water:

1. NPS 1-1/4 and Smaller: Insulation shall be one of the following:

   a. Flexible Elastomeric: 1 inch thick.
   b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

C. Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be the following:
   a. Flexible Elastomeric: 3/4 inch thick.

END OF SECTION 220700

SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Under-building-slab and aboveground domestic water pipes, tubes, and fittings inside buildings.
2. Encasement for piping.

B. Related Requirements:

1. Section 221113 "Facility Water Distribution Piping" for water-service piping and water meters outside the building from source to the point where water-service piping enters the building.

1.3 ACTION SUBMITTALS

A. Product Data: For transition fittings and dielectric fittings.

B. LEED Submittals:

1. Product Data for Credit IEQ 4.1: For solvent cements and adhesive primers, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit IEQ 4: For solvent cements and adhesive primers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

1.4 INFORMATIONAL SUBMITTALS

A. System purging and disinfecting activities report.

B. Field quality-control reports.

1.5 FIELD CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of water service.
2. Do not interrupt water service without Construction Manager's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Potable-water piping and components shall comply with NSF 14 and NSF 61. Plastic piping components shall be marked with "NSF-pw."

2.2 CPVC PIPING

A. CPVC Pipe: ASTM F 441/F 441M, Schedule 40 .

1. CPVC Socket Fittings: ASTM F 438 for Schedule 40 .
2. CPVC Threaded Fittings: ASTM F 437, Schedule 80.

B. CPVC Piping System: ASTM D 2846/D 2846M, SDR 11, pipe and socket fittings.

C. CPVC Tubing System: ASTM D 2846/D 2846M, SDR 11, tube and socket fittings.

2.3 PVC PIPE AND FITTINGS

A. PVC Pipe: ASTM D 1785, Schedule 40 and Schedule 80.

B. PVC Socket Fittings: ASTM D 2466 for Schedule 40 and ASTM D 2467 for Schedule 80.

C. PVC Schedule 80 Threaded Fittings: ASTM D 2464.

2.4 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys.

D. Flux: ASTM B 813, water flushable.

E. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

F. Solvent Cements for Joining CPVC Piping and Tubing: ASTM F 493.

1. CPVC solvent cement shall have a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Solvent cement and adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

G. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Solvent cement and adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

H. Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.5 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

C. Sleeve-Type Transition Coupling: AWWA C219.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Cascade Waterworks Manufacturing.
b. Dresser, Inc.; Piping Specialties Products.
c. Ford Meter Box Company, Inc. (The).
d. JCM Industries.
e. Romac Industries, Inc.
f. Smith-Blair, Inc.; a Sensus company.
g. Viking Johnson.

D. Plastic-to-Metal Transition Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Charlotte Pipe and Foundry Company.
    b. Harvel Plastics, Inc.
    c. Spears Manufacturing Company.

2. Description:

    a. CPVC or PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions.
    b. One end with threaded brass insert and one solvent-cement-socket or threaded end.

E. Plastic-to-Metal Transition Unions:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Colonial Engineering, Inc.
    b. NIBCO Inc.
    c. Spears Manufacturing Company.

2. Description:

    a. CPVC or PVC four-part union.
    b. Brass threaded end.
    c. Solvent-cement-joint plastic end.
    d. Rubber O-ring.
    e. Union nut.

2.6 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Capitol Manufacturing Company; member of the Phoenix Forge Group.
    b. Central Plastics Company.
    c. Hart Industries International, Inc.
    d. Jomar International.
    e. Matco-Norca.
    f. McDonald, A. Y. Mfg. Co.
    g. Watts; a division of Watts Water Technologies, Inc.
    h. Wilkins; a Zurn company.

2. Standard: ASSE 1079.

3. Pressure Rating: 125 psig minimum at 180 deg F .
4. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Capitol Manufacturing Company; member of the Phoenix Forge Group.
   b. Central Plastics Company.
   c. Matco-Norca.
   d. Watts; a division of Watts Water Technologies, Inc.
   e. Wilkins; a Zurn company.

2. Standard: ASSE 1079.
3. Factory-fabricated, bolted, companion-flange assembly.
4. Pressure Rating: 125 psig minimum at 180 deg F .
5. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Advance Products & Systems, Inc.
   b. Calpico, Inc.
   c. Central Plastics Company.
   d. Pipeline Seal and Insulator, Inc.

2. Nonconducting materials for field assembly of companion flanges.
3. Pressure Rating: 150 psig .
4. Gasket: Neoprene or phenolic.
5. Bolt Sleeves: Phenolic or polyethylene.
6. Washers: Phenolic with steel backing washers.

E. Dielectric Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Elster Perfection Corporation.
   b. Grinnell Mechanical Products; Tyco Fire Products LP.
   c. Matco-Norca.
   d. Precision Plumbing Products, Inc.
   e. Victaulic Company.

2. Standard: IAPMO PS 66.
3. Electroplated steel nipple complying with ASTM F 1545.
4. Pressure Rating and Temperature: 300 psig at 225 deg F .
5. End Connections: Male threaded or grooved.
6. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.

D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 221119 "Domestic Water Piping Specialties."

E. Install shutoff valve immediately upstream of each dielectric fitting.

F. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 221119 "Domestic Water Piping Specialties."

G. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.

H. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

I. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

J. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

K. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

L. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

M. Install piping to permit valve servicing.

N. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

O. Install piping free of sags and bends.

P. Install fittings for changes in direction and branch connections.

Q. Install PEX piping with loop at each change of direction of more than 90 degrees.

R. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

S. Install pressure gages on suction and discharge piping for each plumbing pump and packaged booster pump. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping."

T. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 221123 "Domestic Water Pumps."

U. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

V. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

W. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

F. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.

G. Push-on Joints for Copper Tubing: Clean end of tube. Measure insertion depth with manufacturer's depth gage. Join copper tube and push-on-joint fittings by inserting tube to measured depth.

H. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.

I. Joint Construction for Grooved-End Copper Tubing: Make joints according to AWWA C606. Roll groove ends of tubes. Lubricate and install gasket over ends of tubes or tube and fitting. Install coupling housing sections over gasket with keys seated in tubing grooves. Install and tighten housing bolts.

J. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

K. Joint Construction for Solvent-Cemented Plastic Piping: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
3. PVC Piping: Join according to ASTM D 2855.

L. Joints for PEX Piping: Join according to ASTM F 1807.

M. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 TRANSITION FITTING INSTALLATION

A. Install transition couplings at joints of dissimilar piping.

B. Transition Fittings in Underground Domestic Water Piping:

1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
2. Fittings for NPS 2 and Larger: Sleeve-type coupling.

C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.5 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings .

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for seismic-restraint devices in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
4. NPS 2-1/2: 108 inches with 1/2-inch rod.
5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
6. NPS 6: 10 feet with 5/8-inch rod.
7. NPS 8: 10 feet with 3/4-inch rod.

F. Install supports for vertical copper tubing every 10 feet.

G. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
2. NPS 1-1/2: 108 inches with 3/8-inch rod.
3. NPS 2: 10 feet with 3/8-inch rod.
4. NPS 2-1/2: 11 feet with 1/2-inch rod.
5. NPS 3 and NPS 3-1/2: 12 feet with 1/2-inch rod.
6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
7. NPS 6: 12 feet with 3/4-inch rod.
8. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.

H. Install supports for vertical steel piping every 15 feet.

I. Install hangers for stainless-steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
2. NPS 1-1/2: 108 inches with 3/8-inch rod.
3. NPS 2: 10 feet with 3/8-inch rod.
4. NPS 2-1/2: 11 feet with 1/2-inch rod.
5. NPS 3 and NPS 3-1/2: 12 feet with 1/2-inch rod.
6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
7. NPS 6: 12 feet with 3/4-inch rod.
8. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.

J. Install supports for vertical stainless-steel piping every 15 feet.

K. Install vinyl-coated hangers for CPVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1 and Smaller: 36 inches with 3/8-inch rod.
2. NPS 1-1/4 to NPS 2: 48 inches with 3/8-inch rod.
3. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.
4. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
5. NPS 6: 48 inches with 3/4-inch rod.
6. NPS 8: 48 inches with 7/8-inch rod.

L. Install supports for vertical CPVC piping every 60 inches for NPS 1 and smaller, and every 72 inches for NPS 1-1/4 and larger.

M. Install vinyl-coated hangers for PEX piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1 and Smaller: 32 inches with 3/8-inch rod.

N. Install hangers for vertical PEX piping every 48 inches.

O. Install vinyl-coated hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 2 and Smaller: 48 inches with 3/8-inch rod.
2. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
4. NPS 6: 48 inches with 3/4-inch rod.
5. NPS 8: 48 inches with 7/8-inch rod.

P. Install supports for vertical PVC piping every 48 inches.

Q. Install vinyl-coated hangers for PP piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1 and Smaller: 36 inches with 3/8-inch rod.
2. NPS 1-1/4 to NPS 2: 48 inches with 3/8-inch rod.
3. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.
4. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
5. NPS 6: 48 inches with 3/4-inch rod.
6. NPS 8: 48 inches with 7/8-inch rod.

R. Install supports for vertical PP piping every 60 inches for NPS 1 and smaller, and every 72 inches for NPS 1-1/4 and larger.

S. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
3. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
4. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

B. Label pressure piping with system operating pressure.

3.9 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Piping Inspections:

a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.10 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

    a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
    b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

        1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
        2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
d. Repeat procedures if biological examination shows contamination.
e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Clean non-potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:

a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller , shall be one of the following:
1. PVC, Schedule 80; socket fittings; and solvent-cemented joints.

E. Under-building-slab, domestic water piping, NPS 2 and smaller , shall be the following:
1. PVC, Schedule 80; socket fittings; and solvent-cemented joints.

F. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:
1. CPVC, Schedule 40; socket fittings; and solvent-cemented joints.
2. PVC, Schedule 40 ; socket fittings; and solvent-cemented joints.

G. Aboveground domestic water piping, NPS 2-1/2 to NPS 4 , shall be the following:
1. PVC, Schedule 40; socket fittings; and solvent-cemented joints.

3.13 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use gate valves with flanged ends for piping NPS 2-1/2 and larger.

2. Drain Duty: Hose-end drain valves.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION 221116

SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following domestic water piping specialties:
1. Backflow preventers.
2. Hose bibbs.
3. Wall hydrants.
4. Water hammer arresters.

1.3 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig , unless otherwise indicated.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. NSF Compliance:
1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

PART 2 - PRODUCTS

2.1 HOSE BIBBS

A. Hose Bibbs Insert drawing designation if any:
1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
9. Finish for Service Areas: Rough bronze Chrome or nickel plated.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: Wheel handle or operating key.
12. Operation for Service Areas: Wheel handle .
13. Include operating key with each operating-key hose bibb.
14. Include integral wall flange with each chrome- or nickel-plated hose bibb.

2.2 WALL HYDRANTS

A. Vacuum Breaker Wall Hydrants Insert drawing designation if any:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Arrowhead Brass Products, Inc.
b. Mansfield Plumbing Products LLC.
c. McDonald, A. Y. Mfg. Co.
d. Prier Products, Inc.
e. Smith, Jay. R. Mfg. Co.; Division of Smith Industries, Inc.
f. Watts Industries, Inc.; Water Products Div.
g. Woodford Manufacturing Company.
h. Zurn Plumbing Products Group; Light Commercial Operation.
i. Insert manufacturer's name.
3. Standard: ASSE 1019, Type A or Type B.
4. Type: Freeze-resistant, automatic draining with integral air-inlet valve.
5. Classification: Type B, for automatic draining with hose removed or with hose attached and nozzle closed.
6. Pressure Rating: 125 psig.
7. Operation: Loose key Loose key or wheel handle Wheel handle.
8. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
9. Inlet: NPS 1/2 or NPS 3/4.
10. Outlet: Exposed with garden-hose thread complying with ASME B1.20.7.

2.3 WATER HAMMER ARRESTERS

A. Water Hammer Arresters:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. AMTROL, Inc.
b. Josam Company.
c. MIFAB, Inc.

d. PPP Inc.
e. Sioux Chief Manufacturing Company, Inc.
f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
g. Tyler Pipe; Wade Div.
h. Watts Drainage Products Inc.
i. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Copper tube with piston.
4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

2.4 INSTALLATION

A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.

B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
1. Locate backflow preventers in same room as connected equipment or system.
2. Do not install bypass piping around backflow preventers.

C. Install balancing valves in locations where they can easily be adjusted.

D. Install temperature-actuated water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
1. Install thermometers and water regulators if specified.
2. Install cabinet-type units recessed in or surface mounted on wall as specified.

E. Install outlet boxes recessed in wall. Install 2-by-4-inch fire-retardant-treated-wood blocking wall reinforcement between studs. Fire-retardant-treated-wood blocking is specified in Division 06 Section "Rough Carpentry."

2.5 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.

B. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

C. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

2.6 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
1. Double-check backflow-prevention assemblies.

2.7 FIELD QUALITY CONTROL

A. Perform the following tests and prepare test reports:

1. Test each double-check backflow-prevention assembly according to authorities having jurisdiction and the device's reference standard.

B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

2.8 ADJUSTING

A. Set field-adjustable pressure set points of water pressure-reducing valves.

B. Set field-adjustable flow set points of balancing valves.

END OF SECTION 22 11 19

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.
3. Encasement for underground metal piping.

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. LEED Submittals:

1. Product Data for Credit IEQ 4.1: For solvent cements and adhesive primers, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit IEQ 4: For solvent cements and adhesive primers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

1.5 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.

B. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Construction Manager no fewer than 5 days in advance of proposed interruption of sanitary waste service.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

C. Adhesive Primer: ASTM F 656.

1. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Solvent Cement: ASTM D 2564.

1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
3. Unshielded, Non-pressure Transition Couplings:

    a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

        1) Dallas Specialty & Mfg. Co.
        2) Fernco Inc.
        3) Mission Rubber Company; a division of MCP Industries, Inc.
        4) Plastic Oddities; a division of Diverse Corporate Technologies, Inc.

    b. Standard: ASTM C 1173.
    c. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
    d. Sleeve Materials:

        1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
        2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
        3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

4. Shielded, Non-pressure Transition Couplings:

    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Cascade Waterworks Mfg. Co.
        2) Mission Rubber Company; a division of MCP Industries, Inc.

    b. Standard: ASTM C 1460.
    c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

5. Pressure Transition Couplings:

    a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

        1) Cascade Waterworks Mfg. Co.
        2) Dresser, Inc.
        3) EBAA Iron, Inc.
        4) JCM Industries, Inc.
        5) Romac Industries, Inc.

6) Smith-Blair, Inc.; a Sensus company.
7) The Ford Meter Box Company, Inc.
8) Viking Johnson.

b. Standard: AWWA C219.
c. Description: Metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
d. Center-Sleeve Material: Malleable iron.
e. Gasket Material: Natural or synthetic rubber.
f. Metal Component Finish: Corrosion-resistant coating or material.

B. Dielectric Fittings:

1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
2. Dielectric Unions:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Capitol Manufacturing Company.
2) Central Plastics Company.
3) Hart Industries International, Inc.
4) Jomar International Ltd.
5) Matco-Norca, Inc.
6) McDonald, A. Y. Mfg. Co.
7) Watts Regulator Co.; a division of Watts Water Technologies, Inc.
8) Wilkins; a Zurn company.

b. Description:

1) Standard: ASSE 1079.
2) Pressure Rating: 125 psig minimum at 180 deg F .
3) End Connections: Solder-joint copper alloy and threaded ferrous.

3. Dielectric Flanges:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Capitol Manufacturing Company.
2) Central Plastics Company.
3) Matco-Norca, Inc.
4) Watts Regulator Co.; a division of Watts Water Technologies, Inc.
5) Wilkins; a Zurn company.

b. Description:

1) Standard: ASSE 1079.
2) Factory-fabricated, bolted, companion-flange assembly.
3) Pressure Rating: 125 psig minimum at 180 deg F.

4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

4. Dielectric-Flange Insulating Kits:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Advance Products & Systems, Inc.
2) Calpico, Inc.
3) Central Plastics Company.
4) Pipeline Seal and Insulator, Inc.

b. Description:

1) Nonconducting materials for field assembly of companion flanges.
2) Pressure Rating: 150 psig.
3) Gasket: Neoprene or phenolic.
4) Bolt Sleeves: Phenolic or polyethylene.
5) Washers: Phenolic with steel backing washers.

5. Dielectric Nipples:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Elster Perfection.
2) Grinnell Mechanical Products.
3) Matco-Norca, Inc.
4) Precision Plumbing Products, Inc.
5) Victaulic Company.

b. Description:

1) Standard: IAPMO PS 66
2) Electroplated steel nipple.
3) Pressure Rating: 300 psig at 225 deg F.
4) End Connections: Male threaded or grooved.
5) Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

K. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

L. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 2 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

M. Install aboveground PVC piping according to ASTM D 2665.

N. Install underground PVC piping according to ASTM D 2321.

O. Install engineered soil and waste drainage and vent piping systems as follows:

1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.

P. Plumbing Specialties:

1. Install backwater valves in sanitary waster gravity-flow piping. Comply with requirements for backwater valves specified in Section 221319 "Sanitary Waste Piping Specialties."
2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping. Comply with

requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."

3. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."

Q. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

R. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

S. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

T. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.2 JOINT CONSTRUCTION

A. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

B. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
3. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

3.3 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in OD's.
2. In Drainage Piping:Shielded, nonpressure transition couplings.

B. Backwater Valves: Install backwater valves in piping subject to backflow.

1. Horizontal Piping: Horizontal backwater valves. Use normally closed type unless otherwise indicated.
2. Floor Drains: Drain outlet backwater valves unless drain has integral backwater valve.
3. Install backwater valves in accessible locations.
4. Comply with requirements for backwater valve specified in Section 221319 "Sanitary Waste Piping Specialties."

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
1. Install carbon-steel pipe hangers for horizontal piping in
2. Vertical Piping: MSS Type 8 or Type 42, clamps.
3. Install individual, straight, horizontal piping runs:

   a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
   c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

4. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
5. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

D. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
2. NPS 3: 48 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.

E. Install supports for vertical PVC piping every 48 inches.

F. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

3.6 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

E. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
2. Cap and subject piping to static-water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and

allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
4. Prepare reports for tests and required corrective action.

3.8 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

3.9 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground, soil and waste piping NPS 4 and smaller shall be the following:
1. PVC pipe, PVC socket fittings, and solvent-cemented joints.
2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

C. Aboveground, soil and waste piping NPS 5 and larger shall be the following:
1. PVC pipe, PVC socket fittings, and solvent-cemented joints.
2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

D. Aboveground, vent piping NPS 4 and smaller shall be the following:

1. PVC pipe, PVC socket fittings, and solvent-cemented joints.
2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

E. Aboveground, vent piping NPS 5 and larger shall be the following:

1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

F. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:

1. Stainless-steel pipe and fittings, gaskets, and gasketed joints.
2. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

G. Underground, soil and waste piping NPS 5 and larger shall be the following:

1. Solid-wall PVC pipe; PVC socket fittings; and solvent-cemented joints.
2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

END OF SECTION 221316

SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cleanouts.
2. Floor drains.
3. Roof flashing assemblies.
4. Miscellaneous sanitary drainage piping specialties.
5. Flashing materials.
6. Grease interceptors.

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. FOG: Fats, oils, and greases.

C. FRP: Fiberglass-reinforced plastic.

D. HDPE: High-density polyethylene plastic.

E. PE: Polyethylene plastic.

F. PP: Polypropylene plastic.

G. PVC: Polyvinyl chloride plastic.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for the following:
1. Grease interceptors.

B. Shop Drawings: Show fabrication and installation details for frost-resistant vent terminals.

1. Wiring Diagrams: Power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.7 COORDINATION

A. Coordinate size and location of roof penetrations.

PART 2 - PRODUCTS

2.1 BACKWATER VALVES

A. Horizontal, Cast-Iron Backwater Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Josam Company; Josam Div.
    b. MIFAB, Inc.
    c. Smith, Jay R. Mfr. Co.; Division of Smith Industries, Inc.
    d. Tyler Pipe; Wade Div.
    e. Watts Drainage Products Inc.
    f. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASME A112.14.1.
3. Size: Same as connected piping.
4. Body: Cast iron.
5. Cover: Cast iron with bolted access check valve.
6. End Connections: Hubless.
7. Type Check Valve: Removable, bronze, swing check, factory assembled or field modified to hang closed.
8. Extension: ASTM A 74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor; replaces backwater valve cover.

2.2 CLEANOUTS

A. Exposed Metal Cleanouts:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Josam Company; Josam Div.
    b. MIFAB, Inc.
    c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    d. Tyler Pipe; Wade Div.
    e. Watts Drainage Products Inc.
    f. Zurn Plumbing Products Group; Specification Drainage Operation.
    g. Josam Company; Blucher-Josam Div.

2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
3. Size: Same as connected drainage piping
4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk, brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Metal Floor Cleanouts:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Josam Company; Josam Div.
    b. Oatey.
    c. Sioux Chief Manufacturing Company, Inc.
    d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    e. Tyler Pipe; Wade Div.
    f. Watts Drainage Products Inc.
    g. Zurn Plumbing Products Group; Light Commercial Operation.
    h. Zurn Plumbing Products Group; Specification Drainage Operation.
    i. Josam Company; Josam Div.
    j. Kusel Equipment Co.
    k. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    l. Josam Company; Blucher-Josam Div.

2. Standard: ASME A112.36.2M for cast-iron soil pipe with cast-iron ferrule threaded, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Cast-iron soil pipe with cast-iron ferrule .
5. Body or Ferrule: Cast iron .
6. Clamping Device: Required.
7. Outlet Connection: Threaded.
8. Closure: Cast-iron plug.
9. Adjustable Housing Material: Cast iron with threads.
10. Frame and Cover Material and Finish: Painted cast iron .
11. Frame and Cover Shape: Round.
12. Top Loading Classification: Heavy Duty.
13. Riser: ASTM A 74, Serviceclass, cast-iron drainage pipe fitting and riser to cleanout.
14. Standard: ASME A112.3.1.

15. Size: Same as connected branch.

C. Cast-Iron Wall Cleanouts:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Josam Company; Josam Div.
   b. MIFAB, Inc.
   c. Smith, Jay R. Mfg. Co.; d of Smith Industries, Inc.
   d. Tyler Pipe; Wade Div.
   e. Watts Drainage Products Inc.
   f. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk, brassplug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.

D. Cast-Iron Floor Drains:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Commercial Enameling Co.
   b. Josam Company; Josam Div.
   c. MIFAB, Inc.
   d. Prier Products, Inc.
   e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   f. Tyler Pipe; Wade Div.
   g. Watts Drainage Products Inc.
   h. Zurn Plumbing Products Group; Light Commercial Operation.
   i. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASME A112.6.3 with backwater valve.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Anchor Flange: Required.
6. Clamping Device: Required.
7. Outlet: Bottom.
8. Backwater Valve: Drain-outlet type .
9. Coating on Interior and Exposed Exterior Surfaces: Not required.
10. Sediment Bucket: Not required.
11. Top or Strainer Material: Bronze.
12. Top of Body and Strainer Finish: Rough bronze .
13. Top Shape: Square.
14. Top Loading Classification: Light Duty .
15. Funnel: Not required .
16. Inlet Fitting: Not required.
17. Trap Material: Cast iron .
18. Trap Pattern: Standard P-trap .

2.3 ROOF FLASHING ASSEMBLIES

A. Roof Flashing Assemblies:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Acorn Engineering Company; Elmdor/Stoneman Div.
b. Thaler Metal Industries Ltd.

B. Description: Manufactured assembly made of 4.0-lb/sq. ft., 0.0625-inch- thick, lead flashing collar and skirt extending at least 6 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.

1. Open-Top Vent Cap: Without cap.
2. Low-Silhouette Vent Cap: With vandal-proof vent cap.
3. Extended Vent Cap: With field-installed, vandal-proof vent cap.

2.4 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Vent Caps:

1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
2. Size: Same as connected stack vent or vent stack.

2.5 FLASHING MATERIALS

A. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil minimum thickness.

B. Fasteners: Metal compatible with material and substrate being fastened.

C. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

2.6 GREASE INTERCEPTORS

A. Grease Interceptors <Insert drawing designation if any>:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ParkUsa, Inc.
b. Josam Company; Josam Div.
c. Rockford Sanitary Systems, Inc.
d. Ashland Trap Distribution Co.

2. Standard: ASME A112.14.3 for intercepting and retaining fats, oils, and greases from food-preparation.
3. Body Material: Cast concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.

B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

E. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

1. Position floor drains for easy access and maintenance.
2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:

a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.

3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

F. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.

G. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.

1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
2. Size: Same as floor drain inlet.

H. Install vent caps on each vent pipe passing through roof.

I. Install wood-blocking reinforcement for wall-mounting-type specialties.

3.2 CONNECTIONS

A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FLASHING INSTALLATION

A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
1. Copper Sheets: Solder joints of copper sheets.

B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.

1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.

C. Set flashing on floors and roofs in solid coating of bituminous cement.

D. Secure flashing into sleeve and specialty clamping ring or device.

E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Section 076200 "Sheet Metal Flashing and Trim."

F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221319

SECTION 22 33 00 - ELECTRIC, DOMESTIC-WATER HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Commercial, electric, storage, domestic-water heaters.
2. Flow-control, electric, tankless, domestic-water heaters.
3. Domestic-water heater accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of domestic-water heater indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. LEED Submittals:

1. Product Data for Prerequisite EA 2: Documentation indicating that units comply with applicable requirements in ASHRAE/IESNA 90.1, Section 7, "Service Water Heating."

C. Shop Drawings:

1. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For commercial domestic-water heaters, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Product Certificates: For each type of tankless, electric, domestic-water heater, from manufacturer.

C. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.

D. Source quality-control reports.

E. Field quality-control reports.

F. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For electric, domestic-water heaters to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."

1.7 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including storage tank and supports.
b. Faulty operation of controls.
c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Periods: From date of Substantial Completion.

a. Electric, Tankless, Domestic-Water Heaters: Two year(s).

PART 2 - PRODUCTS

A. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:

1. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:

    a. American Water Heaters.
    b. Bradford White Corporation.
    c. Electric Heater Company (The).
    d. GSW Water Heating.
    e. Heat Transfer Products, Inc.
    f. Lochinvar Corporation.
    g. Rheem Manufacturing Company.
    h. Smith, A. O. Water Products Co.; a division of A. O. Smith Corporation.
    i. State Industries.

2. Standard: UL 174.
3. Storage-Tank Construction: Steel, vertical arrangement.

    a. Tappings: ASME B1.20.1 pipe thread.
    b. Pressure Rating: 150 psig.
    c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.

4. Factory-Installed Storage-Tank Appurtenances:

    a. Anode Rod: Replaceable magnesium.
    b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
    c. Drain Valve: ASSE 1005.
    d. Insulation: Comply with ASHRAE/IESNA 90.1[or ASHRAE 90.2].
    e. Jacket: Steel with enameled finish.
    f. Heat-Trap Fittings: Inlet type in cold-water inlet and outlet type in hot-water outlet.
    g. Heating Elements: Two; electric, screw-in immersion type; wired for simultaneous operation unless otherwise indicated. Limited to 12 kW total.
    h. Temperature Control: Adjustable thermostat.
    i. Safety Control: High-temperature-limit cutoff device or system.
    j. Relief Valve: ASME rated and stamped for combination temperature-and-pressure relief valves. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valve with sensing element that extends into storage tank.

5. Special Requirements: NSF 5 construction with legs for off-floor installation.

B. Capacity and Characteristics:

    a. See Drawings:

2. Electrical Characteristics:

    a. See Drawings

2.2 ELECTRIC, TANKLESS, DOMESTIC-WATER HEATERS

A. Flow-Control, Electric, Tankless, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Bosch Water Heating.
    b. Chronomite Laboratories, Inc.
    c. Eemax, Inc.
    d. Stiebel Eltron, Inc.

2. Standard: UL 499 for electric, tankless, (domestic-water heater) heating appliance.
3. Construction: Copper piping or tubing complying with NSF 61 barrier materials for potable water, without storage capacity.

    a. Connections: ASME B1.20.1 pipe thread.
    b. Pressure Rating: 150 psig .
    c. Heating Element: Resistance heating system.
    d. Temperature Control: Flow-control fitting.
    e. Safety Control: High-temperature-limit cutoff device or system.
    f. Jacket: Aluminum or steel with enameled finish or plastic.

4. Support: Bracket for wall mounting.
5. Capacity and Characteristics:

    a. Flow Rate: See plans.
    b. Maximum Temperature Setting: 120.
    c. Power Demand: See Plans.
    d. Electrical Characteristics: See plans

2.3 DOMESTIC-WATER HEATER ACCESSORIES

A. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.

B. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than domestic-water heater working-pressure rating.

C. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water.

2.4 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.

B. Hydrostatically test domestic-water heaters to minimum of one and one-half times pressure rating before shipment.

C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 01 40 00 "Quality Requirements" for retesting and reinspecting requirements and Section 01 73 00 "Execution" for requirements for correcting the Work.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

A. Electric, Tankless, Domestic-Water Heater Mounting: Install electric, tankless, domestic-water heaters at least 18 inches above floor on wall bracket.

1. Maintain manufacturer's recommended clearances.
2. Arrange units so controls and devices that require servicing are accessible.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to supported equipment.
5. Anchor domestic-water heaters to substrate.

B. Install electric, domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523 "General-Duty Valves for Plumbing Piping."

C. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

D. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 221119 "Domestic Water Piping Specialties."

E. Assemble and install inlet and outlet piping manifold kits for multiple electric, domestic-water heaters. Fabricate, modify, or arrange manifolds for balanced water flow through each electric, domestic-water heater. Include shutoff valve and thermometer in each domestic-water heater inlet and outlet, and throttling valve in each electric, domestic-water heater outlet. Comply with requirements for valves specified in Section 220523 "General-Duty Valves for Plumbing Piping," and comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."

3.2 CONNECTIONS

A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

C. Prepare test and inspection reports.

END OF SECTION 223300

SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following conventional plumbing fixtures and related components:

1. Faucets for lavatories.
2. Flushometers.
3. Toilet seats.
4. Protective shielding guards.
5. Fixture supports.
6. Water closets.
7. Urinals.
8. Lavatories.
9. Commercial sinks.
10. Service sinks.

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.

C. Cast Polymer: Cast-filled-polymer-plastic material. This material includes cultured-marble and solid-surface materials.

D. Cultured Marble: Cast-filled-polymer-plastic material with surface coating.

E. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.

F. FRP: Fiberglass-reinforced plastic.

G. PMMA: Polymethyl methacrylate (acrylic) plastic.

H. PVC: Polyvinyl chloride plastic.

I. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.4 SUBMITTALS

A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.

D. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.

1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act" ; and Public Law 101-336, "Americans with Disabilities Act" ; for plumbing fixtures for people with disabilities.

D. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.

E. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

G. Comply with the following applicable standards and other requirements specified for plumbing fixtures:

1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
2. Vitreous-China Fixtures: ASME A112.19.2M.
3. Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.

H. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:

1. Backflow Protection Devices for Faucets with Side Spray: ASME A112.18.3M.
2. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
3. Diverter Valves for Faucets with Hose Spray: ASSE 1025.
4. Faucets: ASME A112.18.1.
5. Hose-Connection Vacuum Breakers: ASSE 1011.

6. Hose-Coupling Threads: ASME B1.20.7.
7. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
8. NSF Potable-Water Materials: NSF 61.
9. Pipe Threads: ASME B1.20.1.
10. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
11. Supply Fittings: ASME A112.18.1.
12. Brass Waste Fittings: ASME A112.18.2.

I. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:

1. Atmospheric Vacuum Breakers: ASSE 1001.
2. Brass and Copper Supplies: ASME A112.18.1.
3. Dishwasher Air-Gap Fittings: ASSE 1021.
4. Manual-Operation Flushometers: ASSE 1037.
5. Plastic Tubular Fittings: ASTM F 409.
6. Brass Waste Fittings: ASME A112.18.2.
7. Sensor-Operation Flushometers: ASSE 1037 and UL 1951.

1.6 WARRANTY

A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace components of whirlpools that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures of unit shell.
b. Faulty operation of controls, blowers, pumps, heaters, and timers.
c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Period for Commercial Applications: One year(s) from date of Substantial Completion.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Faucet Cartridges and O-Rings: Equal to 5percent of amount of each type and size installed.
2. Flushometer Valve, Repair Kits: Equal to 10percent of amount of each type installed, but no fewer than 4 of each type.
3. Provide hinged-top wood or metal box, or individual metal boxes, with separate compartments for each type and size of extra materials listed above.
4. Toilet Seats: Equal to 5 percent of amount of each type installed.

PART 2 - PRODUCTS

2.1 LAVATORY FAUCETS

A. Lavatory Faucets,:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. American Standard Companies, Inc.
   b. Bradley Corporation.
   c. Chicago Faucets.
   d. Delta Faucet Company.
   e. Eljer.
   f. Elkay Manufacturing Co.
   g. Fisher Manufacturing Co.
   h. Grohe America, Inc.
   i. Just Manufacturing Company.
   j. Kohler Co.
   k. Moen, Inc.

2. Description: Single-control mixing valve. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.

   a. Body Material: Commercial, solid brass .
   b. Finish: Polished chrome plate .
   c. Maximum Flow Rate: 0.5 gpm .
   d. Maximum Flow: 0.25 gal..
   e. Centers: 4 inches Single hole.
   f. Mounting: Deck, concealed .
   g. Valve Handle(s): Not applicable.
   h. Inlet(s): NPS 3/8 tubing, with NPS 1/2 male adaptor .
   i. Spout: Rigid type.
   j. Spout Outlet: Aerator.
   k. Operation: Sensor.
   l. Drain: Grid.
   m. Tempering Device: Thermostatic.

2.2 SINK FAUCETS

A. Sink Faucets, :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. American Standard Companies, Inc.
   b. Bradley Corporation.
   c. Chicago Faucets.
   d. Delta Faucet Company.
   e. Eljer.

f. Elkay Manufacturing Co.
g. Fisher Manufacturing Co.
h. Grohe America, Inc.
i. Just Manufacturing Company.
j. Kohler Co.
k. Moen, Inc.

2. Description: Kitchen faucet with spray, three-hole fixture Service sink faucet with stops in shanks, vacuum breaker, hose-thread outlet, and pail hook . Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.

a. Body Material: Commercial, solid brass .
b. Finish: Polished chrome plate .
c. Maximum Flow Rate: 2.5 gpm, unless otherwise indicated.
d. Mixing Valve: Two-lever handle.
e. Backflow Protection Device for Hose Outlet: Required.
f. Backflow Protection Device for Side Spray: Not required.
g. Centers: 4 inches Single hole.
h. Mounting: Deck, exposed.
i. Handle(s): Wrist blade, 4 inches .
j. Inlet(s): NPS 3/8 tubing with NPS 1/2 male adapter .
k. Spout Type: Swing, shaped tube .
l. Spout Outlet: Aerator.
m. Vacuum Breaker: Required.
n. Operation: Compression, manual .
o. Drain: Stopper with chain .

2.3 FLUSHOMETERS

A. Flushometers,:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Coyne & Delany Co.
b. Delta Faucet Company.
c. Sloan Valve Company.
d. Zurn Plumbing Products Group; Commercial Brass Operation.
e. Sloan Valve Company.
f. TOTO USA, Inc.
g. Sloan Valve Company.
h. TOTO USA, Inc.

2. Description: Flushometer for urinal and water-closet-type fixture. Include brass body with corrosion-resistant internal components, control stop with check valve, vacuum breaker, copper or brass tubing, and polished chrome-plated finish on exposed parts.

a. Internal Design: Diaphragm operation.
b. Style: Exposed.
c. Inlet Size: NPS 3/4 for urinal and NPS 1 for water closets.
d. Trip Mechanism: Battery-operated sensor actuator .
e. Consumption: 1.0 gal./flush 3.5 gal./flush .

f. Tailpiece Size: NPS 3/4 NPS 1-1/2.

2.4 TOILET SEATS

A. Toilet Seats, :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Standard Companies, Inc.
b. Bemis Manufacturing Company.
c. Centoco Manufacturing Corp.
d. Church Seats.
e. Eljer.
f. Kohler Co.
g. Olsonite Corp.
h. Sanderson Plumbing Products, Inc.; Beneke Div.
i. Sperzel.
j. Bemis Manufacturing Company.
k. Centoco Manufacturing Corp.
l. Church Seats.
m. Kohler Co.
n. Olsonite Corp.
o. Pressalit A/S.

2. Description: Toilet seat for water-closet-type fixture.

a. Material: Molded, solid plastic.
b. Configuration: Open front without cover.
c. Size: Elongated .
d. Hinge Type: SS, self-sustaining .
e. Class: Standard commercial .
f. Color: White .

2.5 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers, :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Engineered Brass Co.
b. Insul-Tect Products Co.; a Subsidiary of MVG Molded Products.
c. McGuire Manufacturing Co., Inc.
d. Plumberex Specialty Products Inc.
e. TCI Products.
f. TRUEBRO, Inc.
g. Zurn Plumbing Products Group; Tubular Brass Plumbing Products Operation.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

B. Protective Shielding Piping Enclosures, :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. TRUEBRO, Inc.

2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

2.6 FIXTURE SUPPORTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Josam Company.
2. MIFAB Manufacturing Inc.
3. Smith, Jay R. Mfg. Co.
4. Tyler Pipe; Wade Div.
5. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.
6. Zurn Plumbing Products Group; Specification Drainage Operation.

C. Water-Closet Supports, :

1. Description: Combination carrier designed for accessible mounting height of wall-mounting, water-closet-type fixture. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.

D. Urinal Supports, :

1. Description: Type I, urinal carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture for wall-mounting, urinal-type fixture. Include steel uprights with feet.
2. Accessible-Fixture Support: Include rectangular steel uprights.

E. Lavatory Supports, :

1. Description: Type II, lavatory carrier with concealed arms and tie rod for wall-mounting, lavatory-type fixture. Include steel uprights with feet.
2. Accessible-Fixture Support: Include rectangular steel uprights.

F. Sink Supports, :

1. Description: Type II, sink carrier with hanger plate, bearing studs, and tie rod for sink-type fixture. Include steel uprights with feet.

G. Water Closets, :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Crane Plumbing, L.L.C./Fiat Products.
   b. Eljer.
   c. Kohler Co.
   d. American Standard Companies, Inc.
   e. Eljer.
   f. American Standard Companies, Inc.
   g. Crane Plumbing, L.L.C./Fiat Products.

2. Description Wall-mounting, back-outlet, vitreous-china fixture designed for flushometer-valve operation.

   a. Style: Close coupled.

      1) Bowl Type: Elongated with siphon-jet design. Include bolt caps matching fixture.
      2) Height: Standard and Accessible.
      3) Design Consumption: 1.6 gal./flush .

   b. Supply: NPS 1 chrome-plated brass or copper with wheel-handle loose-key stop.
   c. Style: Flushometer valve.

      1) Bowl Type: Elongated with siphon-jet design. Include bolt caps matching fixture.
      2) Height: Accessible.
      3) Design Consumption: 1.6 gal./flush .
      4) Color: White .

   d. Flushometer:
   e. Toilet Seat:
   f. Wall Support: Manufactured waste fitting with seal and fixture bolts.

2.7 URINALS

A. Urinals, :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. American Standard Companies, Inc.
   b. Briggs Plumbing Products, Inc.
   c. Crane Plumbing, L.L.C./Fiat Products.
   d. Eljer.
   e. Kohler Co.

f. Mansfield Plumbing Products, Inc.
g. TOTO USA, Inc.

2. Description: Accessible, wall -mounting, back-outlet, vitreous-china fixture designed for flushometer valve operation.

a. Type: Siphon jet with extended shields .
b. Strainer or Trapway: Integral cast strainer with integral trap.
c. Design Consumption: 0.5 gal./flush .
d. Color: White .
e. Supply Spud Size: NPS 3/4 .
f. Outlet Size: NPS 1-1/2 .
g. Flushometer:
h. Fixture Support: Urinal chair carrier.

2.8 LAVATORIES

A. Lavatories,:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Standard Companies, Inc.
b. Commercial Enameling Company.
c. Eljer.
d. Kohler Co.
e. American Standard Companies, Inc.
f. Barclay Products, Ltd.
g. Briggs Plumbing Products, Inc.
h. Crane Plumbing, L.L.C./Fiat Products.
i. Gerber Plumbing Fixtures LLC.
j. Sterling Plumbing Group, Inc.

2. Description: Accessible, wall vitreous-china fixture.

a. Type: With back .
b. Size: 18 by 15 inches rectangular.
c. Faucet Hole Punching: Three holes, 4-inch centers.
d. Faucet Hole Location: Top .
e. Color: White .
f. Faucet: Lavatory for separate drain.
g. Supplies: NPS 3/8 chrome-plated copper with stops.
h. Drain: Grid .

1) Location: Near back of bowl .

i. Drain Piping: Schedule 40 PVC, P-trap; NPS 1-1/4 , tubular waste to wall; and wall escutcheon.

1) Exception: Omit P-trap if hair interceptor is required.
j. Protective Shielding Guard(s):
k. Fixture Support: Lavatory .

2.9 COMMERCIAL SINKS

A. Commercial Sinks, :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Advance Tabco.
   b. Elkay Manufacturing Co.
   c. Just Manufacturing Company.
   d. Metal Masters Foodservice Equipment Co., Inc.

2. Description: Two -compartment, counter-mounting, stainless-steel commercial sink with backsplash.

   a. Metal Thickness: 0.050 inch .
   b. Compartment:

      1) Dimensions:
      2) Drain: Grid with NPS 1-1/2 tailpiece and twist drain .

         a) Location: Centered in compartment .

   c. Faucet(s): Sink .

      1) Number Required: One .
      2) Mounting: Deck.

   d. Supplies: NPS 1/2 chrome-plated copper with stops or shutoff valves.
   e. Drain Piping: NPS 1-1/2 chrome-plated, cast-brass P-trap; copper pipe waste to wall; continuous waste; and wall escutcheon(s).

2.10 SERVICE SINKS

A. Service Sinks, :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. American Standard Companies, Inc.
   b. Commercial Enameling Company.
   c. Eljer.
   d. Kohler Co.
   e. Crane Plumbing, L.L.C./Fiat Products.
   f. Eljer.
   g. Kohler Co.

2. Description: Trap-standard- and wall-mounting, enameled, cast-iron fixture with roll-rim with two faucet holes in back and rim guard on front and sides.

   a. Size: 24 by 20 inches.
   b. Color: White.

c. Faucet: Sink .
d. Drain: Grid with NPS 3 outlet.
e. Trap Standard: NPS 3 enameled, cast iron with cleanout and floor flange.
f. Fixture Support: Sink .

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.

B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.

B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.

1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.

C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.

D. Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.

E. Install fixtures level and plumb according to roughing-in drawings.

F. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.

1. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture. Valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."

G. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.

H. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.

I. Install toilet seats on water closets.

J. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.

K. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

L. Install traps on fixture outlets.

1. Exception: Omit trap on fixtures with integral traps.

M. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section "Common Work Results for Plumbing."

N. Set service basins in leveling bed of cement grout. Grout is specified in Division 22 Section "Common Work Results for Plumbing."

O. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.

B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.

C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.

D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

E. Install fresh batteries in sensor-operated mechanisms.

3.5 ADJUSTING

A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.

C. Replace washers and seals of leaking and dripping faucets and stops.

D. Install fresh batteries in sensor-operated mechanisms.

3.6 CLEANING

A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:

1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
2. Remove sediment and debris from drains.

B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.7 PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224000

SECTION 22 47 00 - DRINKING FOUNTAINS AND WATER COOLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following drinking fountains and water coolers and related components:

1. Drinking fountains.
2. Pressure water coolers.
3. Fixture supports.

1.3 DEFINITIONS

A. Accessible Drinking Fountain or Water Cooler: Fixture that can be approached and used by people with disabilities.

B. Cast Polymer: Dense, cast-filled-polymer plastic.

C. Drinking Fountain: Fixture with nozzle for delivering stream of water for drinking.

D. Fitting: Device that controls flow of water into or out of fixture.

E. Fixture: Drinking fountain or water cooler unless one is specifically indicated.

F. Water Cooler: Electrically powered fixture for generating and delivering cooled drinking water.

1.4 SUBMITTALS

A. Product Data: For each fixture indicated. Include rated capacities, furnished specialties, and accessories.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For fixtures to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act" ; and Public Law 101-336, "Americans with Disabilities Act" ; for fixtures for people with disabilities.

C. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

D. ARI Standard: Comply with ARI's "Directory of Certified Drinking Water Coolers" for style classifications.

E. ARI Standard: Comply with ARI 1010, "Self-Contained, Mechanically Refrigerated Drinking-Water Coolers," for water coolers and with ARI's "Directory of Certified Drinking Water Coolers" for type and style classifications.

F. ASHRAE Standard: Comply with ASHRAE 34, "Designation and Safety Classification of Refrigerants," for water coolers. Provide HFC 134a (tetrafluoroethane) refrigerant, unless otherwise indicated.

1.6 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filter Cartridges: Equal to 3 percent of amount installed for each type and size indicated, but no fewer than 1 of each.

PART 2 - PRODUCTS

2.1 DRINKING FOUNTAINS

A. Drinking Fountains, :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Filtrine Manufacturing Company; Drinking Water Division.
b. Halsey Taylor.
c. Haws Corporation.
d. Most Dependable Fountains, Inc.
e. Murdock, Inc.
f. Oasis Corporation.
g. Stern-Williams Co., Inc.
h. Sunroc Corp.

2. Description: Accessible, Style F, freestanding drinking fountain.

a. Pedestal:

1) Material: Concrete .
2) Shape: Rectangular with offset to receptor .

b. Receptor(s):

1) Number: Two .
2) Material: Chrome-plated brass or stainless steel .
3) Shape: Rectangular .
4) Bubbler: One for each receptor, with adjustable stream regulator, located on deck.

c. Controls: Foot pedal with adjustable stream regulator.
d. Access to Internal Components: Panel in pedestal.
e. Supply: NPS 1/2 with ball, gate, or globe valve.
f. Drain: Grid with NPS 1-1/4 minimum waste to drainage system.

2.2 PRESSURE WATER COOLERS

A. Water Coolers, Insert drawing designation:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Elkay Manufacturing Co.
b. Halsey Taylor.
c. Haws Corporation.
d. Larco, Inc.
e. Oasis Corporation.
f. Sunroc Corp.

2. Description: ARI 1010, Type PB, pressure with bubbler, Style FW, flush-to-wall water cooler.

a. Cabinet: All stainless steel .
b. Bubbler: One, with adjustable stream regulator, located on deck.
c. Control: Push button .
d. Supply: NPS 3/8 with ball, gate, or globe valve.
e. Filter: One or more water filters complying with NSF 42 and NSF 53 for cyst and lead reduction to below EPA standards; with capacity sized for unit peak flow rate.
f. Drain: Grid with NPS 1-1/4 minimum horizontal waste and trap complying with ASME A112.18.2.
g. Cooling System: Electric, with hermetically sealed compressor, cooling coil, air-cooled condensing unit, corrosion-resistant tubing, refrigerant, corrosion-resistant-metal storage tank, and adjustable thermostat.

1) Capacity: 8 gph of 50 deg F cooled water from 80 deg F inlet water and 90 deg F ambient air temperature.
2) Electrical Characteristics: 1/4 hp; 120-V ac; single phase; 60 Hz.

2.3 FIXTURE SUPPORTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Josam Co.
2. MIFAB Manufacturing, Inc.
3. Smith, Jay R. Mfg. Co.
4. Tyler Pipe; Wade Div.
5. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.
6. Zurn Plumbing Products Group; Specification Drainage Operation.

B. Description: ASME A112.6.1M, water cooler carriers. Include vertical, steel uprights with feet and tie rods and bearing plates with mounting studs matching fixture to be supported.

1. Type I: Hanger-type carrier with two vertical uprights.
2. Type II: Bilevel, hanger-type carrier with three vertical uprights.
3. Supports for Accessible Fixtures: Include rectangular, vertical, steel uprights instead of steel pipe uprights.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water and waste piping systems to verify actual locations of piping connections before fixture installation. Verify that sizes and locations of piping and types of supports match those indicated.

B. Examine walls and floors for suitable conditions where fixtures are to be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Use carrier off-floor supports for wall-mounting fixtures, unless otherwise indicated.

B. Use mounting frames for recessed water coolers, unless otherwise indicated.

C. Set freestanding and pedestal drinking fountains on floor.

D. Set remote water coolers on floor, unless otherwise indicated.

E. Use chrome-plated brass or copper tube, fittings, and valves in locations exposed to view. Plain copper tube, fittings, and valves may be used in concealed locations.

3.3 INSTALLATION

A. Install off-floor supports affixed to building substrate and attach wall-mounting fixtures, unless otherwise indicated.

B. Install mounting frames affixed to building construction and attach recessed water coolers to mounting frames, unless otherwise indicated.

C. Install fixtures level and plumb. For fixtures indicated for children, install at height required by authorities having jurisdiction.

D. Install water-supply piping with shutoff valve on supply to each fixture to be connected to water distribution piping. Use ball, gate, or globe valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."

E. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.

F. Install pipe escutcheons at wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding pipe fittings. Escutcheons are specified in Division 22 Section "Common Work Results for Plumbing."

G. Seal joints between fixtures and walls and floors using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

3.4 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.5 FIELD QUALITY CONTROL

A. Water Cooler Testing: After electrical circuitry has been energized, test for compliance with requirements. Test and adjust controls and safeties.

1. Remove and replace malfunctioning units and retest as specified above.
2. Report test results in writing.

3.6 ADJUSTING

A. Adjust fixture flow regulators for proper flow and stream height.

B. Adjust water cooler temperature settings.

3.7 CLEANING

A. After completing fixture installation, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.

END OF SECTION 224700

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Transition fittings.
2. Sleeves.
3. Escutcheons.
4. Grout.
5. Equipment installation requirements common to equipment sections.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:

1. CPVC: Chlorinated polyvinyl chloride plastic.
2. PE: Polyethylene plastic.
3. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Transition fittings.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Escutcheons.

B. Welding certificates.

1.5 QUALITY ASSURANCE

A. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.

2.3 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.2 PAINTING

A. Painting of HVAC systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.3 GROUTING

A. Mix and install grout for HVAC equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION 230500

SECTION 23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or Sections.

B. Comply with NEMA MG 1 unless otherwise indicated.

C. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet (1000 m) above sea level.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Energy efficient, as defined in NEMA MG 1.

C. Service Factor: 1.15.

D. Multispeed Motors: Variable torque.

1. For motors with 2:1 speed ratio, consequent pole, single winding.
2. For motors with other than 2:1 speed ratio, separate winding for each speed.

E. Multispeed Motors: Separate winding for each speed.

F. Rotor: Random-wound, squirrel cage.

G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.

H. Temperature Rise: Match insulation rating.

I. Insulation: Class F .

J. Code Letter Designation:

1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.

K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T .

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

D. Motors 1/20 HP and Smaller: Shaded-pole type.

E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230513

SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Duct labels.
5. Stencils.
6. Valve tags.
7. Warning tags.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: Black .

C. Background Color: White .

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.4 DUCT LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: Black .

C. Background Color: White .

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.5 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches for ducts; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Material: Fiberboard .
2. Stencil Paint: Exterior, gloss, alkyd enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, alkyd enamel in colors according to ASME A13.1 unless otherwise indicated.

2.6 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass S-hook.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.7 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches minimum .
2. Fasteners: Brass grommet and wire .
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

C. Pipe Label Color Schedule:

1. Refrigerant Piping:

a. Background Color: Black .
b. Letter Color: White .

3.3 DUCT LABEL INSTALLATION

A. Install plastic-laminated duct labels with permanent adhesive on air ducts in the following color codes:

1. Blue : For cold-air supply ducts.
2. Yellow : For hot-air supply ducts.
3. Green : For exhaust-, outside-, relief-, return-, and mixed-air ducts.
4. ASME A13.1 Colors and Designs: For hazardous material exhaust.

B. Stenciled Duct Label Option: Stenciled labels, showing service and flow direction, may be provided instead of plastic-laminated duct labels, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.

C. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 20 in each space where ducts are exposed or concealed by removable ceiling system.

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:

a. Refrigerant: 1-1/2 inches.

2. Valve-Tag Color:

a. Refrigerant: Natural .

3.5 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 230553

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes TAB to produce design objectives for the following:

1. Air Systems:

a. Constant-volume air systems.

1.3 DEFINITIONS

A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.

C. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.

D. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.

E. NC: Noise criteria.

F. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.

G. RC: Room criteria.

H. Report Forms: Test data sheets for recording test data in logical order.

I. Smoke-Control System: An engineered system that uses fans to produce airflow and pressure differences across barriers to limit smoke movement.

J. Smoke-Control Zone: A space within a building that is enclosed by smoke barriers and is a part of a zoned smoke-control system.

K. Stair Pressurization System: A type of smoke-control system that is intended to positively pressurize stair towers with outdoor air by using fans to keep smoke from contaminating the stair towers during an alarm condition.

L. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.

M. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.

N. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

O. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.

P. TAB: Testing, adjusting, and balancing.

Q. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.

R. Test: A procedure to determine quantitative performance of systems or equipment.

S. Testing, Adjusting, and Balancing (TAB) Firm: The entity responsible for performing and reporting TAB procedures.

1.4 SUBMITTALS

A. Qualification Data: Within 30 days from Contractor's Notice to Proceed, submit 4 copies of evidence that TAB firm and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within 30 days from Contractor's Notice to Proceed, submit 4 copies of the Contract Documents review report as specified in Part 3.

C. Strategies and Procedures Plan: Within 60 days from Contractor's Notice to Proceed, submit 4 copies of TAB strategies and step-by-step procedures as specified in Part 3 "Preparation" Article. Include a complete set of report forms intended for use on this Project.

D. Certified TAB Reports: Submit two copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.

E. Sample Report Forms: Submit two sets of sample TAB report forms.

F. Warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. TAB Firm Qualifications: Engage a TAB firm certified by AABC, NEBB, or TABB.

B. TAB Conference: Meet with Owner's and Architect's representatives on approval of TAB strategies and procedures plan to develop a mutual understanding of the details. Ensure the participation of TAB team members, equipment manufacturers' authorized service

representatives, HVAC controls installers, and other support personnel. Provide seven days' advance notice of scheduled meeting time and location.

1. Agenda Items: Include at least the following:

    a. Submittal distribution requirements.
    b. The Contract Documents examination report.
    c. TAB plan.
    d. Work schedule and Project-site access requirements.
    e. Coordination and cooperation of trades and subcontractors.
    f. Coordination of documentation and communication flow.

C. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard forms from SMACNA's TABB "HVAC Systems - Testing, Adjusting, and Balancing."

E. Instrumentation Type, Quantity, and Accuracy: As described in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."

F. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.

1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

1.6 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.7 COORDINATION

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.

B. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

C. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.8 WARRANTY

A. National Project Performance Guarantee: Provide a guarantee on AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" forms stating that AABC will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee includes the following provisions:

1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
2. Systems are balanced to optimum performance capabilities within design and installation limits.

B. Special Guarantee: Provide a guarantee on NEBB forms stating that TABB will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee shall include the following provisions:

1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
2. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

1. Contract Documents are defined in the General and Supplementary Conditions of Contract.
2. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine Project Record Documents described in Division 01 Section "Project Record Documents."

D. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan and pump curves. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.

F. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.

G. Examine system and equipment test reports.

H. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.

I. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.

J. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

K. Examine terminal units, such as variable-air-volume boxes, to verify that they are accessible and their controls are connected and functioning.

L. Examine plenum ceilings used for supply air to verify that they are airtight. Verify that pipe penetrations and other holes are sealed.

M. Examine strainers for clean screens and proper perforations.

N. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

O. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

P. Examine system pumps to ensure absence of entrained air in the suction piping.

Q. Examine equipment for installation and for properly operating safety interlocks and controls.

R. Examine automatic temperature system components to verify the following:

1. Dampers, valves, and other controlled devices are operated by the intended controller.
2. Dampers and valves are in the position indicated by the controller.
3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.
5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.

6. Sensors are located to sense only the intended conditions.
7. Sequence of operation for control modes is according to the Contract Documents.
8. Controller set points are set at indicated values.
9. Interlocked systems are operating.
10. Changeover from heating to cooling mode occurs according to indicated values.

S. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system readiness checks and prepare system readiness reports. Verify the following:

1. Permanent electrical power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Equipment and duct access doors are securely closed.
5. Balance, smoke, and fire dampers are open.
6. Isolating and balancing valves are open and control valves are operational.
7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in SMACNA's TABB "HVAC Systems - Testing, Adjusting, and Balancing" and this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.

C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

E. Check airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling unit components.

L. Check for proper sealing of air duct system.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure fan static pressures to determine actual static pressure as follows:

    a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
    b. Measure static pressure directly at the fan outlet or through the flexible connection.
    c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
    d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

    a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.

3. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers, under final balanced conditions.
4. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
5. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes.
6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling,

full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.

a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure terminal outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust terminal outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 FINAL REPORT

A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in three-ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.

1. Include a list of instruments used for procedures, along with proof of calibration.

C. Final Report Contents: In addition to certified field report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance, but do not include Shop Drawings and Product Data.

D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:

1. Title page.
2. Name and address of TAB firm.

3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB firm who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer, type size, and fittings.
14. Notes to explain why certain final data in the body of reports varies from indicated values.
15. Test conditions for fans and pump performance forms including the following:

    a. Settings for outside-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

E. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outside, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.
7. Position of balancing devices.

F. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

    a. System and air-handling unit number.
    b. Location and zone.
    c. Traverse air temperature in deg F.
    d. Duct static pressure in inches wg.
    e. Duct size in inches.
    f. Duct area in sq. ft..
    g. Indicated airflow rate in cfm.
    h. Indicated velocity in fpm.
    i. Actual airflow rate in cfm.
    j. Actual average velocity in fpm.

k. Barometric pressure in psig.

G. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Test apparatus used.
d. Area served.
e. Air-terminal-device make.
f. Air-terminal-device number from system diagram.
g. Air-terminal-device type and model number.
h. Air-terminal-device size.
i. Air-terminal-device effective area in sq. ft..

2. Test Data (Indicated and Actual Values):

a. Airflow rate in cfm.
b. Air velocity in fpm.
c. Preliminary airflow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final airflow rate in cfm.
f. Final velocity in fpm.
g. Space temperature in deg F.

3.7 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the Final Report.
2. Randomly check the following for each system:

a. Measure airflow of at least 10 percent of air outlets.
b. Measure water flow of at least 5 percent of terminals.
c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
d. Measure sound levels at two locations.
e. Measure space pressure of at least 10 percent of locations.
f. Verify that balancing devices are marked with final balance position.
g. Note deviations to the Contract Documents in the Final Report.

B. Final Inspection:

1. After initial inspection is complete and evidence by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Owner .
2. TAB firm test and balance engineer shall conduct the inspection in the presence of Owner .
3. Owner shall randomly select measurements documented in the final report to be rechecked. The rechecking shall be limited to either 10 percent of the total

measurements recorded, or the extent of measurements that can be accomplished in a normal 8-hour business day.

4. If the rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
6. TAB firm shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes and resubmit the final report.
7. Request a second final inspection. If the second final inspection also fails, Owner shall contract the services of another TAB firm to complete the testing and balancing in accordance with the Contract Documents and deduct the cost of the services from the final payment.

3.8 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional testing, inspecting, and adjusting during near-peak summer and winter conditions.

END OF SECTION 230593

SECTION 23 07 00 - HVAC INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Insulation Materials:

a. Flexible elastomeric.
b. Mineral fiber.
2. Factory-applied jackets.
3. Tapes.
4. Securements.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

B. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use.

1. Sample Sizes:

a. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
b. Jacket Materials for Pipe: 12 inches long by NPS 2.
c. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

C. Qualification Data: For qualified Installer.

D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

E. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket . Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. CertainTeed Corp.; Duct Wrap.
b. Johns Manville; Microlite.
c. Knauf Insulation; Duct Wrap.
d. Manson Insulation Inc.; Alley Wrap.
e. Owens Corning; All-Service Duct Wrap.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Aeroflex USA Inc.; Aeroseal.
b. Armacell LCC; 520 Adhesive.
c. Foster Products Corporation, H. B. Fuller Company; 85-75.
d. RBX Corporation; Rubatex Contact Adhesive.

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Childers Products, Division of ITW; CP-82.
    b. Foster Products Corporation, H. B. Fuller Company; 85-20.
    c. ITW TACC, Division of Illinois Tool Works; S-90/80.
    d. Marathon Industries, Inc.; 225.
    e. Mon-Eco Industries, Inc.; 22-25.

D. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Childers Products, Division of ITW; CP-82.
    b. Foster Products Corporation, H. B. Fuller Company; 85-20.
    c. ITW TACC, Division of Illinois Tool Works; S-90/80.
    d. Marathon Industries, Inc.; 225.
    e. Mon-Eco Industries, Inc.; 22-25.

2.3 SEALANTS

A. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Childers Products, Division of ITW; CP-76.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.

2.4 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.

2.5 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
    b. Compac Corp.; 104 and 105.
    c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
    d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

2.6 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Childers Products; Bands.
    b. PABCO Metals Corporation; Bands.
    c. RPR Products, Inc.; Bands.

2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 ; 0.015 inch thick, 3/4 inch wide with wing or closed seal.
3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

C. Wire: 0.080-inch nickel-copper alloy .

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. C & F Wire.
    b. Childers Products.
    c. PABCO Metals Corporation.
    d. RPR Products, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

1. Verify that systems and equipment to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions. Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

1. Comply with requirements in Division 07 Section "Penetration Firestopping" and fire-resistive joint sealers.

F. Insulation Installation at Floor Penetrations:

1. Duct: Install insulation continuously through floor penetrations that are not fire rated. For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
2. Pipe: Install insulation continuously through floor penetrations.
3. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic

for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.

8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.

3.6 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

C. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.

3. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
4. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.7 FINISHES

A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.9 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.

3.10 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

3.11 INDOOR PIPING INSULATION SCHEDULE

A. Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be one of the following:
   a. Flexible Elastomeric: 3/4 inch thick.
   b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

END OF SECTION 230700

SECTION 23 08 00 - COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.3 ALLOWANCES

A. Labor, instrumentation, tools, and equipment costs for technicians for the performance of commissioning testing are covered by the "Schedule of Allowances" Article in Division 01 Section "Allowances."

1.4 UNIT PRICES

A. Commissioning testing allowance may be adjusted up or down by the "List of Unit Prices" Article in Division 01 Section "Unit Prices" when actual man-hours are computed at the end of commissioning testing.

1.5 CONTRACTOR'S RESPONSIBILITIES

A. Perform commissioning tests at the direction of the CxA.

B. Attend construction phase controls coordination meeting.

C. Attend testing, adjusting, and balancing review and coordination meeting.

D. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

E. Provide information requested by the CxA for final commissioning documentation.

F. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

1.6 CxA'S RESPONSIBILITIES

A. Provide Project-specific construction checklists and commissioning process test procedures for actual HVAC&R systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.

B. Direct commissioning testing.

C. Verify testing, adjusting, and balancing of Work are complete.

D. Provide test data, inspection reports, and certificates in Systems Manual.

1.7 COMMISSIONING DOCUMENTATION

A. Provide the following information to the CxA for inclusion in the commissioning plan:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
5. Certificate of readiness certifying that HVAC&R systems, subsystems, equipment, and associated controls are ready for testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.
8. Verification of testing, adjusting, and balancing reports.

1.8 SUBMITTALS

A. Certificates of readiness.

B. Certificates of completion of installation, prestart, and startup activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

A. Certify that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.2 TESTING AND BALANCING VERIFICATION

A. Prior to performance of testing and balancing Work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. Notify the CxA at least 10 days in advance of testing and balancing Work, and provide access for the CxA to witness testing and balancing Work.

C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.

1. The CxA will notify testing and balancing Contractor 10 days in advance of the date of field verification. Notice will not include data points to be verified.
2. The testing and balancing Contractor shall use the same instruments (by model and serial number) that were used when original data were collected.
3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.
4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.3 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the HVAC&R Contractor , testing and balancing Contractor , and HVAC&R Instrumentation and Control Contractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.4 HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. Boiler Testing and Acceptance Procedures: Testing requirements are specified in Division 23 boiler Sections. Provide submittals, test data, inspector record, and boiler certification to the CxA.

B. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CxA with preparation of testing plans.

C. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment requirements are specified in Division 23 piping Sections. HVAC&R Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:

1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
2. Description of equipment for flushing operations.
3. Minimum flushing water velocity.
4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

D. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

E. HVAC&R Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.

F. Vibration and Sound Tests: Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

G. HVAC System serving Concession stand and Meeting Room.

END OF SECTION 230800

SECTION 23 23 00 - REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes refrigerant piping used for air-conditioning applications.

1.3 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-134a:

1. Suction Lines for Air-Conditioning Applications: 115 psig.
2. Suction Lines for Heat-Pump Applications: 225 psig.
3. Hot-Gas and Liquid Lines: 225 psig.

B. Line Test Pressure for Refrigerant R-410A:

1. Suction Lines for Air-Conditioning Applications: 300 psig.
2. Suction Lines for Heat-Pump Applications: 535 psig.
3. Hot-Gas and Liquid Lines: 535 psig.

1.4 SUBMITTALS

A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:

1. Thermostatic expansion valves.
2. Solenoid valves.
3. Hot-gas bypass valves.
4. Filter dryers.
5. Strainers.
6. Pressure-regulating valves.

B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.

1. Shop Drawing Scale: 1/4 inch equals 1 foot .
2. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between

compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

C. Welding certificates.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.6 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

1.7 COORDINATION

A. Coordinate size and location of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 280, Type ACR.

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

E. Brazing Filler Metals: AWS A5.8.

F. Flexible Connectors:

1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
2. End Connections: Socket ends.

3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch- long assembly.
4. Pressure Rating: Factory test at minimum 500 psig.
5. Maximum Operating Temperature: 250 deg F.

2.2 VALVES AND SPECIALTIES

A. Service Valves:

1. Body: Forged brass with brass cap including key end to remove core.
2. Core: Removable ball-type check valve with stainless-steel spring.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Copper spring.
5. Working Pressure Rating: 500 psig.

B. Solenoid Valves: Comply with ARI 760 and UL 429; listed and labeled by an NRTL.

1. Body and Bonnet: Plated steel.
2. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Threaded.
5. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch conduit adapter, and 208-V ac coil.
6. Working Pressure Rating: 400 psig.
7. Maximum Operating Temperature: 240 deg F.
8. Manual operator.

C. Safety Relief Valves: Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.

1. Body and Bonnet: Ductile iron and steel, with neoprene O-ring seal.
2. Piston, Closing Spring, and Seat Insert: Stainless steel.
3. Seat Disc: Polytetrafluoroethylene.
4. End Connections: Threaded.
5. Working Pressure Rating: 400 psig.
6. Maximum Operating Temperature: 240 deg F.

D. Thermostatic Expansion Valves: Comply with ARI 750.

1. Body, Bonnet, and Seal Cap: Forged brass or steel.
2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
3. Packing and Gaskets: Non-asbestos.
4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
5. Suction Temperature: 40 deg F .
6. Superheat: Nonadjustable.
7. Reverse-flow option (for heat-pump applications).
8. End Connections: Socket, flare, or threaded union.
9. Working Pressure Rating: 450 psig .

E. Straight-Type Strainers:

1. Body: Welded steel with corrosion-resistant coating.
2. Screen: 100-mesh stainless steel.
3. End Connections: Socket or flare.

4. Working Pressure Rating: 500 psig.
5. Maximum Operating Temperature: 275 deg F.

F. Moisture/Liquid Indicators:

1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in ppm.
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 240 deg F.

2.3 REFRIGERANTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. ASHRAE 34, R-134a: Tetrafluoroethane.

C. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT R-134a

A. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR , drawn-temper tubing and wrought-copper fittings with soldered joints.

3.2 PIPING APPLICATIONS FOR REFRIGERANT R-410A

3.3 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Refer to Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operation" for solenoid valve controllers, control wiring, and sequence of operation.

K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

M. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

N. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

O. Before installation of steel refrigerant piping, clean pipe and fittings using the following procedures:

1. Shot blast the interior of piping.
2. Remove coarse particles of dirt and dust by drawing a clean, lintless cloth through tubing by means of a wire or electrician's tape.
3. Draw a clean, lintless cloth saturated with trichloroethylene through the tube or pipe. Continue this procedure until cloth is not discolored by dirt.
4. Draw a clean, lintless cloth, saturated with compressor oil, squeezed dry, through the tube or pipe to remove remaining lint. Inspect tube or pipe visually for remaining dirt and lint.
5. Finally, draw a clean, dry, lintless cloth through the tube or pipe.
6. Safety-relief-valve discharge piping is not required to be cleaned but is required to be open to allow unrestricted flow.

P. Install pipe sleeves at penetrations in exterior walls and floor assemblies.

Q. Seal penetrations through fire and smoke barriers according to Division 07 Section "Penetration Firestopping."

R. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

S. Install sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.

T. Seal pipe penetrations through exterior walls according to Division 07 Section "Joint Sealants" for materials and methods.

U. Identify refrigerant piping and valves according to Division 23 Section "Identification for HVAC Piping and Equipment."

3.4 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.

D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

3.5 HANGERS AND SUPPORTS

A. Hanger, support, and anchor products are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

B. Install the following pipe attachments:

1. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:

1. NPS 1/2: Maximum span, 60 inches; minimum rod size, 1/4 inch.
2. NPS 5/8: Maximum span, 60 inches; minimum rod size, 1/4 inch.
3. NPS 1: Maximum span, 72 inches; minimum rod size, 1/4 inch.

D. Support multifloor vertical runs at least at each floor.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.

    a. Fill system with nitrogen to the required test pressure.
    b. System shall maintain test pressure at the manifold gage throughout duration of test.
    c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.7 SYSTEM CHARGING

A. Charge system using the following procedures:

1. Install core in filter dryers after leak test but before evacuation.
2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
4. Charge system with a new filter-dryer core in charging line.

3.8 ADJUSTING

A. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:

1. Open shutoff valves in condenser water circuit.
2. Verify that compressor oil level is correct.
3. Open compressor suction and discharge valves.
4. Open refrigerant valves except bypass valves that are used for other purposes.
5. Check open compressor-motor alignment and verify lubrication for motors and bearings.

B. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 23 2300

SECTION 23 31 13 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Single-wall round ducts and fittings.
3. Sheet metal materials.
4. Duct liner.
5. Sealants and gaskets.
6. Hangers and supports.
7. Seismic-restraint devices.

B. Related Sections:

1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Division 23 Section "Nonmetal Ducts" for fibrous-glass ducts, thermoset fiber-reinforced plastic ducts, thermoplastic ducts, PVC ducts, and concrete ducts.
3. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated.

1. Static-Pressure Classes:

a. Exhaust Ducts (Negative Pressure): 1-inch wg .

1.4 SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.

B. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.

C. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.

D. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:

    a. Lighting fixtures.
    b. Air outlets and inlets.
    c. Access panels.
    d. Perimeter moldings.

E. Welding certificates.

F. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Lindab Inc.
b. McGill AirFlow LLC.
c. SEMCO Incorporated.
d. Sheet Metal Connectors, Inc.
e. Spiral Manufacturing Co., Inc.

B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter (diameter of the round sides connecting the flat portions of the duct).

C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.

D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.

E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 .
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

2.4 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

3.2 SEAM AND JOINT SEALING

A. Seal duct seams and joints for duct static-pressure and leakage classes specified in "Performance Requirements" Article, according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 1-2, "Standard Duct Sealing Requirements," unless otherwise indicated.

1. For static-pressure classes 1- and 1/2-inch wg, comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Seal Class C, except as follows:

    a. Systems for residential occupancy.
    b. Ducts that are located directly in zones they serve.
    c. Return-air ceiling plenums.

B. Seal Classes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 1-2, "Standard Duct Sealing Requirements."

1. For static-pressure classes 1- and 1/2-inch wg, comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Seal Class C, except as follows:

    a. Systems for residential occupancy.
    b. Ducts that are located directly in zones they serve.
    c. Ducts that have short runs from volume control boxes to diffusers.
    d. Return-air ceiling plenums.

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.4 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual."
2. Test the following systems:

    a. Exhaust Air.

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before insulation application.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.
2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."

    a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

D. Duct system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel.

B. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."

    a. Velocity 1000 fpm or Lower:

        1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
        2) Mitered Type RE 4 without vanes.

    b. Velocity 1000 to 1500 fpm:

        1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
        2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
        3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

    c. Velocity 1500 fpm or Higher:

        1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.

2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."

a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.

1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.

b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.

C. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."

a. Rectangular Main to Rectangular Branch: 45-degree entry.
b. Rectangular Main to Round Branch: Spin in.

2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.

a. Velocity 1000 fpm or Lower: 90-degree tap.
b. Velocity 1000 to 1500 fpm: Conical tap.
c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 233113

SECTION 23 34 23 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Centrifugal roof ventilators.
   2. Centrifugal wall ventilators.
   3. Ceiling-mounting ventilators.

1.3 PERFORMANCE REQUIREMENTS

A. Project Altitude: Base fan-performance ratings on sea level.

B. Operating Limits: Classify according to AMCA 99.

1.4 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:

   1. Certified fan performance curves with system operating conditions indicated.
   2. Certified fan sound-power ratings.
   3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
   4. Material thickness and finishes, including color charts.
   5. Dampers, including housings, linkages, and operators.
   6. Roof curbs.
   7. Fan speed controllers.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

   1. Wiring Diagrams: Power, signal, and control wiring.
   2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
   3. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, and base weights.

C. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Roof framing and support members relative to duct penetrations.
2. Ceiling suspension assembly members.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.

C. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.

D. UL Standard: Power ventilators shall comply with UL 705.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.

B. Disassemble and reassemble units, as required for moving to final location, according to manufacturer's written instructions.

C. Lift and support units with manufacturer's designated lifting or supporting points.

1.7 COORDINATION

A. Coordinate size and location of structural-steel support members.

B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

C. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Belts: One set(s) for each belt-driven unit.

PART 2 - PRODUCTS

2.1 CENTRIFUGAL ROOF VENTILATORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Acme Engineering & Mfg. Corp.
2. Breidert Air Products.
3. Carnes Company HVAC.
4. Greenheck.
5. Hartzell Fan, Inc.
6. JencoFan; Div. of Breidert Air Products.
7. Loren Cook Company.
8. Penn Ventilation.

B. Description: Direct- or belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.

C. Housing: Removable, extruded-aluminum, rectangular top ; square, one-piece, aluminum base with venturi inlet cone.
1. Hinged Subbase: Galvanized-steel hinged arrangement permitting service and maintenance.

D. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.

E. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:

1. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
3. Pulleys: Cast-iron, adjustable-pitch motor pulley.
4. Fan and motor isolated from exhaust airstream.

F. Accessories:

1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
3. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
4. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.

G. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch- thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.

1. Configuration: Self-flashing without a cant strip, with mounting flange Built-in cant and mounting flange .
2. Overall Height: 12 inches .
3. Sound Curb: Curb with sound-absorbing insulation matrix.
4. Pitch Mounting: Manufacture curb for roof slope.
5. Metal Liner: Galvanized steel.

H. Capacities and Characteristics: See drawings

2.2 CENTRIFUGAL WALL VENTILATORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Acme Engineering & Mfg. Corp.
2. Breidert Air Products.
3. Carnes Company HVAC.
4. Greenheck.
5. Hartzell Fan, Inc.
6. JencoFan; Div. of Breidert Air Products.
7. Loren Cook Company.
8. Penn Ventilation.

B. Description: Direct- or belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, and accessories.

C. Housing: Heavy-gage, removable, spun-aluminum, dome top and outlet baffle; venturi inlet cone.

D. Fan Wheel: Aluminum hub and wheel with backward-inclined blades.

E. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:

1. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
3. Pulleys: Cast-iron, adjustable-pitch motor pulley.
4. Fan and motor isolated from exhaust airstream.

F. Accessories:

1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through internal aluminum conduit.
3. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
4. Wall Grille: Ring type for flush mounting.
5. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in wall sleeve; factory set to close when fan stops.

G. Capacities and Characteristics: See Drawings

2.3 CEILING-MOUNTING VENTILATORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Acme Engineering & Mfg. Corp.
2. Breidert Air Products.
3. Carnes Company HVAC.
4. Greenheck.

5. Hartzell Fan, Inc.
6. JencoFan; Div. of Breidert Air Products.
7. Loren Cook Company.
8. Penn Ventilation.

B. Description: Centrifugal fans designed for installing in ceiling or wall or for concealed in-line applications.

C. Housing: Steel, lined with acoustical insulation.

D. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.

E. Grille: Aluminum , louvered grille with flange on intake and thumbscrew attachment to fan housing.

F. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

G. Accessories:
1. Manual Starter Switch: Single-pole rocker switch assembly with cover and pilot light.
2. Time-Delay Switch: Assembly with single-pole rocker switch, timer, and cover plate.
3. Filter: Washable aluminum to fit between fan and grille.
4. Isolation: Rubber-in-shear vibration isolators.
5. Manufacturer's standard roof jack or wall cap, and transition fittings.

H. Capacities and Characteristics: See Drawings

2.4 PROPELLER FANS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Acme Engineering & Mfg. Corp.
2. Breidert Air Products.
3. Carnes Company HVAC.
4. Greenheck.
5. Hartzell Fan, Inc.
6. JencoFan; Div. of Breidert Air Products.
7. Loren Cook Company.
8. Penn Ventilation.
9. Big Ass Fans

B. Description: Direct- or belt-driven propeller fans consisting of fan blades, hub, housing, orifice ring, motor, drive assembly, and accessories.

C. Housing: Galvanized-steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat applied after assembly.

D. Steel Fan Wheels: Formed-steel blades riveted to heavy-gage steel spider bolted to cast-iron hub.

E. Fan Wheel: Replaceable, extruded-aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.

F. Belt-Driven Drive Assembly: Resiliently mounted to housing, statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.

1. Service Factor Based on Fan Motor Size: 1.4.
2. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.

    a. Ball-Bearing Rating Life: ABMA 9, L_{10} of 100,000 hours .

4. Pulleys: Cast iron with split, tapered bushing; dynamically balanced at factory.
5. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
6. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
7. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.

G. Accessories:
1. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
2. Wall Sleeve: Galvanized steel to match fan and accessory size.
3. Weathershield Hood: Galvanized steel to match fan and accessory size.
4. Weathershield Front Guard: Galvanized steel with expanded metal screen.
5. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
6. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.

H. Capacities and Characteristics: See Drawings

1. Vibration Isolators:

    a. Type: Elastomeric hangers .
    b. Static Deflection: 1 inch .

2. Spark Arrestance Class: A .

2.5 MOTORS

A. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."

B. Enclosure Type: Totally enclosed, fan cooled.

2.6 SOURCE QUALITY CONTROL

A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install power ventilators level and plumb.

B. Support units using elastomeric mounts having a static deflection of 1 inch . Vibration- and seismic-control devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

1. Secure vibration and seismic controls to concrete bases using anchor bolts cast in concrete base.

C. Install floor-mounting units on concrete bases. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete."

D. Install floor-mounting units on concrete bases designed to withstand, without damage to equipment, the seismic force required by code. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete."

E. Secure roof-mounting fans to roof curbs with cadmium-plated hardware. Refer to Division 07 Section "Roof Accessories" for installation of roof curbs.

F. Ceiling Units: Suspend units from structure; use steel wire or metal straps.

G. Support suspended units from structure using threaded steel rods and elastomeric hangers having a static deflection of . Vibration-control devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

H. Install units with clearances for service and maintenance.

I. Label units according to requirements specified in Division 23 Section "Identification for HVAC Piping and Equipment."

3.2 CONNECTIONS

A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Air Duct Accessories."

B. Install ducts adjacent to power ventilators to allow service and maintenance.

C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that cleaning and adjusting are complete.
4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
5. Adjust belt tension.
6. Adjust damper linkages for proper damper operation.
7. Verify lubrication for bearings and other moving parts.
8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
10. Shut unit down and reconnect automatic temperature-control operators.
11. Remove and replace malfunctioning units and retest as specified above.

B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust belt tension.

C. Refer to Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.

D. Replace fan and motor pulleys as required to achieve design airflow.

E. Lubricate bearings.

END OF SECTION 233423

SECTION 23 37 13 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Rectangular and square ceiling diffusers.
2. Louver face diffusers.
3. Linear bar diffusers.
4. Modular core supply grilles.
5. Fixed faceregisters and grilles

B. Related Sections:

1. Division 08 Section "Louvers and Vents" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
2. Division 23 Section "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

B. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.

C. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.

D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Ceiling suspension assembly members.
2. Method of attaching hangers to building structure.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Duct access panels.

E. Source quality-control reports.

PART 2 - PRODUCTS

A. Rectangular and Square Ceiling Diffusers CD:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. A-J Manufacturing Co., Inc.
    b. Anemostat Products; a Mestek company.
    c. Carnes.
    d. Hart & Cooley Inc.
    e. Krueger.
    f. METALAIRE, Inc.
    g. Nailor Industries Inc.
    h. Price Industries.
    i. Titus.
    j. Tuttle & Bailey.

2. Devices shall be specifically designed for variable-air-volume flows.
3. Material: Steel .
4. Finish: Baked enamel, white .
5. Face Size: 24 by 24 inches .
6. Face Style: Three cone .
7. Mounting: Surface .
8. Pattern: Two position .
9. Dampers: Radial opposed blade .
10. Accessories:

    a. Equalizing grid.
    b. Plaster ring.
    c. Safety chain.
    d. Wire guard.
    e. Sectorizing baffles.
    f. Operating rod extension.

2.2 REGISTERS AND GRILLES

A. Adjustable Bar Grille:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. A-J Manufacturing Co., Inc.
    b. Anemostat Products; a Mestek company.
    c. Carnes.
    d. Dayus Register & Grille Inc.
    e. Hart & Cooley Inc.
    f. Krueger.
    g. METALAIRE, Inc.

h. Nailor Industries Inc.
i. Price Industries.
j. Titus.
k. Tuttle & Bailey.

2. Material: Steel .
3. Finish: Baked enamel, white .
4. Face Blade Arrangement: Horizontal spaced 3 inches apart.
5. Core Construction: Integral .
6. Rear-Blade Arrangement: Vertical spaced 3/4 inch apart.
7. Frame: 1 inch wide.
8. Mounting Frame: .
9. Mounting: Countersunk screw .

B. Fixed Face Grille:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. A-J Manufacturing Co., Inc.
b. Anemostat Products; a Mestek company.
c. Carnes.
d. Dayus Register & Grille Inc.
e. Hart & Cooley Inc.
f. Krueger.
g. Nailor Industries Inc.
h. Price Industries.
i. Titus.
j. Tuttle & Bailey.

2. Material: Steel .
3. Finish: Baked enamel, white .
4. Face Arrangement: 1/2-by-1/2-by-1/2-inch grid core.
5. Core Construction: Integral .
6. Frame: 1 inch wide.
7. Mounting Frame: .
8. Mounting: Countersunk screw .

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

SECTION 23 38 13 - COMMERCIAL-KITCHEN HOODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Type I commercial kitchen hoods.

1.3 DEFINITIONS

A. Listed Hood: A hood, factory fabricated and tested for compliance with UL 710 by a testing agency acceptable to authorities having jurisdiction.

B. Standard Hood: A hood, usually field fabricated, that complies with design, construction, and performance criteria of applicable national and local codes.

C. Type I Hood: A hood designed for grease exhaust applications.

D. Type II Hood: A hood designed for heat and steam removal and for other nongrease applications.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Filters/baffles.
2. Fire-suppression systems.
3. Lighting fixtures.

B. Shop Drawings: Signed and sealed by a qualified professional engineer.

1. Shop Drawing Scale: 1/4 inch = 1 foot .
2. Show plan view, elevation view, sections, roughing-in dimensions, service requirements, duct connection sizes, and attachments to other work.
3. Show cooking equipment plan and elevation to confirm minimum code-required overhang.
4. Indicate performance, exhaust and makeup air airflow, and pressure loss at actual Project-site elevation.
5. Show water-supply and drain piping connections.
6. Show control cabinets.
7. Show fire-protection cylinders, piping, actuation devices, and manual control devices.
8. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

9. Design Calculations: Calculate requirements for selecting seismic restraints.
10. Wiring Diagrams: Power, signal, and control wiring.
11. Piping Diagrams: Detail fire-suppression piping and components and differentiate between manufacturer-installed and field-installed piping. Include roughing-in requirements for drain connections. Show cooking equipment plan and elevation to illustrate fire-suppression nozzle locations.

    a. Piping Diagram Scale: 1/4 inch = 1 foot .

C. Welding certificates.

D. Manufacturer Seismic Qualification Certification: Submit certification that commercial kitchen hoods, accessories, and components will withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

    a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Welding: Qualify procedures and personnel according to AWS D1.1/D 1.1M, "Structural Welding Code - Steel," for hangers and supports; and AWS D9.1/D9.1M, "Sheet Metal Welding Code," for joint and seam welding.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 COORDINATION

A. Coordinate equipment layout and installation with adjacent Work, including lighting fixtures, HVAC equipment, plumbing, and fire-suppression system components.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish one complete set(s) of grease filters/baffles.

PART 2 - PRODUCTS

2.1 HOOD MATERIALS

A. Stainless-Steel Sheet: ASTM A 666, Type 304.

1. Minimum Thickness: 0.050 inch .
2. Finish: Comply with SSINA's "Finishes for Stainless Steel" for recommendations for applying and designating finishes.

a. Finish shall be free from tool and die marks and stretch lines and shall have uniform, directionally textured, polished finish indicated, free of cross scratches. Grain shall run with long dimension of each piece.

3. Concealed Stainless-Steel Surfaces: ASTM A 480/A 480M, No. 2B finish (bright, cold-rolled, unpolished finish).
4. Exposed Surfaces: ASTM A 480/A 480M, No. 2B finish (bright, cold-rolled, unpolished).
5. Exposed Surfaces: ASTM A 480/A 480M, No. 3 finish (intermediate polished surface).
6. Exposed Surfaces: ASTM A 480/A 480M, No. 4 finish (directional satin).
7. Exposed Surfaces: ASTM A 480/A 480M, No. 6 finish (dull satin).
8. Exposed Surfaces: ASTM A 480/A 480M, No. 7 finish (reflective, directional polish).
9. Exposed Surfaces: ASTM A 480/A 480M, No. 8 finish (mirrorlike reflective, nondirectional polish).
10. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

B. Carbon-Steel Sheets: ASTM A 1008/A 1008M, cold-rolled sheets; commercial quality; with oiled, exposed matte finish.

1. Minimum Thickness: 0.0478 inch .

C. Zinc-Coated Steel Shapes: ASTM A 36/A 36M, zinc coated according to ASTM A 123/A 123M requirements.

D. Sealant: ASTM C 920; Type S, Grade NS, Class 25, Use NT. Elastomeric sealant shall be NSF certified for commercial kitchen hood application. Sealants, when cured and washed, shall comply with requirements in 21 CFR, Section 177.2600, for use in areas that come in contact with food.

1. Color: As selected by Architect from manufacturer's full range.
2. Backer Rod: Closed-cell polyethylene, in diameter larger than joint width.

E. Sound Dampening: NSF-certified, nonabsorbent, hard-drying, sound-deadening compound for permanent adhesion to metal in minimum 1/8-inch thickness that does not chip, flake, or blister.

F. Gaskets: NSF certified for end-use application indicated; of resilient rubber, neoprene, or PVC that is nontoxic, stable, odorless, nonabsorbent, and unaffected by exposure to foods and cleaning compounds, and that passes testing according to UL 710.

2.2 TYPE I EXHAUST HOOD FABRICATION

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Weld all joints exposed to grease with continuous welds, and make filters/baffles or grease extractors and makeup air diffusers easily accessible for cleaning.

1. Fabricate hoods according to NSF 2, "Food Equipment."
2. Hoods shall be listed and labeled, according to UL 710, by a testing agency acceptable to authorities having jurisdiction.
3. Hoods shall be designed, fabricated, and installed according to NFPA 96.
4. Include access panels as required for access to fire dampers and fusible links.
5. Duct Collars: Minimum 0.0598-inch- thick steel at least 3 inches long, continuously welded to top of hood and at corners. Fabricate a collar with a 0.5-inch- wide duct flange.

C. Hood Configuration: Exhaust and makeup air.
1. Makeup air shall be introduced through front of canopy through perforated diffusers .

D. Hood Style: Wall-mounted canopy.

E. Filters/Baffles: Removable, stainless-steel, with spring-loaded fastening. Fabricate stainless steel for filter frame and removable collection cup and pitched trough. Exposed surfaces shall be pitched to drain to collection cup. Filters/baffles shall be tested according to UL 1046, "Grease Filters for Exhaust Ducts," by an NRTL acceptable to authorities having jurisdiction.

F. Lighting Fixtures: LED fixtures and lamps with lenses sealed vaportight. Wiring shall be installed in conduit on hood exterior. Number and location of fixtures shall provide a minimum of 70 fc at 30 inches above finished floor.

1. Light switches shall be mounted on front panel of hood canopy in hood control panel.
2. Lighting Fixtures: Fluorescent complying with UL 1598.

G. Hood Controls: Hood-mounting control cabinet, factory wired to control groups of adjacent hoods, and fabricated of stainless steel.

1. Exhaust Fan: On-off switches shall start and stop the exhaust fan. Interlock exhaust fan with makeup air supply fan to operate simultaneously. Interlock exhaust fan with fire-suppression system to operate fan(s) during fire-suppression-agent release and to remain in operation until manually stopped. Include red pilot light to indicate fan operation. Motor starters shall comply with Division 26 Section "Enclosed Controllers."
2. Exhaust Fan Interlock: Factory wire the exhaust fan starters in a single control cabinet for adjacent hoods to operate together.
3. Photocell and Temperature Control: Cycle makeup air and exhaust-air fans on and off, based on temperature at hood discharge and opacity of smoke in hood. Interlock fan control with fire-suppression system to operate during fire-suppression-agent release and to remain in operation until manually stopped. Provide air-purge fan and conduit to photocell and reflector to avoid grease accumulation that will negatively affect performance of system.

4. Photocell and Temperature Control: Change speed (off, low, and high) of makeup air and exhaust-air fans with speed switch, based on temperature at hood discharge and opacity of smoke in hood. Interlock fan control with fire-suppression system to operate at high speed during fire-suppression-agent release and to remain in high-speed operation until manually stopped. Provide air-purge fan and conduit to photocell and reflector to avoid grease accumulation that will negatively affect performance of system. Controller shall limit supply quantity for proper operation of makeup air unit.
5. Photocell and Temperature Control: Vary speed of makeup air and exhaust-air fans with variable-frequency controllers, based on temperature at hood discharge and opacity of smoke in hood. Interlock fan control with fire-suppression system to operate at high speed during fire-suppression-agent release and to remain in high-speed operation until manually stopped. Provide air-purge fan and conduit to photocell and reflector to avoid grease accumulation that will negatively affect performance of system. Controller shall limit exhaust-duct velocity between and . Controller shall limit supply quantity to for proper operation of makeup air unit.
6. High-Temperature Control: Alarm shall sound and cooking equipment shall shut down before hood discharge temperature rises to actuation temperature of fire-suppression system.

2.3 WET-CHEMICAL FIRE-SUPPRESSION SYSTEM

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Description: Engineered distribution piping designed for automatic detection and release or manual release of fire-suppression agent by hood operator. Fire-suppression system shall be listed and labeled for complying with NFPA 17A, "Wet Chemical Extinguishing Systems," by a qualified testing agency acceptable to authorities having jurisdiction.

1. Steel Pipe, NPS 2 and Smaller: ASTM A 53/A 53M, Type S, Grade A, Schedule 40, plain ends.
2. Malleable-Iron Threaded Fittings: ASME B16.3, Classes 150 and 300.
3. Piping, fusible links and release mechanism, tank containing the suppression agent, and controls shall be factory installed. Controls shall be in stainless-steel control cabinet mounted on hood . Furnish manual pull station for wall mounting. Exposed piping shall be covered with chrome-plated aluminum tubing. Exposed fittings shall be chrome plated.
4. Liquid Extinguishing Agent: Noncorrosive, low-pH liquid.
5. Furnish electric-operated gas shutoff valve with clearly marked open and closed indicator for field installation.
6. Fire-suppression system controls shall be integrated with controls for fans, lights, and fuel supply and located in a single cabinet for each group of hoods immediately adjacent.
7. Wiring shall have color-coded, numbered terminal blocks and grounding bar. Spare terminals for fire alarm, optional wiring to start fan with fire alarm, red pilot light to indicate fan operation, and control switches shall all be factory wired in control cabinet with relays or starters. Include spare terminals for fire alarm, and wiring to start fan with fire alarm.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before equipment installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Complete field assembly of hoods where required.

1. Make closed butt and contact joints that do not require filler.
2. Grind field welds on stainless-steel equipment smooth, and polish to match adjacent finish. Comply with welding requirements in Part 2 "General Hood Fabrication Requirements" Article.

B. Install hoods and associated services with clearances and access for maintaining, cleaning, and servicing hoods, filters/baffles, grease extractor, and fire-suppression systems according to manufacturer's written instructions and requirements of authorities having jurisdiction.

C. Make cutouts in hoods where required to run service lines and to make final connections, and seal openings according to UL 1978.

D. Securely anchor and attach items and accessories to walls, floors, or bases with stainless-steel fasteners, unless otherwise indicated.

E. Install hoods to operate free from vibration.

F. Install seismic restraints according to SMACNA's "Kitchen Equipment Fabrication Guidelines," Appendix 1, "Guidelines for Seismic Restraints of Kitchen Equipment."

G. Install trim strips and similar items requiring fasteners in a bed of sealant. Fasten with stainless-steel fasteners at 48 inches o.c. maximum.

H. Install sealant in joints between equipment and abutting surfaces with continuous joint backing, unless otherwise indicated. Provide airtight, watertight, vermin-proof, sanitary joints.

I. Install lamps, with maximum recommended wattage, in equipment with integral lighting.

J. Set initial temperatures, and calibrate sensors.

K. Set field-adjustable switches.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping with clearance to allow service and maintenance.

C. Install reduced-pressure backflow preventer on washer-water supply. Backflow preventer is specified in Division 22 Section "Domestic Water Piping Specialties."

D. Install washer-water drain piping full size of hood connection to an adjacent floor drain or floor sink.

E. Makeup Water Connection: Comply with applicable requirements in Division 22 Section "Domestic Water Piping Specialties" for valves and accessories on piping connections to water-cooled units.

F. Connect ducts according to requirements in Division 23 Section "Air Duct Accessories." Install flexible connectors on makeup air supply duct. Weld exhaust-duct connections with continuous liquidtight joint.

G. Install fire-suppression piping for remote-mounted suppression systems according to NFPA 17A, "Wet Chemical Extinguishing Systems."

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Test each equipment item for proper operation. Repair or replace equipment that is defective, including units that operate below required capacity or that operate with excessive noise or vibration.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Test water, drain, gas, and liquid-carrying components for leaks. Repair or replace leaking components.
4. Perform hood performance tests required by authorities having jurisdiction.
5. Perform fire-suppression system performance tests required by authorities having jurisdiction.

E. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial kitchen hoods. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 233813

SECTION 23 81 26 - SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes split-system air-conditioning and heat pump units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

F. Warranty: Special warranty specified in this Section.

G. LEED Submittals:

1. Credit EA 4: Manufacturers' product data for refrigerants, including printed statement that refrigerants are free of HCFCs.

1.4 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

D. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

E. Units shall be designed to operate with HCFC-free refrigerants.

1.5 COORDINATION

A. Coordinate size and location of concrete bases for units. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete."

B. Coordinate size, location, and connection details with roof curbs, equipment supports, and roof penetrations specified in Division 07 Section "Roof Accessories."

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set of filters for each unit.
2. Fan Belts: One set of belts for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Carrier Air Conditioning; Div. of Carrier Corporation.
2. Evcon Industries, Inc.
3. First Co.
4. Friedrich Air Conditioning Company.
5. Koldwave, Inc.
6. Lennox Industries Inc.
7. Mitsubishi Electric Sales Canada, Inc.
8. Mitsubishi Electronics America, Inc.; HVAC Division.
9. Mitsubishi Heavy Industries America, Inc.; Air-Conditioning & Refrigeration Division, Inc.
10. Sanyo Fisher (U.S.A.) Corp..
11. Tadiran Electronic Industries Inc.; Appliance Division.
12. Trane Company (The); Unitary Products Group.
13. York International Corp.

2.2 CONCEALED EVAPORATOR-FAN COMPONENTS

A. Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.

1. Insulation: Faced, glass-fiber duct liner.
2. Drain Pans: Galvanized steel, with connection for drain; insulated.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.

D. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.

E. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."

1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.

F. Disposable Filters: 1 inch thick, in fiberboard frames.

G. Wiring Terminations: Connect motor to chassis wiring with plug connection.

2.3 FLOOR-MOUNTING, EVAPORATOR-FAN COMPONENTS

A. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect.

1. Discharge Grille: Steel with surface-mounted frame .
2. Insulation: Faced, glass-fiber, duct liner.
3. Drain Pans: Galvanized steel, with connection for drain; insulated.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.

D. Fan: Direct drive, centrifugal.

E. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."

1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.

F. Filters: Permanent, cleanable.

2.4 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS

A. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

1. Compressor Type: Scroll.
2. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
3. Refrigerant Charge: R-410A .

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.

D. Heat Pump Components: Reversing valve and low-temperature air cut-off thermostat.

E. Fan: Aluminum-propeller type, directly connected to motor.

F. Motor: Permanently lubricated, with integral thermal-overload protection.

G. Low Ambient Kit: Permits operation down to 45 deg F.

H. Mounting Base: Polyethylene.

2.5 ACCESSORIES

A. Control equipment and sequence of operation are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls."

B. Thermostat: Low voltage with subbase to control compressor and evaporator fan.

C. Thermostat: Wireless infrared functioning to remotely control compressor and evaporator fan, with the following features:

1. Compressor time delay.
2. 24-hour time control of system stop and start.
3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
4. Fan-speed selection, including auto setting.

D. Automatic-reset timer to prevent rapid cycling of compressor.

E. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

F. Additional Monitoring:

1. Monitor constant and variable motor loads.
2. Monitor variable frequency drive operation.
3. Monitor economizer cycle.

4. Monitor cooling load.
5. Monitor air distribution static pressure and ventilation air volumes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install ground-mounting, compressor-condenser components on 4-inch- thick, reinforced concrete base; 4 inches larger on each side than unit. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete." Coordinate anchor installation with concrete base.

D. Install ground-mounting, compressor-condenser components on polyethylene mounting base.

E. Install roof-mounting compressor-condenser components on equipment supports specified in Division 07 Section "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.

F. Install seismic restraints.

G. Install compressor-condenser components on restrained, spring isolators with a minimum static deflection of 1 inch . Refer to Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

H. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

1. Water Coil Connections: Comply with requirements in Division 23 Section "Hydronic Piping." Connect to supply and return coil with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.
2. Remote Water-Cooled Condenser Connections: Comply with requirements in Division 23 Section "Hydronic Piping." Connect to supply and return with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.
3. Steam Coil Connections: Comply with requirements in Division 23 Section "Steam and Condensate Heating Piping." Connect to steam piping with shutoff valve and union or flange; for condensate piping, starting from the coil connection, connect with union or flange, strainer, trap, and shutoff valve.

B. Install piping adjacent to unit to allow service and maintenance.

C. Duct Connections: Duct installation requirements are specified in Division 23 Section "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Division 23 Section "Air Duct Accessories."

D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

E. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 238126

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Electrical equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Common electrical installation requirements.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."."

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, :

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Plastic . Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches above finished floor level.

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants.".

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 260500

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

B. Related Sections include the following:

1. Division 26 Section "Medium-Voltage Cables" for single-conductor and multiconductor cables, cable splices, and terminations for electrical distribution systems with 2001 to 35,000 V.
2. Division 26 Section "Undercarpet Electrical Power Cables" for flat cables for undercarpet installations.
3. Division 27 Section "Communications Horizontal Cabling" for cabling used for voice and data circuits.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For testing agency.

C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
4. Senator Wire & Cable Company.
5. Southwire Company.

C. Copper Conductors: Comply with NEMA WC 70.

D. Conductor Insulation: Comply with NEMA WC 70 for Types THW THHN-THWN XHHW UF USE and SO.

2.2 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SLEEVES FOR CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.4 SLEEVE SEALS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Advance Products & Systems, Inc.
2. Calpico, Inc.
3. Metraflex Co.
4. Pipeline Seal and Insulator, Inc.

B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Plastic . Include two for each sealing element.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway .

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway .

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway .

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway .

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
2. For sleeve rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both wall surfaces.

G. Extend sleeves installed in floors 2 inches above finished floor level.

H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section "Joint Sealants."

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 07 Section "Penetration Firestopping."

L. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

M. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.6 SLEEVE-SEAL INSTALLATION

A. Install to seal underground exterior-wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Perform tests and inspections and prepare test reports.

C. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.

    a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
    b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

D. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

E. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:

1. Ground rods.
2. Grounding arrangements and connections for separately derived systems.

C. Qualification Data: For testing agency and testing agency's field supervisor.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:

1. Instructions for periodic testing and inspection of grounding features at grounding connections for separately derived systems based on NETA MTS .

   a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
   b. Include recommended testing intervals.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Bare Grounding Conductor and Conductor Protector for Wood Poles:

1. No. 4 AWG minimum, soft-drawn copper.
2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir or cypress or cedar.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by10 feet in diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING OVERHEAD LINES

A. Comply with IEEE C2 grounding requirements.

B. Install 2 parallel ground rods if resistance to ground by a single, ground-rod electrode exceeds 25 ohms.

C. Drive ground rods until tops are 12 inches below finished grade in undisturbed earth.

D. Ground-Rod Connections: Install bolted connectors for underground connections and connections to rods.

E. Lightning Arrester Grounding Conductors: Separate from other grounding conductors.

F. Secondary Neutral and Transformer Enclosure: Interconnect and connect to grounding conductor.

G. Protect grounding conductors running on surface of wood poles with molding extended from grade level up to and through communication service and transformer spaces.

3.3 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.

D. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches from the foundation.

3.4 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
10. X-Ray Equipment Circuits: Install insulated equipment grounding conductor in circuits supplying x-ray equipment.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers,

humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

E. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

F. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.5 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.

1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

F. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

I. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of 20 feet of bare copper conductor not smaller than No. 4 Insert size AWG.

1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

C. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before any conductors are connected.

a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
b. Perform tests by fall-of-potential method according to IEEE 81.

3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

D. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
2. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 Insert value ohm(s).

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include **r**ecommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.
2. Nonmetallic slotted support systems.

B. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.
g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Channel Dimensions: Selected for applicable load criteria.

B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- diameter holes at a maximum of 8 inches o.c., in at least 1 surface.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. Fabco Plastics Wholesale Limited.
d. Seasafe, Inc.

2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.

3. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
4. Rated Strength: Selected to suit applicable load criteria.

C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.
        4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, **zinc-coated stainless** steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Cooper B-Line, Inc.; a division of Cooper Industries.
        2) Empire Tool and Manufacturing Co., Inc.
        3) Hilti Inc.
        4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps .

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 .
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi , 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section " Cast-in-Place Concrete (Limited Applications)."

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:

1. Division 26 Section "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit.

H. NBR: Acrylonitrile-butadiene rubber.

I. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

1. Custom enclosures and cabinets.
2. For handholes and boxes for underground wiring, including the following:

a. Duct entry provisions, including locations and duct sizes.
b. Frame and cover design.
c. Grounding details.
d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
e. Joint details.

C. Qualification Data: For professional engineer and testing agency.

D. Source quality-control test reports.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

C. Rigid Steel Conduit: ANSI C80.1.

D. IMC: ANSI C80.6.

E. EMT: ANSI C80.3.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: Steel or die-cast, compression type.

3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.

H. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 METAL WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1 or 3R, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Screw-cover type .

E. Finish: Manufacturer's standard enamel finish.

2.3 BOXES, ENCLOSURES, AND CABINETS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy , Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

E. Nonmetallic Floor Boxes: Nonadjustable, round.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.

H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic, finished inside with radio-frequency-resistant paint.

I. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

2.4 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. Description: Comply with SCTE 77.

1. Color of Frame and Cover: Green.
2. Configuration: Units shall be designed for flush burial and have open bottom, unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, "ELECTRIC."
6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
7. Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel or fiberglass or a combination of the two.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armorcast Products Company.
b. Carson Industries LLC.
c. CDR Systems Corporation.
d. NewBasis.

2.5 SLEEVES FOR RACEWAYS

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.

C. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.6 SLEEVE SEALS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Advance Products & Systems, Inc.
2. Calpico, Inc.
3. Metraflex Co.
4. Pipeline Seal and Insulator, Inc.

B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Plastic . Include two for each sealing element.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by a independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit RNC, Type EPC-80-PVC.
2. Concealed Conduit, Aboveground: Rigid steel conduit .

3. Underground Conduit: RNC, Type EPC- 80-PVC, direct buried.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFNC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R .
6. Application of Handholes and Boxes for Underground Wiring:

    a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete , SCTE 77, Tier 15 structural load rating.
    b. Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer-concrete units , SCTE 77, Tier 8 structural load rating.
    c. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf vertical loading.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT or .
2. Exposed, Not Subject to Severe Physical Damage: EMT .
3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit . Includes raceways in the following locations:

    a. Loading dock.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.

4. Concealed in Ceilings and Interior Walls and Partitions: EMT or .
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: IMC.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits in contact with concrete.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

H. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:

1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

N. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:

   a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
   b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
   c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

O. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

Q. Set metal floor boxes level and flush with finished floor surface.

R. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Division 31 Section "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

6. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits, placing them 24 inches o.c. Align planks along the width and along the centerline of conduit.

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install handholes and boxes with bottom below the frost line, below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both surfaces of walls.

G. Extend sleeves installed in floors 2 inches above finished floor level.

H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Penetration Firestopping."

L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.6 SLEEVE-SEAL INSTALLATION

A. Install to seal underground, exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.7 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Identification for raceway and metal-clad cable.
2. Identification for conductors and communication and control cable.
3. Underground-line warning tape.
4. Warning labels and signs.
5. Instruction signs.
6. Equipment identification labels.
7. Miscellaneous identification products.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

C. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and ANSI C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.145.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Color for Printed Legend:

1. Power Circuits: Black letters on an orange field.

C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

D. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.

2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

C. Aluminum Wraparound Marker Labels: Cut from 0.014-inch- thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.

D. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking nylon tie fastener.

E. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.3 UNDERGROUND-LINE WARNING TAPE

A. Description: Permanent, bright-colored, continuous-printed, polyethylene tape.

1. Not less than 6 inches wide by 4 mils thick.
2. Compounded for permanent direct-burial service.
3. Embedded continuous metallic strip or core.
4. Printed legend shall indicate type of underground line.

2.4 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.

C. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.5 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face .
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.6 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and ultraviolet-resistant seal for label.

C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

D. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch .

2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch.
2. Tensile Strength: 50 lb, minimum.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding.

B. Paint: Paint materials and application requirements are specified in Division 09 painting Sections.

1. Exterior Ferrous Metal:

a. Semigloss Alkyd-Enamel Finish: One finish coat(s) over a primer.

1) Primer: Exterior ferrous-metal primer.
2) Finish Coats: Exterior semigloss alkyd enamel.

2. Exterior Zinc-Coated Metal (except Raceways):

a. Semigloss Alkyd-Enamel Finish: One finish coat(s) over a primer.

1) Primer: Exterior zinc-coated metal primer.
2) Finish Coats: Exterior semigloss alkyd enamel.

3. Interior Ferrous Metal:

a. Semigloss Acrylic-Enamel Finish: One finish coat(s) over a primer.

1) Primer: Interior ferrous-metal primer.
2) Finish Coats: Interior semigloss acrylic enamel.

4. Interior Zinc-Coated Metal (except Raceways):

a. Semigloss Acrylic-Enamel Finish: One finish coat(s) over a primer.

1) Primer: Interior zinc-coated metal primer.
2) Finish Coats: Interior semigloss acrylic enamel.

C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 APPLICATION

A. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, snap-around, color-coding bands:

1. Fire Alarm System: Red.
2. Fire-Suppression Supervisory and Control System: Red and yellow.
3. Combined Fire Alarm and Security System: Red and blue.
4. Security System: Blue and yellow.
5. Mechanical and Electrical Supervisory System: Green and blue.
6. Telecommunication System: Green and yellow.
7. Control Wiring: Green and red.

B. Power-Circuit Conductor Identification: For primary and secondary conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape write-on tags. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

C. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use marker tape . Identify each ungrounded conductor according to source and circuit number.

D. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source and circuit number.

E. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.

F. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable. .

G. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply baked-enamel warning signs . Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:

   a. Power transfer switches.
   b. Controls with external control power connections.

2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.

H. Instruction Signs:

1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

I. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where 2 lines of text are required, use labels 2 inches high.
b. Outdoor Equipment: Engraved, laminated acrylic or melamine label .
c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:

a. Panelboards, electrical cabinets, and enclosures.
b. Access doors and panels for concealed electrical items.
c. Electrical switchgear and switchboards.
d. Transformers.
e. Electrical substations.
f. Motor-control centers.
g. Disconnect switches.
h. Enclosed circuit breakers.
i. Motor starters.
j. Push-button stations.
k. Power transfer equipment.
l. Contactors.
m. Remote-controlled switches, dimmer modules, and control devices.
n. Intercommunication and call system master and staff stations.
o. Security and intrusion-detection control stations, control panels, terminal cabinets, and racks.
p. Monitoring and control equipment.

3.2 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.

1. Color shall be factory applied or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.
2. Colors for 208/120-V Circuits:

    a. Phase A: Black.
    b. Phase B: Red.
    c. Phase C: Blue.

3. Colors for 480/277-V Circuits:

    a. Phase A: Brown.
    b. Phase B: Orange.
    c. Phase C: Yellow.

4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

I. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

J. Painted Identification: Prepare surface and apply paint according to Division 09 painting Sections.

END OF SECTION 260553

SECTION 26 09 23 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following lighting control devices:

1. Time switches.
2. Outdoor and indoor photoelectric switches.
3. Indoor occupancy sensors.
4. Outdoor motion sensors.
5. Lighting contactors.
6. Emergency shunt relays.

B. DEFINITIONS

1. LED: Light-emitting diode.
2. PIR: Passive infrared.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Interconnection diagrams showing field-installed wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Area Lighting Research, Inc.; Tyco Electronics.
1. Grasslin Controls Corporation; a GE Industrial Systems Company.
2. Intermatic, Inc.
3. Leviton Mfg. Company Inc.
4. Lightolier Controls; a Genlyte Company.
5. Lithonia Lighting; Acuity Lighting Group, Inc.
6. Paragon Electric Co.; Invensys Climate Controls.
7. Square D; Schneider Electric.
8. TORK.
9. Touch-Plate, Inc.
10. Watt Stopper (The).
11. Retain one of two paragraphs and associated subparagraphs below.
12. Electronic Time Switches: Electronic, solid-state programmable units with alphanumeric display; complying with UL 917.

13. Contact Configuration: SPST .
14. Contact Rating: 30-A inductive or resistive, 240-V ac Insert rating.
15. Program: 8 on-off set points on a 24-hour schedule and an annual holiday schedule that overrides the weekly operation on holidays.
16. Program: 2 on-off set points on a 24-hour schedule, allowing different set points for each day of the week.
17. Programs: Insert number channels; each channel shall be individually programmable with 8 on-off set points on a 24-hour schedule.
18. Astronomic Time: All Selected channels.
19. Battery Backup: For schedules and time clock.
20. OUTDOOR PHOTOELECTRIC SWITCHES

C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

D. Area Lighting Research, Inc.; Tyco Electronics.
1. Grasslin Controls Corporation; a GE Industrial Systems Company.
2. Intermatic, Inc.
3. Lithonia Lighting; Acuity Lighting Group, Inc.
4. Novitas, Inc.
5. Paragon Electric Co.; Invensys Climate Controls.
6. Square D; Schneider Electric.
7. TORK.
8. Touch-Plate, Inc.
9. Watt Stopper (The).

10. Retain one of two paragraphs and associated subparagraphs below. Light-level range is typical for dusk-to-dawn lighting applications. Inductive rating for a switch means it is UL tested at 50 percent power factor.
11. First paragraph describes a device with built-in, metal-oxide-varistor surge protection, selection of contact ratings, and range of adjustments to orient the photocell. These features allow flexibility in making device suitable for a wide range of mounting and control situations.
12. Second paragraph describes a device with less-effective surge protection, having a fixed load-breaking contact capacity, and that may be considered for control of a single lighting fixture designed for mounting on fixture.
13. Description: Solid state, with SPST dry contacts rated for 1800-VA tungsten or 1000-VA inductive , to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A.

14. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range, and a directional lens in front of photocell to prevent fixed light sources from causing turn-off.
15. Time Delay: 15-second minimum, to prevent false operation.
16. Surge Protection: Metal-oxide varistor, complying with IEEE C62.41.1, IEEE C62.41.2, and IEEE 62.45 for Category A1 locations.
17. Mounting: Twist lock complying with IEEE C136.10, with base-and-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.

E. Description: Solid state, with DPST dry contacts rated for 1800 VA to operate connected load, relay, or contactor coils; complying with UL 773.

1. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range.
2. Time Delay: 30-second minimum, to prevent false operation.
3. Lightning Arrester: Air-gap type.
4. Mounting: Twist lock complying with IEEE C136.10, with base.

2.2 INDOOR PHOTOELECTRIC SWITCHES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Allen-Bradley/Rockwell Automation.
1. Area Lighting Research, Inc.; Tyco Electronics.
2. Eaton Electrical Inc; Cutler-Hammer Products.
3. Grasslin Controls Corporation; a GE Industrial Systems Company.
4. Intermatic, Inc.
5. Lithonia Lighting; Acuity Lighting Group, Inc.
6. MicroLite Lighting Control Systems.
7. Novitas, Inc.
8. Paragon Electric Co.; Invensys Climate Controls.
9. Square D; Schneider Electric.
10. TORK.
11. Touch-Plate, Inc.
12. Watt Stopper (The).
13. Photoelectric switch in paragraph and subparagraphs below is used to turn lighting on and off, depending on amount of daylight reaching the work plane. Switch described is for lighting control of interior spaces. Switching range should correspond to typical interior lighting levels for the space in which it is mounted.

14. Paragraph below is suitable for general indoor daylight harvesting applications. Sensors and accessories are for switching ballasts or lamps. Dimming controls are specified in Division 26 Sections "Central Dimming Controls" and "Modular Dimming Controls."
15. Ceiling-Mounted Photoelectric Switch: Solid-state, light-level sensor unit, with separate relay unit mounted on luminaire, to detect changes in lighting levels that are perceived by the eye. Cadmium sulfide photoresistors are not acceptable.

16. Sensor Output: Contacts rated to operate the associated relay, complying with UL 773A. Sensor shall be powered from the relay unit.
17. Relay Unit: Dry contacts rated for 20 Insert amperage-A ballast load at 120- and 277-V ac, for 13 Insert amperage-A tungsten at 120-V ac, and for 1 Insert value hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
18. Light-Level Monitoring Range: 10 to 200 fc 100 to 1000 fc, with an adjustment for turn-on and turn-off levels within that range.
19. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling, with deadband adjustment.
20. Indicator: Two LEDs to indicate the beginning of on-off cycles.

C. Skylight Photoelectric Sensors: Solid-state, light-level sensor; housed in a threaded, plastic fitting for mounting under skylight, facing up at skylight; with separate relay unit mounted on luminaire, to detect changes in lighting levels that are perceived by the eye. Cadmium sulfide photoresistors are not acceptable.

1. Sensor Output: Contacts rated to operate the associated relay, complying with UL 773A. Sensor shall be powered from the relay unit.
2. Relay Unit: Dry contacts rated for 20 Insert amperage-A ballast load at 120- and 277-V ac, for 13 Insert amperage-A tungsten at 120-V ac, and for 1 Insert value hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
3. Light-Level Monitoring Range: 1000 to 10,000 fc, with an adjustment for turn-on and turn-off levels within that range.
4. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling, with deadband adjustment.
5. Indicator: Two LEDs to indicate the beginning of on-off cycles.

D. LIGHTING CONTACTORS

E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

F. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

G. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings Insert manufacturer's name; product name or designation or a comparable product by one of the following:

1. Allen-Bradley/Rockwell Automation.
2. ASCO Power Technologies, LP; a division of Emerson Electric Co.
3. Eaton Electrical Inc.; Cutler-Hammer Products.
4. GE Industrial Systems; Total Lighting Control.
5. Grasslin Controls Corporation; a GE Industrial Systems Company.
6. Hubbell Lighting.
7. Lithonia Lighting; Acuity Lighting Group, Inc.
8. MicroLite Lighting Control Systems.

9. Square D; Schneider Electric.
10. TORK.
11. Touch-Plate, Inc.
12. Watt Stopper (The).
13. Description: Electrically operated and mechanically electrically held, combination type with fusible switch nonfused disconnect, complying with NEMA ICS 2 and UL 508.

14. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
15. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
16. Enclosure: Comply with NEMA 250.
17. Provide with control and pilot devices as indicated on Drawings scheduled, matching the NEMA type specified for the enclosure.

H. CONDUCTORS AND CABLES

I. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

J. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 22 24 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

K. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 16 18 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

A. Wiring Method: Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size shall be 1/2 inch.

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

A. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."

1. Identify controlled circuits in lighting contactors.
2. Identify circuits or luminaries controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
2. Operational Test: Verify operation of each lighting control device, and adjust time delays.

B. Lighting control devices that fail tests and inspections are defective work.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions. Provide up to two Insert number visits to Project during other-than-normal occupancy hours for this purpose.

3.7 DEMONSTRATION

A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control system specified in Division 26 Section "Network Lighting Controls."

B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 260923

SECTION 26 22 00 - LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:

1. Distribution transformers.

1.3 SUBMITTALS

A. Product Data: Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.

C. Manufacturer Seismic Qualification Certification: Submit certification that transformers, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Qualification Data: For testing agency.

E. Source quality-control test reports.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7.

C. Source Limitations: Obtain each transformer type through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

1.6 COORDINATION

A. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of wall-mounting and structure-hanging supports with actual transformer provided.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ACME Electric Corporation; Power Distribution Products Division.
2. Challenger Electrical Equipment Corp.; a division of Eaton Corp.
3. Controlled Power Company.
4. Eaton Electrical Inc.; Cutler-Hammer Products.
5. Federal Pacific Transformer Company; Division of Electro-Mechanical Corp.
6. General Electric Company.
7. Hammond Co.; Matra Electric, Inc.
8. Magnetek Power Electronics Group.
9. Micron Industries Corp.
10. Myers Power Products, Inc.
11. Siemens Energy & Automation, Inc.
12. Sola/Hevi-Duty.
13. Square D; Schneider Electric.

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

B. Cores: Grain-oriented, non-aging silicon steel.

C. Coils: Continuous windings without splices except for taps.

1. Internal Coil Connections: Brazed or pressure type.
2. Coil Material: Copper.

2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NEMA ST 20, and list and label as complying with UL 1561.

B. Provide transformers that are constructed to withstand seismic forces specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

C. Cores: One leg per phase.

D. Enclosure: Ventilated, NEMA 250, Type 2.

1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.

E. Enclosure: Ventilated, NEMA 250.

1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.

F. Transformer Enclosure Finish: Comply with NEMA 250.

1. Finish Color: Gray.

G. Taps for Transformers Smaller Than 3 kVA: .

H. Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity.

I. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.

J. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 150deg C rise above 40 deg C ambient temperature.

K. Energy Efficiency for Transformers Rated 15 kVA and Larger:

1. Complying with NEMA TP 1, Class 1 efficiency levels.
2. Tested according to NEMA TP 2.

L. K-Factor Rating: Transformers indicated to be K-factor rated shall comply with UL 1561 requirements for nonsinusoidal load current-handling capability to the degree defined by designated K-factor.

1. Unit shall not overheat when carrying full-load current with harmonic distortion corresponding to designated K-factor.
2. Indicate value of K-factor on transformer nameplate.

M. Electrostatic Shielding: Each winding shall have an independent, single, full-width copper electrostatic shield arranged to minimize interwinding capacitance.

1. Arrange coil leads and terminal strips to minimize capacitive coupling between input and output terminals.
2. Include special terminal for grounding the shield.
3. Shield Effectiveness:

a. Capacitance between Primary and Secondary Windings: Not to exceed 33 picofarads over a frequency range of 20 Hz to 1 MHz.
b. Common-Mode Noise Attenuation: Minimum of minus 120 dBA at 0.5 to 1.5 kHz; minimum of minus 65 dBA at 1.5 to 100 kHz.
c. Normal-Mode Noise Attenuation: Minimum of minus 52 dBA at 1.5 to 10 kHz.

N. Wall Brackets: Manufacturer's standard brackets.

O. Fungus Proofing: Permanent fungicidal treatment for coil and core.

P. Low-Sound-Level Requirements: Minimum of 3 dBA less than NEMA ST 20 standard sound levels when factory tested according to IEEE C57.12.91.

2.4 IDENTIFICATION DEVICES

A. Nameplates: Engraved, laminated-plastic or metal nameplate for each distribution transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Division 26 Section "Identification for Electrical Systems."

2.5 SOURCE QUALITY CONTROL

A. Test and inspect transformers according to IEEE C57.12.91.

B. Factory Sound-Level Tests: Conduct sound-level tests on equipment for this Project.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.

C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.

D. Verify that ground connections are in place and requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.

1. Brace wall-mounting transformers as specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems.

B. Construct concrete bases and anchor floor-mounting transformers according to manufacturer's written instructions and requirements in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

3.3 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

E. Remove and replace units that do not pass tests or inspections and retest as specified above.

F. Infrared Scanning: Two months after Substantial Completion, perform an infrared scan of transformer connections.

1. Use an infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.
2. Perform 2 follow-up infrared scans of transformers, one at 4 months and the other at 11 months after Substantial Completion.
3. Prepare a certified report identifying transformer checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and scanning observations after remedial action.

G. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.5 ADJUSTING

A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.

B. Connect buck-boost transformers to provide nameplate voltage of equipment being served, plus or minus 5 percent, at secondary terminals.

C. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.6 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 16461

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Distribution panelboards.

1.3 DEFINITIONS

A. SVR: Suppressed voltage rating.

B. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS

A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.
   1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
   2. Detail enclosure types and details for types other than NEMA 250, Type 1.
   3. Detail bus configuration, current, and voltage ratings.
   4. Short-circuit current rating of panelboards and overcurrent protective devices.
   5. Include evidence of NRTL listing for series rating of installed devices.
   6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
   7. Include wiring diagrams for power, signal, and control wiring.
   8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

C. Qualification Data: For qualified testing agency.

D. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Field Quality-Control Reports:
1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

F. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

G. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.
1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NEMA PB 1.

F. Comply with NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NECA 407 .

1.7 PROJECT CONDITIONS

A. Environmental Limitations:
   1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
   2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
      a. Ambient Temperature: Not exceeding minus 22 deg F to plus 104 deg F.
      b. Altitude: Not exceeding 6600 feet.

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:
   1. Ambient temperatures within limits specified.
   2. Altitude not exceeding 6600 feet.

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
   1. Notify Construction Manager no fewer than two days in advance of proposed interruption of electric service.
   2. Do not proceed with interruption of electric service without Construction Manager's written permission.
   3. Comply with NFPA 70E.

1.8 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Five years from date of Substantial Completion.

1.10 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Two spares for each type of panelboard cabinet lock.
2. Circuit Breakers Including GFCI and Ground Fault Equipment Protection (GFEP) Types: Two spares for each panelboard.
3. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
4. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

B. Enclosures: Flush- and surface-mounted cabinets.
1. Rated for environmental conditions at installed location.
   a. Indoor Dry and Clean Locations: NEMA 250, Type 1 .
   b. Outdoor Locations: NEMA 250, Type 3R .
2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
4. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
5. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
6. Finishes:
   a. Panels and Trim: Steel , factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
   b. Back Boxes: Galvanized steel .
   c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.
7. Directory Card: Inside panelboard door, mounted in transparent card holder .

C. Incoming Mains Location: Top and bottom.

D. Phase, Neutral, and Ground Buses:
1. Material: Hard-drawn copper, 98 percent conductivity.
2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
3. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.
4. Split Bus: Vertical buses divided into individual vertical sections.

E. Conductor Connectors: Suitable for use with conductor material and sizes.
1. Material: Hard-drawn copper, 98 percent conductivity.
2. Main and Neutral Lugs: Compression type.
3. Ground Lugs and Bus-Configured Terminators: Compression type.

4. Feed-Through Lugs: Compression type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
5. Subfeed (Double) Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
6. Gutter-Tap Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
7. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.

F. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.

G. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

H. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, listed and labeled for series-connected short-circuit rating by an NRTL.

I. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 DISTRIBUTION PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Panelboards: NEMA PB 1, power and feeder distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
1. For doors more than 36 inches high, provide two latches, keyed alike.

D. Mains: Circuit breaker .

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.

F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

G. Branch Overcurrent Protective Devices: Fused switches.

H. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
2. External Control-Power Source: 120-V branch circuit .

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with series-connected rating to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:
a. Instantaneous trip.
b. Long- and short-time pickup levels.
c. Long- and short-time time adjustments.
d. Ground-fault pickup level, time delay, and I^2t response.
4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
6. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
7. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
8. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
a. Standard frame sizes, trip ratings, and number of poles.
b. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.
c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

2.4 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store panelboards according to NECA 407 .

B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install panelboards and accessories according to NECA 407 .

B. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

C. Mount top of trim 90 inches above finished floor unless otherwise indicated.

D. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

E. Install overcurrent protective devices and controllers not already factory installed.
1. Set field-adjustable, circuit-breaker trip ranges.

F. Install filler plates in unused spaces.

G. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

H. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

I. Comply with NECA 1.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26 Section "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Acceptance Testing Preparation:
   1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
   2. Test continuity of each circuit.

E. Tests and Inspections:
   1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
   2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
   3. Perform the following infrared scan tests and inspections and prepare reports:
      a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
      b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
      c. Instruments and Equipment:
         1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

F. Panelboards will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as indicated

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.
   1. Measure as directed during period of normal system loading.
   2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
   3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
   4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.6 PROTECTION

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION 262416

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Wall-box motion sensors.
3. Solid-state fan speed controls.
4. Wall-switch and exterior occupancy sensors.
5. Communications outlets.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Samples: One for each type of device and wall plate specified, in each color specified.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 STRAIGHT BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 5351 (single), 5352 (duplex).
b. Hubbell; HBL5351 (single), CR5352 (duplex).
c. Leviton; 5891 (single), 5352 (duplex).
d. Pass & Seymour; 5381 (single), 5352 (duplex).

2.3 GFCI RECEPTACLES

A. General Description: Straight blade, feed -through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; GF20.
b. Pass & Seymour; 2084.

2.4 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

C. Key-Operated Switches, 120/277 V, 20 A:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 2221L.
b. Hubbell; HBL1221L.
c. Leviton; 1221-2L.
d. Pass & Seymour; PS20AC1-L.

3. Description: Single pole, with factory-supplied key in lieu of switch handle.

D. Key-Operated, Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 1995L.
b. Hubbell; HBL1557L.
c. Leviton; 1257L.
d. Pass & Seymour; 1251L.

2.5 FAN SPEED CONTROLS

A. Modular, 120-V, full-wave, solid-state units with integral, quiet on-off switches and audible frequency and EMI/RFI filters. Comply with UL 1917.

1. Continuously adjustable slider rotary knob, 5 A .

2.6 OCCUPANCY SENSORS

A. Wall-Switch Sensors:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 6111 for 120 V, 6117 for 277 V.
b. Hubbell; WS1277.
c. Leviton; ODS 10-ID.
d. Pass & Seymour; WS3000.
e. Watt Stopper (The); WS-200.

3. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 180-degree field of view, with a minimum coverage area of 900 sq. ft..

B. Wall-Switch Sensors:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell; AT120 for 120 V, AT277 for 277 V.
b. Leviton; ODS 15-ID.

3. Description: Adaptive-technology type, 120/277 V, adjustable time delay up to 20 minutes, 180-degree field of view, with a minimum coverage area of 900 sq. ft..

4. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 110-degree field of view, with a minimum coverage area of 1200 sq. ft..

C. Wide-Range Wall-Switch Sensors:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell; ATP120HBRP.
b. Leviton; ODWHB-IRW.
c. Pass & Seymour; HS1001.
d. Watt Stopper (The); CX-100-3.

3. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 150-degree field of view, with a minimum coverage area of 1200 sq. ft..

2.7 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Smooth, high-impact thermoplastic .
3. Material for Unfinished Spaces: Smooth, high-impact thermoplastic.
4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover, and listed and labeled for use in "wet locations."

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant thermoplastic with lockable cover.

2.8 FINISHES

A. Color: Wiring device catalog numbers in Section Text do not designate device color.

1. Wiring Devices Connected to Normal Power System: Ivory , unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

a. Cut back and pigtail, or replace all damaged conductors.
b. Straighten conductors that remain and remove corrosion and foreign matter.
c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up , and on horizontally mounted receptacles to the right .

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black -filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.

4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION 262726

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Fusible switches.
2. Nonfusible switches.
3. Molded-case circuit breakers (MCCBs).
4. Enclosures.

1.3 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of NRTL listing for series rating of installed devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Submit on translucent log-log graph paper.

B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
1. Wiring Diagrams: For power, signal, and control wiring.

C. Qualification Data: For qualified testing agency.

D. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Field quality-control reports.
1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

F. Manufacturer's field service report.

G. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Submit on translucent log-log graph paper.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.
1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NFPA 70.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
2. Altitude: Not exceeding 6600 feet.

B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
1. Notify Construction Manager no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.

3. Do not proceed with interruption of electric service without Construction Manager's written permission.
4. Comply with NFPA 70E.

1.7 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.8 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
2. Fuse Pullers: Two for each size and type.

PART 2 - PRODUCTS

2.1 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Type GD, General Duty, Single Throw, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

D. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
4. Lugs: Compression type, suitable for number, size, and conductor material.

2.2 RECEPTACLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Type HD, Heavy-Duty, Single-Throw Fusible Switch: 600-V ac, 100 A; UL 98 and NEMA KS 1; horsepower rated, with clips or bolt pads to accommodate specified fuses; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.

C. Type HD, Heavy-Duty, Single-Throw Nonfusible Switch: 600-V ac, 100 A; UL 98 and NEMA KS 1; horsepower rated, lockable handle with capability to accept three padlocks; interlocked with cover in closed position.

D. Interlocking Linkage: Provided between the receptacle and switch mechanism to prevent inserting or removing plug while switch is in the on position, inserting any plug other than specified, and turning switch on if an incorrect plug is inserted or correct plug has not been fully inserted into the receptacle.

2.3 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

E. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
1. Instantaneous trip.
2. Long- and short-time pickup levels.
3. Long- and short-time time adjustments.
4. Ground-fault pickup level, time delay, and I^2t response.

F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

G. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.

H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

I. Ground-Fault, Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).

J. Features and Accessories:
1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Compression type, suitable for number, size, trip ratings, and conductor material.
3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.

2.4 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
1. Indoor, Dry and Clean Locations: NEMA 250, Type 1 .
2. Outdoor Locations: NEMA 250, Type 3R .
3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4 .

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

D. Install fuses in fusible devices.

E. Comply with NECA 1.

3.3 IDENTIFICATION

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."
1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Acceptance Testing Preparation:
1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

E. Tests and Inspections:
1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:
a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each enclosed switch and circuit breaker 11 months after date of Substantial Completion.
c. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Division 26 Section "Overcurrent Protective Device Coordination Study".

END OF SECTION 262816

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Interior lighting fixtures, lamps, and ballasts.
2. Emergency lighting units.
3. Exit signs.

B. Related Sections include the following:

1. Division 26 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.3 DEFINITIONS

A. BF: Ballast factor.

B. CRI: Color-rendering index.

C. CU: Coefficient of utilization.

D. HID: High-intensity discharge.

E. LER: Luminaire efficacy rating.

F. Luminaire: Complete lighting fixture, including ballast housing if provided.

G. RCR: Room cavity ratio.

1.4 SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.
2. Emergency lighting units including battery and charger.
3. Ballast.
4. Energy-efficiency data.

5. Air and Thermal Performance Data: For air-handling lighting fixtures. Furnish data required in "Submittals" Article in Division 23 Section "Diffusers, Registers, and Grilles."
6. Sound Performance Data: For air-handling lighting fixtures. Indicate sound power level and sound transmission class in test reports certified according to standards specified in Division 23 Section "Diffusers, Registers, and Grilles."
7. Life, output, and energy-efficiency data for lamps.
8. Photometric data, in IESNA format, based on laboratory tests of each lighting fixture type, outfitted with lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.

    a. For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by the manufacturer.
    b. Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program (NVLAP) for Energy Efficient Lighting Products.

B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories.

1. Wiring Diagrams: Power and control wiring.

C. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Lighting fixtures.
2. Suspended ceiling components.
3. Structural members to which suspension systems for lighting fixtures will be attached.
4. Other items in finished ceiling including the following:

    a. Air outlets and inlets.
    b. Speakers.
    c. Sprinklers.
    d. Smoke and fire detectors.
    e. Occupancy sensors.
    f. Access panels.

5. Perimeter moldings.

D. Samples for Verification: Interior lighting fixtures designated for sample submission in Interior Lighting Fixture Schedule. Each sample shall include the following:

1. Lamps: Specified units installed.
2. Accessories: Cords and plugs.

E. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.

F. Qualification Data: For agencies providing photometric data for lighting fixtures.

G. Field quality-control test reports.

H. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

I. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.7 WARRANTY

A. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Emergency Lighting Unit Batteries: 10years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining nine years.
2. Warranty Period for Emergency Fluorescent Ballast Self-Powered Exit Sign Batteries: 5years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining six years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

B. In Interior Lighting Fixture Schedule where titles below are column or row headings that introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
3. Basis-of-Design Product: The design for each lighting fixture is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Incandescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5A.

C. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.

D. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.

E. Metal Parts: Free of burrs and sharp corners and edges.

F. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

G. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

H. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.
4. Laminated Silver Metallized Film: 90 percent.

I. Plastic Diffusers, Covers, and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

   a. Lens Thickness: At least 0.125 inch minimum unless different thickness is indicated.
   b. UV stabilized.

2. Glass: Annealed crystal glass, unless otherwise indicated.

J. Electromagnetic-Interference Filters: Factory installed to suppress conducted electromagnetic-interference as required by MIL-STD-461E. Fabricate lighting fixtures with one filter on each ballast indicated to require a filter.

K. Air-Handling Fluorescent Fixtures: For use with plenum ceiling for air return and heat extraction and for attaching an air-diffuser-boot assembly specified in Division 23 Section "Diffusers, Registers, and Grilles."

1. Air Supply Units: Slots in one or both side trims join with air-diffuser-boot assemblies.
2. Heat Removal Units: Air path leads through lamp cavity.
3. Combination Heat Removal and Air Supply Unit: Heat is removed through lamp cavity at both ends of the fixture door with air supply same as for air supply units.
4. Dampers: Operable from outside fixture for control of return-air volume.
5. Static Fixture: Air supply slots are blanked off, and fixture appearance matches active units.

2.3 EMERGENCY FLUORESCENT POWER UNIT

A. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with ballast. Comply with UL 924.

1. Emergency Connection: Operate 1fluorescent lamp(s) continuously at an output of 1100 lumens each. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
2. Night-Light Connection: Operate one fluorescent lamp continuously.
3. Test Push Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space.

    a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

4. Battery: Sealed, maintenance-free, nickel-cadmium type.
5. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
6. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
7. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

B. External Type: Self-contained, modular, battery-inverter unit, suitable for powering one or more fluorescent lamps, remote mounted from lighting fixture. Comply with UL 924.

1. Emergency Connection: Operate one fluorescent lamp continuously. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
2. Night-Light Connection: Operate one fluorescent lamp in a remote fixture continuously.
3. Battery: Sealed, maintenance-free, nickel-cadmium type.
4. Charger: Fully automatic, solid-state, constant-current type.
5. Housing: NEMA 250, Type 1 enclosure.
6. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
7. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

8. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
9. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

2.4 EXIT SIGNS

A. Description: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.

2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

a. Battery: Sealed, maintenance-free, nickel-cadmium type.
b. Charger: Fully automatic, solid-state type with sealed transfer relay.
c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
f. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
g. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

B. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as a support element.

1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches from lighting fixture corners.
2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.

3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
4. Install at least one independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.

C. Suspended Lighting Fixture Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.

D. Air-Handling Lighting Fixtures: Install with dampers closed and ready for adjustment.

E. Adjust aimable lighting fixtures to provide required light intensities.

F. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 265100

SECTION 26 56 00 - EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Exterior luminaires with lamps and ballasts.
2. Luminaire-mounted photoelectric relays.
3. Poles and accessories.
4. Luminaire lowering devices.

B. Related Sections include the following:

1. Division 26 Section "Interior Lighting" for exterior luminaires normally mounted on exterior surfaces of buildings.

1.3 DEFINITIONS

A. CRI: Color-rendering index.

B. HID: High-intensity discharge.

C. Luminaire: Complete lighting fixture, including ballast housing if provided.

D. Pole: Luminaire support structure, including tower used for large area illumination.

E. Standard: Same definition as "Pole" above.

1.4 STRUCTURAL ANALYSIS CRITERIA FOR POLE SELECTION

A. Dead Load: Weight of luminaire and its horizontal and vertical supports, lowering devices, and supporting structure, applied as stated in AASHTO LTS-4.

B. Live Load: Single load of 500 lbf, distributed as stated in AASHTO LTS-4.

C. Ice Load: Load of 3 lbf/sq. ft., applied as stated in AASHTO LTS-4.

D. Wind Load: Pressure of wind on pole and luminaire, calculated and applied as stated in AASHTO LTS-4.

1. Wind speed for calculating wind load for poles exceeding 50 feet in height is 110 mph .
2. Wind speed for calculating wind load for poles 50 feet or less in height is 110 mph .

1.5 SUBMITTALS

A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:

1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.
2. Details of attaching luminaires and accessories.
3. Details of installation and construction.
4. Luminaire materials.
5. Photometric data based on laboratory tests of each luminaire type, complete with indicated lamps, ballasts, and accessories.

    a. For indicated luminaires, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
    b. Photometric data shall be certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

6. Photoelectric relays.
7. Ballasts, including energy-efficiency data.
8. Lamps, including life, output, and energy-efficiency data.
9. Materials, dimensions, and finishes of poles.
10. Means of attaching luminaires to supports, and indication that attachment is suitable for components involved.
11. Anchor bolts for poles.
12. Manufactured pole foundations.

B. Shop Drawings:

1. Anchor-bolt templates keyed to specific poles and certified by manufacturer.
2. Design calculations, certified by a qualified professional engineer, indicating strength of screw foundations and soil conditions on which they are based.
3. Wiring Diagrams: Power and control wiring.

C. Samples for Verification: For products designated for sample submission in Exterior Lighting Device Schedule. Each sample shall include lamps and ballasts.

D. Pole and Support Component Certificates: Signed by manufacturers of poles, certifying that products are designed for indicated load requirements in AASHTO LTS-4 and that load imposed by luminaire has been included in design.

E. Qualification Data: For agencies providing photometric data for lighting fixtures.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For luminaires and poles luminaire lowering devices to include in emergency, operation, and maintenance manuals.

H. Warranty: Special warranty specified in this Section.

1.6 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with IEEE C2, "National Electrical Safety Code."

E. Comply with NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Package aluminum poles for shipping according to ASTM B 660.

B. Store poles on decay-resistant-treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.

C. Handle wood poles so they will not be damaged. Do not use pointed tools that can indent pole surface more than 1/4 inch deep. Do not apply tools to section of pole to be installed below ground line.

D. Retain factory-applied pole wrappings on fiberglass and laminated wood poles until right before pole installation. Handle poles with web fabric straps.

E. Retain factory-applied pole wrappings on metal poles until right before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.

1. Warranty Period for Luminaires: Five years from date of Substantial Completion.
2. Warranty Period for Metal Corrosion: Fiveyears from date of Substantial Completion.
3. Warranty Period for Color Retention: Fiveyears from date of Substantial Completion.
4. Warranty Period for Lamps: Replace lamps and fuses that fail within 12 months from date of Substantial Completion.
5. Warranty Period for Poles: Repair or replace lighting poles and standards that fail in finish, materials, and workmanship within manufacturer's standard warranty period, but not less than threeyears from date of Substantial Completion.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps: 10 for every 100 of each type and rating installed. Furnish at least one of each type.
2. Glass and Plastic Lenses, Covers, and Other Optical Parts: 10 for every 100 of each type and rating installed. Furnish at least one of each type.
3. Ballasts: 10 for every 100 of each type and rating installed. Furnish at least one of each type.
4. Globes and Guards: 10 for every 20 of each type and rating installed. Furnish at least one of each type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

B. In Exterior Lighting Device Schedule where titles below are column or row headings that introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
3. Basis of Design Product: The design of each item of exterior luminaire and its support is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 LUMINAIRES, GENERAL REQUIREMENTS

A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.

B. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.

E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during

relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.

G. Exposed Hardware Material: Stainless steel.

H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

I. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.

J. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

K. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

L. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

M. Factory-Applied Finish for Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

    a. Color: As selected by Architect from manufacturer's full range.

N. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.
3. Class I, Clear Anodic Finish: AA-M32C22A41 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
4. Class I, Color Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

    a. Color: Medium bronze .

2.3 LUMINAIRE-MOUNTED PHOTOELECTRIC RELAYS

A. Comply with UL 773 or UL 773A.

B. Contact Relays: Factory mounted, single throw, designed to fail in the on position, and factory set to turn light unit on at 1.5 to 3 fc and off at 4.5 to 10 fc with 15-second minimum time delay.

1. Relay with locking-type receptacle shall comply with NEMA C136.10.
2. Adjustable window slide for adjusting on-off set points.

2.4 POLES AND SUPPORT COMPONENTS, GENERAL REQUIREMENTS

A. Structural Characteristics: Comply with AASHTO LTS-4.

1. Wind-Load Strength of Poles: Adequate at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of speed indicated in Part 1 "Structural Analysis Criteria for Pole Selection" Article, with a gust factor of 1.3.
2. Strength Analysis: For each pole, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.

B. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts, unless otherwise indicated.

C. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.

1. Materials: Shall not cause galvanic action at contact points.
2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication, unless stainless-steel items are indicated.
3. Anchor-Bolt Template: Plywood or steel.

D. Concrete Pole Foundations: Cast in place, with anchor bolts to match pole-base flange. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete."

E. Power-Installed Screw Foundations: Factory fabricated by pole manufacturer, with structural steel complying with ASTM A 36/A 36M and hot-dip galvanized according to ASTM A 123/A 123M; and with top-plate and mounting bolts to match pole base flange and strength required to support pole, luminaire, and accessories.

F. Breakaway Supports: Frangible breakaway supports, tested by an independent testing agency acceptable to authorities having jurisdiction, according to AASHTO LTS-4.

2.5 STEEL POLES

A. Poles: Comply with ASTM A 500, Grade B, carbon steel with a minimum yield of 46,000 psig; 1-piece construction up to 40 feet in height with access handhole in pole wall.

1. Shape: Round, tapered.
2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.

B. Steel Mast Arms: Single-arm type, continuously welded to pole attachment plate. Material and finish same as pole.

C. Brackets for Luminaires: Detachable, cantilever, without underbrace.

1. Adapter fitting welded to pole and bracket, then bolted together with galvanized-steel bolts.
2. Cross Section: Tapered oval, with straight tubular end section to accommodate luminaire.
3. Match pole material and finish.

D. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.

E. Steps: Fixed steel, with nonslip treads, positioned for 15-inch vertical spacing, alternating on opposite sides of pole; first step at elevation 10 feet above finished grade.

F. Intermediate Handhole and Cable Support: Weathertight, 3-by-5-inch handhole located at midpoint of pole with cover for access to internal welded attachment lug for electric cable support grip.

G. Grounding and Bonding Lugs: Welded 1/2-inch threaded lug, complying with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems," listed for attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.

H. Cable Support Grip: Wire-mesh type with rotating attachment eye, sized for diameter of cable and rated for a minimum load equal to weight of supported cable times a 5.0 safety factor.

I. Platform for Lamp and Ballast Servicing: Factory fabricated of steel with finish matching that of pole.

J. Prime-Coat Finish: Manufacturer's standard prime-coat finish ready for field painting.

K. Galvanized Finish: After fabrication, hot-dip galvanize complying with ASTM A 123/A 123M.

L. Factory-Painted Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
2. Interior Surfaces of Pole: One coat of bituminous paint, or otherwise treat for equal corrosion protection.
3. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

a. Color: As selected by Architect from manufacturer's full range.

2.6 LOWERING SYSTEM FOR LUMINAIRES

A. Arrange system to lower luminaire assembly to a servicing position within 36 inches of finished grade in winds up to 30 mph and to provide for manual plug connection to electrical power in the lowered position for testing.

B. Coordinate with luminaire and pole manufacturers for assembly details, wind-load and vibration analysis, and compatibility of materials for electrolysis-free attachment and connection for luminaire mounting assembly, lowering device, lowering cable, and portable winch.

C. Structural and Mechanical Design: Use a minimum safety factor of 5.0 for static and dynamic loads of load-bearing components, including cable.

D. Luminaire Mounting and Disconnect Arrangement: Multiple carriage-mounted luminaires, arranged for lowering and raising as a group.

1. Electrical cable for normal operating power to luminaires manually disconnects inside pole base, using weatherproof multipin connector, and shall be arranged to move within the pole during lowering and raising of luminaire assembly.

E. Lowering Device: Weatherproof, cast-aluminum housing and multiple mechanical latches. Moving parts of latching assembly shall be located in the portion of the unit that is lowered to the servicing position. Positive latching in the operating position shall be indicated to the operator at the base of the pole by a clear visual signal, or by other means acceptable to Owner or authorities having jurisdiction.

F. Lowering Cable: Zinc-electroplated- steel aircraft cable.

G. Portable Winch: Manual type. One required.

1. Winch Power Connection: Cord and plug.
2. Winch Raise-Lower Control: Remote-control station with 15 feet of cable.

H. Winch Transformer: Portable, totally enclosed, encapsulated, single-phase, dry type. Primary rated at lighting-circuit voltage; secondary rated at 120 V. Permanent, primary and secondary, twist-locking plug connectors on pigtails shall match pole-base power outlet and winch plug.

2.7 REQUIREMENTS FOR INDIVIDUAL EXTERIOR LIGHTING DEVICES

A. Exterior Lighting Device Type:

1. Basis-of-Design Product: or a comparable product by one of the following:
   a. SportLighting Inc. or pre-approved equal

2. Voltage: 277-V ac.
3. Focusing and Aiming Provisions:
4. IESNA Lateral Distribution Class: II.
5. IESNA Cutoff Category: Cutoff.
6. Photometric Performance of Installed Units:

   a. Spot Intensity: Minimum initial horizontal illumination at grade shall be 30 fc at a point.
   b. Average Intensity: Minimum average initial horizontal illumination at grade in the illuminated area shall be 30 fc.

7. Pole Description:

    a. Material or Type: Steel.
    b. Luminaire Support Components and Accessories: Mast arms Grounding and bonding lug.
    c. Mounting Provisions: Concrete foundation.
    d. Luminaire Mounting Height above Finished Grade: See plans

PART 3 - EXECUTION

3.1 LUMINAIRE INSTALLATION

A. Install lamps in each luminaire.

B. Fasten luminaire to indicated structural supports.

1. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

C. Adjust luminaires that require field adjustment or aiming.[Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources.]

3.2 POLE INSTALLATION

A. Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.

B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features, unless otherwise indicated on Drawings:

1. Fire Hydrants and Storm Drainage Piping: 60 inches.
2. Water, Gas, Electric, Communication, and Sewer Lines: 10 feet.
3. Trees: 15 feet.

C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Division 03 Section "Cast-in-Place Concrete."

D. Foundation-Mounted Poles: Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.

1. Use anchor bolts and nuts selected to resist seismic forces defined for the application and approved by manufacturer.
2. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
3. Install base covers, unless otherwise indicated.
4. Use a short piece of 1/2-inch- diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.

3.3 CORROSION PREVENTION

A. Steel Conduits: Comply with Division 26 Section "Raceway and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.4 GROUNDING

A. Ground metal poles and support structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."

1. Install grounding electrode for each pole, unless otherwise indicated.
2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

B. Ground nonmetallic poles and support structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."

1. Install grounding electrode for each pole.
2. Install grounding conductor and conductor protector.
3. Ground metallic components of pole accessories and foundations.

3.5 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.

1. Verify operation of photoelectric controls.

C. Illumination Tests:

1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IESNA testing guide(s):

a. IESNA LM-5, "Photometric Measurements of Area and Sports Lighting."

D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain luminaire lowering devices. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 265600

SECTION 27 41 13 SPORTSPLEX SOUND REINFORCEMENT SYSTEM

PART 1 – GENERAL

1. DESCRIPTION OF THE WORK

   A. A Sportsplex with multiple Baseball Fields, with full-range loudspeaker systems.
   B. Ancillary devices related to the input, mixing, processing, and amplification of audio into the systems.
   C. Microphones, jacks, wire, and all miscellaneous parts of the systems.

2. SCOPE OF THE WORK

   A. Furnish, deliver, erect, install and connect completely all of the material and appliances described herein and supply all other incidental material and appliances, tools, transportation, etc., required to make the work complete, and to leave the Audio Systems in first class operating condition.
   B. Perform all assembly of equipment, wiring and inter-connection and soldering of wires to jacks, devices, terminals or equipment, using technical employees only, who are experienced in the installation of Audio System equipment and its inter-connection. Coordinate final utility rough-in locations with actual equipment furnished.
   C. Verify dimensions and conditions at the job site prior to installation, and perform installation in accordance with these Specifications, manufacturers' recommendations and all applicable code requirements.

3. SUBSTITUTIONS

   A. Items are listed in the Specifications by the manufacturer's type or model number, without a detailed performance specification. Where this is the case, no substitutions will be accepted without written consent of the Owner.

4. INSTALLATION CONTRACTOR QUALIFICATIONS

   A. The work performed under this Section shall be performed by a Profession Audio Systems contractor, normally engaged in the business of Audio Systems installation. The prospective contractor must be in the Audio Systems installation business for a period of not less than five years and has successfully completed projects of similar size and scope.
   B. Contractor shall hold a current, valid franchise for the major lines of Sound equipment furnished by him under these Specifications.
   C. Contractor shall have at least one technician on-staff that has experience programming Dynacord SONICUE sound system software.

D. The selected contractor will be required to be familiarized and have experience with Digital Audio Network Through Ethernet.

5. GUARANTEE AND WARRANTY

A. Guarantee all parts, labor, and workmanship furnished under this contract for a period of twelve months from the date of substantial completion.
B. During the warranty period, report to the site and repair or replace any defective materials or workmanship without cost to the Owner.
C. Where warranties on individual pieces of equipment exceed twelve months, the guarantee period shall be extended to the warranty period of the particular items.
D. Furnish complete and working Audio Systems. Be of maximum assistance to Owner during the guarantee period of the system, to the degree that maximum satisfaction is assured.

6. RELATED WORK NOT INCLUDED WITHIN SCOPE

A. All conduits with pull strings, all electrical pull boxes, and all outlet boxes shall be furnished and installed by electrical contractor.
B. All power, power conductors and conduits associated with power circuits to all equipment locations shall be furnished and installed by electrical contractor.
C. All power for equipment racks shall be supplied & terminated by electrical contractor inside duplex convenience outlets or to proper power distribution panels.

PART 2 – PRODUCTS

1. GENERAL

A. All items shall be new and unused.
B. The following sections specifically list the acceptable equipment types and items for this project.

2. WIRE AND CABLE

A. All wire and cable shall be new and unused.
B. Voice coil loudspeaker cable for main loudspeakers: 12AWG jacketed twisted pair.
C. Constant voltage (70.7-volt) loudspeaker cable: 16AWG jacketed twisted pair.
D. Microphone-level audio cable (installed, not portable): 22AWG twisted pair with foil shield.
E. Line-level audio cable and all inter-rack audio cable: 22AWG twisted pair with foil shield.
F. Other equipment control cables shall be stranded wire, appropriately shielded, of gauge and number of conductors required by the manufacturer for proper operation of the system or equipment item furnished.

G. Wire and cable for all other devices shall be supplied in accordance with the recommendations of the device manufacturer and the National Electrical Code.
H. Furnish and install fiber optic cable between Building A equipment rack and each press box. Both ends of fiber optic cable shall be properly terminated.

3. EQUIPMENT RACK AND POWER DISTRIBUTION

A. Furnish Building A Rack for use in housing equipment including, but not limited to, power amplifiers, signal processors, power distribution.
B. Fill all other portions of unused rack front sections with matching blank panels.
C. Power distribution within racks shall be supplied via sequentially switched convenience outlets, allowing incremental switching of components. Program so that when rack power is switched, power amplifiers are last to turn on, and first to turn off.
D. Furnish and install the following:
    i. Lowell LER-4422 floor standing sound rack (Qty: 1).
    ii. Lowell LFD-44FV fully-vented front door (Qty: 1).
    iii. Lowell LMSB-22 mobile rack base (Qty: 1).
    iv. GATOR GRW-DRW3 rack drawer (Qty: 2).
    v. Middle Atlantic EB1 blank rack panel (Qty: 24).
    vi. Middle Atlantic BR1 brush grommet panel (Qty: 2).
    vii. Middle Atlantic HP 10-32 rack screws pack (Qty: 1).
    viii. Surgex SEQ-1U rack mount power sequencer (Qty: 1).

4. MICROPHONES

A. Furnish and install the following in each Press box:
    i. Electro-Voice PC Desktop freestanding gooseneck microphone (Qty: 2).
    ii. Electro-Voice RE3-ND86-5L handheld wireless system (Qty: 2).

5. BASEBALL FIELD MIXING, PROCESSING AND AUDIO NETWORK

A. Integrator shall program the Dynacord TPC-1 touch panel for system control of each field. The TPC-1 interface is freely configurable in SONICUE sound system software, allowing custom images and text in local languages to be added to control elements.
B. Furnish digital audio signal processors to process levels, matrix, equalization, leveling, limiting, etc. of the audio signals.
C. Integrator shall setup a local Digital Audio Network Through Ethernet. The Dante network will effectively distribute digital audio over fiber-optic cable. Network Switch will be installed in Building A equipment rack.
D. Furnish and install the following:
    i. CISCO SG350-10P-K9-NA Network Gigabit PoE Managed Switch (Qty: 1).

ii. DYNACORD MXE5 Professional Matrix Mix Engine (Qty: 1).
iii. Dynacord SONICUE sound system software (Qty: 1).
iv. Dynacord TPC-1 Customized Touch Panel Controller (Qty: 3).

6. PLAYBACK AND AUDIO OUTPUT DEVICES

A. Furnish and install devices for audio playback.
B. Furnish and install the following:
   i. RDL CP-2 Single Cover Plate (Qty: 4)
   ii. RDL DD-BN31 Mic/Line Input Assembly (Qty: 4)

7. POWER AMPLIFIERS

A. Each power amplifier shall have an input connector which is either a screw-type barrier strip or XLR type. Output connections shall be either screw posts or speakon. Other types of connectors shall not be accepted.
B. Power amplifiers shall be microprocessor controlled for management of environmental and electrical conditions. They shall be Class-H topology for maximum efficiency, with appropriate power output capabilities to fully drive their respective loudspeaker loads and still have adequate headroom to compensate for line voltage drops and high duty cycle signals.
C. The amplifiers shall incorporate modules which provide loudspeaker processing (including native manufacturer preset libraries for the loudspeakers), real-time amplifier and speaker supervision as well as the capability for full frequency impedance testing of speaker components under a test-mode routine. These modules also shall provide the amplifier with communication of digital audio and control data over the system's TCP/IP Local Area Network.
D. Furnish and install the following for the Sportsplex:
   i. DYNACORD IPX5:4 4x1250W DSP Amplifier (Qty: 1).

8. MAIN LOUDSPEAKERS

A. Integrator shall provide drawings indicating loudspeaker positions and angles of orientation.
B. Speakers shall be suspended from the structure, at the positions and angles indicated. Suspend each component with aircraft quality steel cable and commercial rigging hardware, in such a way as to facilitate minor angle adjustments. Safety factor shall be at least 5. Secure any loose hardware to prevent vibration and rattling. Orient each speaker at the location and angles indicated in the drawings. Make minor adjustments as required to provide even sound distribution.
C. Loudspeakers shall be rated by the Manufacturer for outdoor applications with protected exposure to elements, as inside a scoreboard sound enclosure. They shall tolerate temperature and humidity changes, with shelter against UV rays and direct rain exposure. As

such, they shall not include any active AC-powered electronics and shall provide appropriately sealed connection points.

D. Furnish and install the following on each Press box:
   i. Main Speakers: Electro-Voice SX300PI_HE (Qty: 2).
   ii. Speaker Brackets: Electro-Voice MB200 (Qty: 2).

PART 3 – EXECUTION

1. INSTALLATION

A. Furnish components, racks, wire, cabinetry, connectors, materials, parts, equipment and labor necessary for the complete installation of the systems, in full accordance with the recommendations of the equipment manufacturers and the requirements of the specification.
B. Installation shall follow standard industry wiring and installation practice, and shall meet or exceed industry standards for such work.
C. Equipment shall be held firmly in place with proper types of mounting hardware. All equipment affixed to the building structure must be self-supporting with a safety factor of at least five. All equipment shall be installed so as to provide reasonable safety to the operator and occupants. Supply adequate ventilation for all enclosed equipment items which produce heat.
D. Furnish the system to facilitate expansion and servicing using modular, solid-state components. All equipment shall be designed and rated for continuous operation and shall be UL listed or manufactured to UL standards.
E. Observe proper circuit polarity and loudspeaker wiring polarity. No cables shall be wired with a polarity reversal between connectors with respect to either end. Special care shall be taken when wiring microphone cables, to ensure that constant polarity is maintained. Balance audio connectors shall be wired as follows: Black Wire to Pin #3/Ring/ Low(-); Red or White Wire to Pin #2/Tip/ High(+); Bare to Pin #1/Shield/Ground.
F. Route cables and wiring within equipment racks and cabinetry according to function, separating wires of different signal levels (video, microphone level, line level, amplifier output, 120VAC, intercom, control, etc.) by as much physical distance as possible. Neatly arrange and bundle all cables loosely with plastic cable ties. Cables and wires shall be continuous lengths without splices.
G. All system wire, except spare wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. No terminated wire ends will be accepted.

2. AUDIO-VIDEO SYSTEMS FINAL TESTING AND EQUALIZATION

A. The Installation Contractor shall perform thorough preliminary testing of the Audio Systems prior to the final inspections by customer. All systems and subsystems shall be tested to ensure that they are in proper working order. Perform preliminary programming and setup of digital signal processors as necessary to conduct these tests.
B. The completed Audio Systems shall be physically inspected by the customer to assure that all equipment is installed in a neat and professional manner, and in accordance with these Specifications.
C. The testing and equalization work shall be performed after the installation work has been completed, but prior to any use of the system.
D. Coordinate as necessary to ensure a totally quite room during the Audio Systems testing and balancing period.
E. Prior to requesting systems testing, verify the following:
    i. All systems are in first-class working condition and free of short circuits, ground loops, parasitic oscillations, excessive system noise beyond published specifications of the equipment, hum, RF interference, or instability of any form.
    ii. All specified equipment, including loose and portable equipment, is on the job site for proper accounting.
    iii. All loudspeaker circuits have been tested, are connected to the proper crossover frequency, and are in perfect working order.
    iv. Installation Contractor shall provide all signal processing software loaded on a portable PC with handheld mouse and ready for use at time of testing.
    v. Installation Contractor shall provide a calibrated RTA and microphone, and pink noise generator at time of testing.

3. CUSTOMER TRAINING AND FAMILIARIZATION

A. The installer shall furnish Owner representatives with training necessary to properly operate the systems. Demonstrate in detail all functions of the systems. The person(s) conducting training shall be proficient in the operation of the supplied control surfaces.

END OF SECTION

SECTION 31 20 00 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Preparation of subgrade for building, slabs, walks, pavements, and other sitework.
2. Rough and finish grading.
3. Excavation for filling and grading.
4. Filling and subgrade preparation.
5. Geotechnical Data

B. Related Documents: The Contract Documents, as defined in Section 011100 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

C. Related Sections:
1. Section 31 23 00 - Excavation and Fill: Earthwork for structures, utilities, and pavement.
2. Section 31 25 00 - Erosion and Sedimentation Controls: Temporary and permanent erosion control and slope protection systems.
3. Section 31 32 00 - Soil Stabilization: Lime, cement, fly ash, and geotextile subgrade stabilizers.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
1. ASTM C 136 - Method for Sieve Analysis of Fine and Course Aggregates.
2. ASTM D 698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
3. ASTM D 1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
4. ASTM D 1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
5. ASTM D 2167 - Test Method for Density and Unit Weight of Soil In-Place by the Rubber Balloon Method.
6. ASTM D 2487 - Classification of Soils for Engineering Purposes (Unified Soil Classification System).
7. ASTM D 2922 - Test Methods for Density of Soil and Soil- Aggregate in Place by Nuclear Methods (Shallow Depth).
8. ASTM D 3017 - Test Method for Moisture Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
9. STM D 4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B. American Association of State Highway and Transportation Officials (AASHTO):
1. AASHTO T 88 - Particle Size Analysis of Soils

1.3 DEFINITIONS

A. Building Area Subgrade Pad: Portion of site directly beneath and within a line 10 feet 0 inches beyond building and appurtenances including limits of any future building expansion areas indicated on Drawings.

1.4 SUBMITTALS

A. Division 01 – Shop Drawings, Product Data and Samples: Procedures for submittals.
1. Shop Drawings:
a. Submit drawings or details indicating proposed alternate earthwork procedures or proposed procedures not indicated in Contract Documents.
b. Submit drawings or details of design for use of fabrics or geogrids.
2. Assurance/Control Submittals:
a. Material Source: Submit name of imported materials suppliers. Provide materials from same source throughout the Work. Change of source requires Contracting Officer approval.
b. Test Reports: Submit the following reports directly to Contracting Officer from Testing Laboratory, with copy to Contractor. Prepare reports in conformance with Section 014500 – Contractor Quality Control for Building Projects:
1) Test reports on borrow material.
2) Verification of each footing subgrade.
3) Field density test reports.
4) Optimum moisture-maximum density curve for each type of soil encountered.
5) Report of actual unconfined compressive strength and bearing tests/results for each strata tested. Give "three-dimensional" description of each test location.
c. Certificates: Gradation and certification of aggregate material for Testing Laboratory review.
d. Qualification Documentation: Submit earthwork company documentation of experience indicating compliance with specified qualification requirements.

B. Division 01 – Closeout Procedures: Procedures for closeout submittals.
1. Project Record Documents: Accurately record final grade contours, spot elevations, and slope gradients.

1.5 QUALITY ASSURANCE

A. Qualifications: Earthwork company specializing in performing the Work of this Section with minimum 5 years documented experience.

B. Regulatory Requirements: Perform earthwork in accordance with applicable requirements of governing authorities having jurisdiction.

C. Pre-Installation Meetings:
1. Convene a pre-installation meeting one week prior to commencing Work of this Section.
2. Require attendance of parties directly affecting Work of this Section.
3. Review conditions of earthwork operations, earthwork procedures and coordination with related Work.
4. Agenda:
a. Tour, inspect, and discuss conditions of existing soils and soil substrates.
b. Review dust control measures and their requirements.
c. Review required submittals, both completed and yet to be completed.
d. Review Survey and Civil sitework Drawings.
e. Approve proposed earthwork equipment.
f. Approve excess material dump location.
g. Approve import material storage location.
h. Review and finalize construction schedule related to earthwork and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
i. Review required inspections, testing, certifying, and material usage accounting procedures.
j. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.

k. Review safety precautions relating to earthwork operations.
l. Review environmental procedures.

1.6 PROJECT CONDITIONS OR SITE CONDITIONS

A. Existing Conditions:
1. Geotechnical Data:
a. Soils investigation reports and data are not a part of Contract Documents.
b. Soil and subsurface investigations were conducted at site by an Independent Testing Laboratory and a report with log of borings prepared. Report was obtained for Architect and Engineer design use only.
c. Soils investigation data is not warranted to indicate actual conditions. Owner, Architect, and Engineer do not assume responsibility for variations in kind, depth, quantity and condition of soils. Owner, Architect and Engineer disclaim responsibility for accuracy, true location, and extent of soils investigation prepared by others; and further disclaim responsibility for interpretation of data by Contractor such as projecting soil bearing values, rock profiles, soil stability, and presence, level, and extent of underground water.
d. Contractor may make additional test borings and other exploratory operations at no additional cost to the Owner. Coordinate tests with Contracting Officer.
2. Classification of Excavations: Contractor acknowledges that Contractor has investigated project site to determine type, quantity, quality, and character of excavation work to be performed. Consider excavation as unclassified excavation, except where Rock Excavation is required. Rock Excavation criteria is as follows:
a. Rock Excavation: Igneous, metamorphic, or sedimentary rock that cannot be removed by rippers or other mechanical methods requiring drilling and blasting.
b. Rock Excavation Indicated by Report of Subsurface Exploration: (Not included)
c. Rock Excavation Not Indicated in Report of Subsurface Exploration:
1) Notify Contracting Officer immediately, and in writing, prior to start of Rock Excavation operations.
2) Contracting Officer will visit Project Site, verify requirement for Rock Excavation, determine estimated quantity Rock Excavation required, and provide Contractor written authorization to proceed.
3) Contracting Officer will verify measurements and quantities of actual Rock Excavation required and make adjustments to Contract as specified in Section 01 29 00.
3. Existing Utilities: Contact local utility companies and make arrangements to obtain utility company location and marking service prior to start of Earthwork operations.
a. Locate existing underground utilities in areas of Work. If utilities are to remain in place, provide means of support and protection during Earthwork operations.
1) Pothole and locate existing underground utilities at locations to assure that no conflict with Work of this Contract will occur and required clearance is available to prevent damage to existing utilities.
2) Perform potholing minimum 10 days before start of excavation or underground work.
b. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility company and Contracting Officer immediately for directions.
c. Coordinate with Contracting Officer and utility companies to keep existing utility services and facilities in operation.
d. Repair damaged utilities to satisfaction of utility company, at no additional cost to the Owner.
e. Do not interrupt existing utilities serving facilities occupied and used by the Owner or others, during occupied hours, except when permitted in writing by Contracting Officer and then only after acceptable temporary utility services have been provided and approved by Contracting Officer.

f. Demolish and completely remove from site existing underground utilities indicated on Drawings to be removed as specified in Section 024113. Coordinate with utility companies for shut-off of services if lines are active.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Subsoil: Approved by Testing Laboratory and Contracting Officer.
1. Select or local borrow.
2. Graded.
3. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
4. Conforming to ASTM D 2487 [OL] [CL].

B. Aggregate: Approved by Testing Laboratory and Contracting Officer.
1. Coarse Aggregate: Crushed stone; free of shale, clay, friable material and debris; graded in accordance with ASTM D 2487 Group Symbol [GW] [GP] [GM] [GC]; within the following limits:

SIEVE SIZE	PERCENT PASSING
2 inches	100
1 inch	95
3/4 inch	95 to 100
5/8 inch	75 to 100
3/8 inch	55 to 85
No. 4	35 to 60
No. 16	15 to 35
No. 40	10 to 25
No. 200	5 to 10

2. Pea Gravel: Natural Stone; washed, free of clay, shale, organic matter; graded in accordance with ASTM D 2487 Group Symbol [GM] [GC]; to the following limits:
a. Minimum Size: 1/4 inch.
b. Maximum Size: 5/8 inch.
3. Fine Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with ASTM D 2487 Group Symbol [SW] [SP] [SM] [SC]; within the following limits:

SIEVE SIZE	PERCENT PASSING
No. 4	100
No. 14	10 to 100
No. 50	5 to 90
No. 100	4 to 30
No. 200	0

C. Topsoil: Approved by Testing Laboratory and Contracting Officer.
1. Unclassified.
2. Graded.
3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, and foreign matter.
4. Conforming to ASTM D 2487 Group Symbol [OH] [PT] .

D. Topsoil: Approved by Testing Laboratory and Contracting Officer.
1. Imported borrow.
2. Friable loam.
3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, and foreign matter.
4. Acidity range (pH) of 5.5 to 7.5.
5. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.

6. Conforming to ASTM D 2487 Group Symbol [OH] [PT] .
7. Limit decaying matter to 0 percent of total content by volume.

E. Filter/Drainage Fabrics:
1. Mirafi 140N.
2. Amoco Style #4546.
3. DuPont Typar 3341.

F. Soil Stabilization Materials: Specified in Section 31 32 00.

2.2 SOURCE QUALITY CONTROL

A. Section 01 45 00 – Contractor Quality Control for Building Projects: Testing Laboratory services.

B. Testing and Analysis:
1. Soil: Perform in accordance with ASTM D 698.
2. Aggregate: Perform in accordance with ASTM D 698.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials from same source throughout the Work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Division 01 – Progress Cleaning: Verification of existing conditions before starting work.
Division 01 – Construction Waste Management and Disposal
Division 01 – Final Cleaning

B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to for earthwork operations to begin.
1. Verify that existing site soils and soil conditions encountered are as indicated in Geotechnical Data.
2. Verify quantity and type of each soil material before start of material installation.
3. Backfilling:
   a. Verify imported fill and stockpiled fill to be reused is approved.
   b. Verify foundation perimeter drainage installation has been inspected and approved.
   c. Verify foundation or basement walls are braced to support surcharge forces imposed by backfilling operations.
   d. Verify areas to be backfilled are free of debris, snow, ice, or water, and ground surfaces are not frozen.

C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.2 PREPARATION

A. Clear site as specified in Division 01.

B. Identify required lines, elevations, levels, contours, grades, and datum necessary to perform earthwork operations as indicated on Drawings.

C. Examine Project Site with Contracting Officer before start of earthwork operations. Identify areas and prepare to brace or shore areas of adjacent property subject to rotation, slumping, or cave-in to prevent dislocation of adjacent soil, pavement, utilities, structures, or other items to remain.

D. Verify that survey benchmark and intended elevations for Work are as indicated on Drawings. Short form contour designations are intended to be a continuing of the long form bench mark.

E. Locate, identify, and protect existing utilities to remain and previously installed utilities that may be damaged by construction operations.
   1. Notify Contracting Officer and utility company immediately of utilities, not indicated on Drawings, encountered.
   2. Maintain existing utilities, active utilities, and drainage systems in operating condition.
   3. Comply with utility company requirements and directions of Contracting Officer to keep utilities in operation.
   4. Repair damage to utilities as directed by Contracting Officer.

F. Protect plant life, lawns, fences, existing structures, sidewalks, paving and curbs from earthwork operations, excavating equipment, and vehicular traffic.

G. Protect benchmarks, property corners, and other survey monuments from damage or displacement. Where markers are required to be removed, provide removal and reinstallation by licensed land surveyor licensed in State where project is located.

H. Remove material encountered in grading operations that is unsuitable for backfilling, subgrade or foundation purposes as determined by Testing Laboratory and as directed by Contracting Officer. Dispose of materials off-site in an approved manner in accordance with requirements of authorities having jurisdiction.

I. Prior to placing fill in low areas, such as previously existing creeks, ponds, or lakes, perform following procedures:
   1. Drain water out by gravity with ditch having flow line lower than lowest elevation in low area. If drainage cannot be performed by gravity ditch, use pumping equipment.
   2. After drainage of low area is complete, remove mulch, mud, debris, and other unsuitable material by using equipment and methods keeping natural soils underlying low areas dry and undisturbed.
   3. If proposed for fill, dry muck, mud, and other materials removed from low areas on-site by spreading in thin layers for inspection by Testing Laboratory and Contracting Officer. Place material determined by the Testing Laboratory and contracting Officer suitable for use as fill material into lowest elevation of site filling operation. Do not place under building subgrade pad or paving subgrade. If material is determined by the Testing Laboratory and Contracting Officer to be unsuitable, remove material from site.

3.3 EXCAVATION FOR FILLING AND GRADING

A. Provide dewatering, drainage, and ground water management to control moisture of soils when performing grading operations during periods of wet weather.

B. Shore, brace, and drain excavations to maintain excavations safe, secure, and free of water at all times.

C. Provide protection for workers within trench areas in accordance with local, State, and Federal Occupational Safety and Health requirements and regulations.

D. Unacceptable Fill Material for Building and Paving Areas: Excavated material containing rock or stone greater than 6 inches in largest dimension.

E. Acceptable Fill Material:
1. Rock or stone less than 6 inches in largest dimension as fill to within 24 inches of surface of proposed subgrade when mixed with suitable material.
2. Rock or stone less than 2 inches in largest dimension mixed with suitable material as fill within the upper 24 inches of proposed subgrade.

3.4 FILLING AND SUBGRADE PREPARATION

A. Fill areas to contours and elevations as indicated on Drawings with materials specified herein.

B. Place fill in continuous lifts as specified herein.

C. Refer to Section 312300 for filling requirements for structures, utilities, and pavements.

D. Areas Exposed by Excavation or Stripping:
1. Scarify areas exposed by excavation or stripping on which building subgrade preparations are to be performed to minimum 12 inch depth.
2. Compact to minimum 95 percent optimum density in accordance with ASTM D 698 at minimum moisture content 1 percent below and maximum 3 percent above optimum moisture content.
3. Proof roll to detect any areas of insufficient compaction by making minimum of 2 complete passes with fully-loaded tandem-axle dump truck, or Contracting Officer approved equivalent, in each of two perpendicular directions under supervision and direction of Testing Laboratory and Contracting Officer.
4. Excavate and recompact areas failing to meet specified requirements.

E. Fill Material Placement:
1. Place in 9 inch maximum lifts compacted minimum 95 percent optimum density in accordance with ASTM D 698 at minimum moisture content of 3 percent below and maximum moisture content 3 percent above optimum moisture content.

F. Provide material imported from off-site with CBR (California Bearing Ratio) or LBR (Limerock Bearing Ratio) value equal to or above pavement design subgrade CBR or LBR value indicated on Drawings.

3.5 MAINTENANCE OF SUBGRADE

A. Verify finished subgrades for conformance to elevations as indicated on Drawings and for specified conditions for subgrade.

B. Protect subgrade from excessive wheel loading during construction, including concrete trucks and dump trucks.

C. Remove areas of finished subgrade with compaction density below specified density to depth required as directed by Testing Laboratory and Contracting Officer. Fill removed areas and compact to specified compaction density.

D. Provide surface of subgrade after compaction hard, uniform, smooth, stable, and true to grade and cross-section.

3.6 FINISH GRADING

A. Grade areas other than paved areas and building pad areas to finish grade elevations or contours as indicated on Drawings including the following:
1. Excavated areas.
2. Filled and transition areas.
3. Landscaped areas.

B. Provide finish graded areas uniform and smooth, free from rocks, debris, or irregular surface changes with maximum tolerance of 0.10 feet above or below established finish subgrade elevation. Provide graded surfaces sloping uniformly between indicated elevations.

C. Provide drainage ditches graded with uniform slope to allow drainage without ponding, minimizing potential for erosion. Refer to Section 31 25 00 for procedures to protect slopes and control erosion.

D. Refer to Section 313200 for soil stabilization using lime, cement, fly ash and geotextile fabric methods for subbase materials.

E. Refer to Section 329113 for placing topsoil and fine grading in landscaped areas.

3.7 FIELD QUALITY CONTROL

A. Section 014500 – Contractor Quality Control for Building Projects: Field testing and inspection.

B. Excavation: Notify Testing Laboratory and Contracting Officer for visual inspection of bearing surfaces, 48 hours prior to backfilling and other subsequent Work.

C. Site Tests - Quantity:
1. Building Area Subgrade Pad:
   a. Cut Areas: Minimum one compaction test for every 2500 square feet.
   b. Fill Areas: Minimum one compaction test for every 2500 square feet for each 9 inch lift, measured loose.
2. Areas Outside Building Area Subgrade Pad:
   a. Cut Areas: Minimum one compaction test for every 10,000 square feet.
   b. Fill Areas: Minimum one compaction test for every 10,000 square feet for each 9 inch lift, measured loose.

D. Site Tests - Methods:
1. Perform tests on each type of existing on-site or imported off-site material used for compacted fill.
   a. Moisture and Density Relationship: ASTM D 698.
   b. Mechanical Analysis: AASHTO T-88
   c. Plasticity Index: ASTM D 4318
      1) One optimum moisture-maximum density curve for each type of soil encountered.
      2) Report of actual unconfined compressive strength and bearing tests/results for each strata tested. Give "three-dimensional" description of each test location.
2. Perform field density tests for in-place materials in accordance to one of the following standards:
   a. Sand-Cone Method: ASTM D 1556
   b. Balloon Method: ASTM D 2167
   c. Nuclear Method: ASTM D 2922 (Method B-Direct Transmission)
3. Perform a CBR (California Bearing Ratio) or LBR (Limerock Bearing Ratio) test for each type of imported off-site material in areas where pavement will be placed.

E. If tests indicate the Work does not meet specified requirements, remove Work, replace, compact, and retest at no additional cost to Owner.

3.8 PROTECTION

A. Protect building subgrade pad and building related earthwork from damage by construction operations and erosion.

B. Prohibit vehicles from entering building subgrade pad area. Vehicles not permitted.

C. Scarify surface, reshape, and compact areas damaged by construction operations or weather erosion.

END OF SECTION

SECTION 31 23 00 - EXCAVATION AND FILL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavating and backfilling for structures, utilities, and pavement.
2. Pipe bedding.
3. Compacting fill materials.
4. Borings and casings under roads.

B. Related Documents: The Contract Documents, as defined in Section 011100 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

C. Related Sections:
1. Section 31 20 00 - Earthwork: Cutting, filling, and grading for proposed site improvements.
2. Section 31 32 00 - Soil Stabilization: Lime, cement, fly ash, and geotextile subgrade stabilizers.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
1. ASTM D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
2. ASTM D1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.

B. American Association of State Highway and Transportation Officials (AASHTO):
1. AASHTO T 180 - Moisture-Density relations of Soils Using a 10 Pound Rammer and an 18 Inch Drop.

C. American Water Works Association (AWWA):
1. AWWA C 200 - Steel Water Pipe, 6 Inch and Larger.
2. AWWA C 206 - Field Welding of Steel Water Pipe.

D. National Fire Protection Association (NFPA):
1. NFPA 70 - National Electric code.

1.3 DEFINITIONS

A. Building Area Subgrade Pad: Portion of site directly beneath and within a line 10 feet beyond building and appurtenances including limits of any future building expansion areas indicated on Drawings.

1.4 SUBMITTALS

A. Division 01 – Shop Drawings, Product Data and Samples: Procedures for submittals.
1. Shop Drawings:
a. Submit drawings or details indicating proposed alternate earthwork procedures or proposed procedures not indicated in Contract Documents.
b. Shop Drawings or details pertaining to Site Utilities are not required unless required by regulatory authorities or unless use of materials, methods, equipment, or procedures are contrary to Drawings or these specifications are proposed. Do not perform work until required shop drawings have been approved by Contracting Officer.
2. Assurance/Control Submittals:

a. Material Source: Submit name of imported materials suppliers. Provide materials from same source throughout the work. Change of source requires Contracting Officer approval.

b. Test Reports: Submit the following reports directly to Contracting Officer from Testing Laboratory, with copy to Contractor:
   1) Test reports on borrow material.
   2) Verification of each footing subgrade.
   3) Field density test reports.
   4) Optimum moisture-maximum density curve for each type of soil encountered.
   5) Report of actual unconfined compressive strength and bearing tests/results for each strata tested. Give "three-dimensional" description of each test location.

c. Certificates: Gradation and certification of aggregate material for Testing Laboratory review.

d. Qualification Documentation: Submit earthwork company documentation of experience indicating compliance with specified qualification requirements.

B. Division 01 – Close Out Procedures: Procedures for closeout submittals.
   1. Project Record Documents: Accurately record the following.
      a. Spot elevations for building area subgrade pad.
      b. Location of existing utilities remaining, re-routed utilities, new utilities by horizontal dimensions, elevations or inverts, and slope gradients.

1.5 QUALITY ASSURANCE

A. Qualifications: Earthwork company specializing in performing the Work of this Section with minimum 5 years documented experience.

B. Regulatory Requirements: Perform earthwork in accordance with applicable requirements of governing authorities having jurisdiction.

1.6 PROJECT CONDITIONS OR SITE CONDITIONS

A. Existing Conditions: Requirements specified in Section 31 20 00.

B. Existing Utilities: Requirements specified in Section 31 20 00.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stockpiled on-site fill and backfill material specified in Section 31 20 00, tested by Testing Laboratory and approved by Contracting Officer.

B. Imported off-site fill and backfill material specified in Section 31 20 00, tested by Testing Laboratory and approved by Contracting Officer.

C. Pipe Bedding Material: Processed sand and gravel free from clay lumps, organic, or other deleterious material complying with the following gradation requirements:

SIEVE SIZE	PERCENT PASSING
1 Inch	100
3/4 Inch	90 to 100
3/8 Inch	20 to 55

No. 4	0 to 10
No. 8	0 to 5

D. Steel Casing Pipe: AWWA C 200, minimum grade B; size and wall thickness as indicated on Drawings.

E. Stabilization Fabrics and Geogrids:
1. Mirafi 500X or 600X.
2. Amoco Style #2002 Woven.
3. Reemay Typar 3401 and 3601.
4. Trevira S1114 and S1120.
5. Tensar 1100 and 1200.

F. Filter/Drainage Fabrics:
1. Mirafi 140 N.
2. Amoco Style #4546.
3. Reemay Typar 3341.
4. Carthage Mills, Carthage 6%.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Division 01 – Progress Cleaning: Verification of existing conditions before starting work.
Division 01 – Construction Waste Management and Disposal
Division 01 – Final Cleaning.

B. Verification of Conditions: Verify that field measurements, surfaces, and conditions are as required, and ready to receive Work.

C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to Owner.

3.2 PREPARATION

A. Identify required lines, elevations, levels, contours, grades, and datum necessary to perform earthwork operations as indicated on Drawings.

B. Verify that survey benchmark and intended elevations for the Work are as indicated on Drawings.

C. Locate, identify, and protect existing utilities to remain and previously installed utilities that may be damaged by construction operations.
1. Notify Contracting Officer, municipality, and utility company immediately of utilities, not indicated on Drawings, encountered.
2. Maintain existing utilities, active utilities, and drainage systems in operating condition.
3. Comply with utility company requirements and directions of Construction Manager to keep utilities in operation.
4. Repair damage to utilities as directed by Contracting Officer.

D. Protect plant life, lawns, fences, existing structures, sidewalks, paving and curbs from earthwork operations, excavating equipment, and vehicular traffic.

E. Protect bench marks, property corners, and other survey monuments from damage or displacement. Where markers are required to be removed, provide removal and reinstallation by licensed land surveyor licensed in State where project is located.

F. Over excavate areas of building subgrade found consisting of unsuitable materials as determined by Testing Laboratory and Contracting Officer. Prepare, fill with suitable material, and compact as specified. Stabilize areas as specified in Section 31 32 00.

3.3 EXCAVATION

A. Excavation for filling and grading specified in Section 31 20 00.

B. Excavation for Structures:
   1. Excavate subbase for building foundations, slabs-on-grade and site structures to width and depth indicated on Drawings.
      a. Cut excavation banks vertically.
      b. Remove rocks, loose soil, and debris from bottom of excavation.
      c. Over excavate wet or unsuitable soil from bottom of excavation.
      d. Provide stable base for concrete reinforcing installation and concrete placement.
      e. Hand trim to indicated lines and grades just prior to concrete reinforcing installation.
   2. Provide protection for workers within trench areas in accordance with local, state, and national Occupational Safety and Health requirements and regulations.
      a. Trenches minimum 4 feet in depth.
   3. During excavation, stockpile materials suitable for backfilling away from excavation to prevent overloading, slides, or cave-ins.
   4. Remove material encountered in excavating operations that is unsuitable for backfilling, subgrade or foundation purposes as determined by Testing Laboratory and Contracting Officer. Dispose of materials off-site in an approved manner in accordance with requirements of authorities having jurisdiction.
   5. Prevent surface water from flowing into excavations by temporary grading or other approved methods.
      a. Do not allow water to accumulate in excavations.
      b. Remove accumulated water in excavations.
      c. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components required to remove water from excavations.

C. Excavation for Utilities:
   1. Excavate trench width and depth required for laying pipe, conduit, or cable. Cut trench banks vertical. Remove stones from bottom of trench as required to avoid point-bearing. Over excavate wet or unstable soil, if encountered, from trench bottom as required to provide suitable base for continuous and uniform bedding.
   2. During excavation, stockpile materials suitable for backfilling away from trench bank to prevent overloading, slides, or cave-ins.
   3. Remove material encountered in trenching operations that is unsuitable for backfilling, subgrade or foundation purposes as determined by Testing Laboratory and Contracting Officer. Dispose of materials off-site in an approved manner in accordance with requirements of authorities having jurisdiction.
   4. Prevent surface water from flowing into trenches or other excavations by temporary grading or other approved methods.
      a. Do not allow water to accumulate in excavations.
      b. Remove accumulated water in excavations.

c. Provide and maintain pumps, well points, sumps, suction and discharge lines and other dewatering system components required to remove water from excavations.

5. Open cut excavation using trenching machine or backhoe. Do not use dirt clods for backfill created by use of machines other than ladder or wheel-type trenching machines.
6. Grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material along entire trench length, except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Do not excavate trench deeper, longer, or wider than required to make proper joint connection.
7. Excavate trench width below the top of pipe minimum 300 mm wide and maximum 460 mm wider than outside surface of pipe or conduit installed to elevations and grades indicated on Drawings. Excavate trench width for other pipe, conduit, or cable to least practical width allowing for proper compaction of trench backfill.
8. Excavate trench depth measured from finished grade or paved surface to the following requirements or applicable codes and ordinances:
   a. Water Mains: 30 inches to top of pipe barrel or 6 inches below frost line established by local building official, whichever is deeper.
   b. Sanitary Sewer: Elevations, and grades indicated on Drawings.
   c. Storm Sewer: Depths, elevations, and grades indicated on Drawings.
   d. Electrical Conduits: 24 inches minimum to top of conduit or as required by NFPA 70, or local utility company requirements, whichever is deeper.
   e. TV Conduits: 18 inches minimum to top of conduit or as required by local utility company, whichever is deeper.
   f. Telephone Conduits: 18 inches minimum to top of conduit, or as required by local utility company, whichever is deeper.
   g. Gas Mains and Service: 30 inches minimum to top of pipe, or as required by local utility company, whichever is deeper.
9. Provide shoring, sheeting, and bracing, as required, in trenches and other excavations where protection of construction personnel is required. Sheeting may be removed after sufficient backfilling to protect against damaging or injurious caving.

D. Excavation for Pavement:
1. Excavate roadway and pavement areas to line and grade indicated on Drawings.
2. Stockpile excavated material suitable for backfilling on-site.
3. Remove excavated materials not required or not suitable for backfill from site.
4. Over excavate areas of pavement subgrade found to contain unsuitable material. Prepare, fill with suitable material, and compact as specified. Stabilize areas as specified in Section 313200.

3.4 PIPE BEDDING

A. Excavate trenches, for pipe or conduit installed to elevations indicated on Drawings, 4 inches below bottom of pipe and to width as specified. Place 4 inches of bedding material, compact in bottom of trench, and shape to conform to lower portion of pipe barrel. After pipe installation, backfill and compact to top of trench.

B. Place geotextile fabric as indicated on Drawings.

3.5 BACKFILLING AND SUBGRADE PREPARATION

A. Backfilling:
1. Verify that imported off-site fill and stockpiled on-site fill is tested and approved.
2. Verify that foundation perimeter drainage installation is inspected and approved.
3. Verify that foundation or below grade structure walls are braced to support surcharge forces imposed by backfilling operations.
4. Verify that backfill areas are free of debris, snow, ice, or water, and that ground surfaces are not frozen.

B. Prepare building area subgrade pad in accordance with foundation subsurface preparation information indicated on Drawings and specified herein. Do not use rock larger than 6 inches for building subgrade fill.

C. Areas Exposed by Excavation or Stripping:
1. Scarify areas exposed by excavation or stripping on which building subgrade preparations are to be performed to minimum 12 inch depth.
2. Compact to minimum 95 percent optimum density in accordance with ASTM D698 (Standard Proctor) at minimum moisture content 1 percent below and maximum 3 percent above optimum moisture content.
3. Proof roll to detect any areas of insufficient compaction by making minimum of 2 complete passes with fully-loaded tandem-axle dump truck, or Contracting Officer approved equivalent, in each of two perpendicular directions under supervision and direction of Contracting Officer.
4. Excavate and recompact areas failing to meet specified requirements.

D. Fill Material Placement:
1. Place in 9 inch maximum lifts compacted minimum 95 percent optimum density in accordance with ASTM D698 (Standard Proctor) at minimum moisture content of 3 percent below and maximum moisture content 3 percent above optimum moisture content.
2. Maximum allowable values for plasticity index (PI) and liquid limit (LL) of suitable fill materials to be used as fill in the specified areas, unless indicated otherwise on Drawings:

	LOCATION	PI	LL
a.	Building area, below upper 4 feet of proposed subgrade elevation	6-15	35
b.	Building area, upper 4 feet of proposed subgrade elevation	6-15	35
c.	Paving area, below upper 4 feet of proposed subgrade elevation	6-15	35
d.	Paving area, upper 4 feet of proposed subgrade elevation	6-15	35

E. Provide material imported from off-site with CBR (California Bearing Ratio) or LBR (Limerock Bearing Ratio) value equal to or above pavement design subgrade CBR or LBR value indicated on Drawings.

3.6 MAINTENANCE OF SUBGRADE

A. Verify finished subgrades for elevations indicated on Drawings and specified conditions for construction above subgrade.

B. Protect subgrade from excessive wheel loading during construction, including concrete trucks and dump trucks.

C. Remove areas of finished subgrade found to have insufficient compaction density. Replace in a manner that will comply with compaction requirements as directed by Contracting Officer. Provide hard, uniform, smooth, stable surface, true to grade and cross-section after completion of compaction.

3.7 BORINGS AND CASINGS UNDER ROADS

A. Install street, road, or highway crossings for utility mains by jacking and boring method in accordance with requirements of governing authorities having jurisdiction.

B. Locate approach pits and trenches within right- of-way of street, road, highway, or railroad distance from paving permitting traffic to pass without interference. Tamp backfill for approach pits and trenches within right- of-way in layers not greater than 6 inches thick for entire length and depth of trench or pit.

Compact backfill to 95 percent of maximum density obtained at optimum moisture as determined by AASHTO T 180, Method A (Modified Proctor). Mechanical tampers may be used after cover of 6 inches has been obtained over top of pipe barrel.

C. Use commercial type boring rig providing hole bored to proper alignment and grade within 2 inches of same diameter as largest outside joint diameter of pipe installed. Install pipe in hole immediately after bore has been made, and in no instance shall hole be left open while unattended.

D. Clean and prime interior and exterior of casing pipe; apply two coats of asphalt in accordance with requirements of governing authorities having jurisdiction.

E. Butt weld steel casing. Weld using full penetration single butt-welds in accordance with AWWA C 206.

F. Install casing and utility pipe with end seals, vent pipe, and other special equipment in accordance with requirements of governing authorities having jurisdiction.

G. Paving Damage Caused by Contractor Construction Operations:
1. Repair paving where cracks occur on either side of line where pipe was installed by removing damaged paving between cracks, saw cutting paving in straight line at a point sufficiently beyond location of cracks for repair and placing new paving to match existing in areas where paving removed.
2. Make repairs to the satisfaction of paving owner.
3. Make repairs at no additional cost to Owner within one year from Date of Substantial Completion.

3.8 FIELD QUALITY CONTROL

A. Division 01 – Contractor Quality Control for Building Projects: Field testing and inspection.

B. Excavation: Notify Testing Laboratory and Contracting Officer for visual inspection of bearing surfaces, 48 hours prior to backfilling and other subsequent Work.

C. Site Tests:
1. Specified in Section 31 20 00.
2. Tests for Building Area Subgrade Pad:
   a. Cut Areas: Minimum one compaction test for every 2500 square feet.
   b. Fill Areas: Minimum one compaction test for every 2500 square feet for each 9 inch lift measured loose.
3. Tests for areas outside building area subgrade pad specified in Section 312000.

D. If tests indicate the Work does not meet specified requirements, remove Work, replace, compact and retest at no additional cost to Owner.

3.9 PROTECTION

A. Protect building subgrade pad and building related earthwork from damage by construction operations and erosion.

B. Prohibit vehicles from entering building subgrade pad area. Vehicles not permitted.

C. Scarify surface, reshape, and compact areas damaged by construction operations or weather erosion.

END OF SECTION

SECTION 31 25 00 - EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Temporary and permanent erosion control systems.
2. Slope protection systems.

B. Related Documents: The Contract Documents, as defined in Section 011100 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

C. Related Sections:
1. Section 31 32 00 - Soil Stabilization: Lime, cement, fly ash, and geotextile subgrade stabilizers.

1.2 SUBMITTALS

A. Division 01 – Shop Drawings, Product Data and Samples: Procedures for Quality Assurance/Control submittals.
1. Material Source: Submit name of material suppliers.
2. Provide materials from same source throughout Work. Change of source requires Contracting Officer approval.

1.3 PROJECT CONDITIONS OR SITE CONDITIONS

A. Environmental Requirements: Protect adjacent properties and water resources from erosion and sediment damage throughout Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Quick Growing Grasses: Wheat, rye, or oats.

B. Straw Bales: Free of weed seed.

C. Fencing for Siltation Control: Indicated on Drawings.

D. Erosion Control Blankets and/or Erosion Control Geotextiles.

E. Bale Stakes:
1. Minimum 4 feet length.
2. 2 No. 4 steel reinforcing bars or,
3. 2 steel pickets or,
4. 2 - 2x2 inch hardwood stakes driven 18 inches to 24 inches into ground.

F. Temporary Mulches: Loose straw, netting, wood cellulose, or agricultural silage free of seed.

G. Metal Fence Stakes: Minimum 8-foot length.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Division 01 – Progress Cleaning: Verification of existing conditions before starting work.
Division 01 – Construction Waste Management and Disposal
Division 01 – Final Cleaning.

B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.

C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.2 PREPARATION

A. Review Stormwater Pollution Prevention Plan SWP^3.

B. Notify Contracting Officer of deficiencies or changes in Stormwater Pollution Prevention Plan SWP3 required by current site conditions. Revisions of plan will be made as determined by Contracting Officer.

3.3 EROSION CONTROL AND SLOPE PROTECTION IMPLEMENTATION

A. Contracting Officer may direct Contractor to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and may direct Contractor to provide immediate permanent or temporary pollution control measures.

B. Provide permanent erosion control measures at earliest practical time to minimize requirement for temporary erosion controls. Permanently seed and mulch cut slopes as excavation proceeds.

C. Maintain temporary erosion control systems installed by Contractor as directed by Contracting Officer to control siltation at all times throughout Work. Provide maintenance or additional Work directed by Contracting Officer within 48 hours of notification by Contracting Officer.

D. Apply soil stabilization as specified in Section 31 32 00 or seed slopes that may be easily eroded with wheat, rye or oat grasses.

END OF SECTION

SECTION 31 32 00 - SOIL STABILIZATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Lime stabilized subgrade.
2. Cement stabilized subgrade.
3. Fly ash stabilized subgrade.
4. Geotextile fabric stabilized subgrade.

B. Related Documents: The Contract Documents, as defined in Division 01 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

C. Related Sections:
1. Section 31 20 00 - Earthwork: Cutting, filling, and grading for site improvements.
2. Section 31 23 00 - Excavation and Fill: Earthwork for structures., utilities, and pavement.

1.2 REFERENCES

A. American Society for Testing Materials (ASTM):
1. ASTM C 150 - Specification for Portland Cement
2. ASTM C 618 - Specification for Fly Ash and Raw of Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
3. ASTM C 977 - Specification for Quicklime and Hydrated Lime for Soil Stabilization
4. ASTM D 698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 Pound Rammer and 12 Inch Drop.
5. ASTM D 1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 10 Pound Rammer and 18 Inch Drop.

1.3 SUBMITTALS

A. Division 01 - Shop Drawings, Product Data and Samples : Requirements for submittals.
1. Material Source:
a. Submit name of imported materials suppliers.
b. Provide materials from same source throughout the work. Change of source requires Contracting Officer approval.
2. Samples: Submit two samples of each type of imported off-site fill material in air-tight, 10-pound container for Contracting Officer testing or submit gradation and certification of aggregate material for Contracting Officer review.
3. Mix Design: Submit mix design and materials mix ratio that will achieve specified requirements for soil stabilization by state and local agencies.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Perform soil stabilization work in accordance with applicable requirements of governing authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Division 01 - Product Storage and Handling Requirements: Transport, handle, store, and protect products.
B. Examine soil stabilization materials upon delivery to site. Verify that materials are as specified and match approved samples. Remove non-complying materials from site.

1.6 PROJECT CONDITIONS OR SITE CONDITIONS

A. Environmental Requirements:
1. Do not begin mixing operation when subgrade is frozen or when air temperature is less than 40 degrees F.
2. Do not install mixed materials in wind above 10 miles per hour.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Quicklime or Hydrated Lime: ASTM C 977.

B. Portland Cement: ASTM C 150.

C. Fly Ash: ASTM C 618.

D. Fine and Coarse Aggregate: In accordance with applicable State Highway Standard Specification regarding source, quality, gradation, liquid limit, plasticity index, and mix proportioning.

E. Subsoil: Existing reused.
1. Near surface over burden soils consist of clays and shaley clays.
2. Gray Shale is encountered at a depth of 28’ below grade in a few locations.

F. Degradable natural fiber erosion control blankets
1. Provide and install materials in accordance with applicable state highway standard specification.

2.2 EQUIPMENT

A. Perform operations using suitable, well maintained equipment capable of excavating subsoil, mixing and placing materials, wetting, consolidation and compaction of material.

2.3 SOIL MIX

A. Mix materials in accordance with the Geotech Investigation Report as prepared by Testing Engineers DFW.

B. Add water to mix to achieve a consistent mixture without lumping yet not create a wet plastic consistency.

C. Addition of lime may be specified or approved to facilitate mixing fly ash with soil materials. When specified, or directed by Contracting Officer in writing, use lime to prevent fly ash "flash set" or retard soil-fly ash reactivity occurring during final mixing.

1. Uniformly blend lime additive with fly ash on surface for incorporation with soil materials during first mixing operations unless other methods of application are approved.
2. Proportion of lime additive with the fly ash will be based on laboratory testing and field trial procedures necessary to determine proper soil modification.
3. Addition of lime will permit a reduction of fly ash requirement on a replacement basis as approved by Contracting Officer.

D. Obtain Contracting Officer approval of mix before proceeding with placement.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Division 01 – Progress Cleaning: Verification of existing conditions before starting work.
Division 01 – Construction Waste Management and Disposal
Division 01 – Final Cleaning.

B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
1. Verify that existing site soils and soil conditions encountered are as indicated in Geotechnical Data.
2. Verify quantity and type of soil stabilization materials before beginning material installation.

C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to Owner.

3.2 PREPARATION

A. Obtain Contracting Officer approval of mix design before proceeding with placement.

B. Do not start stabilization without weather and soil conditions being favorable for successful application of proposed material.

C. Proof roll subgrade to identify areas in need of stabilization.

D. Prior to stabilization of soils, prepare surface areas in accordance with applicable State Highway Standard Specifications.

3.3 EXCAVATION

A. Excavate subsoil to a depth sufficient to accommodate soil stabilization.

B. Remove lumped subsoil, boulders and rock that interfere with achieving uniform subsoil conditions.

3.4 SOIL TREATMENT AND BACKFILLING

A. Do not backfill over frozen or spongy subgrade surfaces.

B. Lime Stabilized Subgrade: Where indicated on Drawings, treat prepared subgrade with hydrated lime in accordance with the applicable provisions of the Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges Item 260. Compact to minimum 95 percent optimum density in accordance with ASTM D 698.

C. Fine and Course Aggregates: Treat prepared subgrade with fine or course aggregates in accordance with applicable State Highway Standard Specification. Compact to minimum 95 percent optimum density as determined by ASTM D 698.

D. Maintain optimum moisture of mix materials to attain required stabilization and compaction.

E. Finish subgrade surface as specified in Section 312000.

3.5 GEOTEXTILE FABRIC

A. Place fabric in areas indicated on Drawings or in areas requiring additional stabilization prior to placement of base course.

B. Place fabric in accordance with manufacturers published instructions.

END OF SECTION

SECTION 32 18 24 – SYNTHETIC SPORTS TURF

PART 1 - GENERAL REQUIREMENTS

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this section.

1.2 Scope of Work

A. Furnish all labor, materials, tools, and equipment necessary to install, in place, all synthetic turf material as indicated on the plans and as specified herein. The installation of all new materials shall be performed in strict accordance with the Manufacturer's written installation instructions, and in accordance with all approved shop drawings.

B. Prior to order of materials, the Synthetic Turf Contractor shall submit the following:

1. Product data, including Independent Laboratory Test Results,
2. Installation details,
3. Sample Warranty,
4. Field layout and striping plans,
5. Details on construction, especially any details that may deviate from plans and specifications.

C. Prior to the beginning of installation, the Synthetic Turf Contractor of the synthetic turf shall verify the base for planarity. Upon written confirmation from the base contractor that compaction/planarity and drainage/permeability specifications have been achieved, the installation of synthetic turf will proceed as arranged.

D. Prior to Final Acceptance, the Synthetic Turf Contractor shall submit to the Owner three (3) copies of Executed Warranty Documents and Maintenance Manuals, which will include necessary instructions for the proper care and preventative maintenance of the synthetic turf system, including painting and striping.

1.3 Shop Drawings

A. Shop drawings shall be prepared and contain all pertinent information regarding installation. These drawings shall be submitted to the Owner or Owner's representative for approval prior to the manufacturing and shipment of materials.

B. Submit drawings for:

1. Installation details, edge detail, goal post detail, other inserts, and covers, etc., as required by contract.
2. Striping plan showing any field lines, markings and boundaries, and field logos per project drawings.

1.4 Quality Assurance

A. Synthetic Turf Manufacturer is defined as:
1. Be a company specializing in the design and manufacturing of in-filled turf systems with not less than five (5) years documented experience.

2. Manufacturer shall have an experienced technical services and sales professional who is available during the course of the work to meet personally with the Owner, Contractor, and Landscape Architect.

B. Synthetic Turf Manufacturer's Experience:

1. The Synthetic Turf Manufacturer shall have the experience of at least one hundred (100) acceptable installations of full-size fields (minimum 65,000 sq. ft.) in the United States within the past five (5) years of tufted, polyethylene grass-like fabrics that are filled with either all rubber or a mixture of SBR rubber and sand. Submit a list of all applicable installations with the bid.
2. The Synthetic Turf Manufacturer shall have the experience of twenty-five (25) acceptable installations (minimum 65,000 sq. ft.) of fields that are at least eight years old. Submit a list of all applicable installations with the bid.
3. The Synthetic Turf Manufacturer shall have the experience of fifty (50) acceptable installations of the specific fiber system specified. Submit a list of all applicable installations with the bid.
4. The Synthetic Turf Manufacturer shall have the experience (if applicable to this project specification) of one hundred (100) installations with sewn main fabric seams.
5. The Synthetic Turf Manufacturer must be a certified member of the Synthetic Turf Council in good standing.
6. The Synthetic Turf Manufacturer must have and operate its own extensive research and development laboratory. This laboratory must include testing devices for the following tests: Yarn Tensile Strength, Yarn Elongation, Tuft Bind, Grab Tear Strength, Seam Strength, g-max, Force Reduction, Vertical Deformation, Ball Roll, Ball Rebound, Rotational Resistance, Linear Traction, Relative Abrasive Index, UV Resistance, Flammability, and Simulated Aging.
7. The Synthetic Turf Manufacturer must have manufactured and installed fields at every level of competition, including high school, college and professional.
8. The Synthetic Turf Manufacturer must have at least (1) one current NCAA Division 1 and (1) one current NFL game stadium or NFL practice field installation.
9. The Synthetic Turf Manufacturer must be a FIFA licensee and have at least (1) one FIFA 2-Star field installed in the North America.
10. The Synthetic Turf Manufacturer must not have had more than (5) five fields replaced, under warranty, during the past 5 years.
11. The Synthetic Turf Manufacturer must be vertically integrated including in-house tufting, polyethylene monofilament extrusion, in-house coating, polyurethane compounding, manufacture own primary backing, in-house yarn texturizing, ability and flexibility to tuft various gauge widths and have the ability to recycle used/old fields.
12. The Synthetic Turf Manufacturer must have a fully integrated quality system, directly based on and compliant with ISO 9000, ISO 14001 and OHSAS 18001 international standards.

B. Synthetic Turf Contractor is defined as:

1. Have built and installed a minimum of 10 in-filled synthetic turf fields. Turf contractors and on-site superintendent shall provide a resume to provide proof of experience
2. At any time after award of the contract and before the completion of the project, should any member of the approved crew or subcontractor discontinue their relationship with the synthetic turf crew or subcontractor the Owner shall be notified. Failure to provide personnel meeting the minimum qualifications shall be considered default of the contract requirements

C. Warranty: The Synthetic Turf Contractor shall submit it Manufacturer's Warranty, which guarantees the usability and playability of the synthetic turf system for its intended uses for an eight (8) year period commencing with the date of Substantial Completion.

1. The warranty submitted must have the following characteristics:

a) Must provide full-field coverage for eight (8) years from date of Substantial Completion,
b) Must warrant materials and workmanship,
c) Must warrant that the materials installed meet or the product specifications within manufacturing tolerances,
d) Must have a provision to either repair or replace such portion of the installed materials that are no longer serviceable to maintain a serviceable and playable surface,
e) Must be a Manufacturer's warranty from a single source covering workmanship and all self-manufactured or procured materials,
f) Must not be limited to the amount of annual usage,
g) Must provide, at the time of bid, a copy of its pre-paid 3rd party insurance policy. This policy must have an annual aggregate amount of no less than $60 million, and a per incident limit of no less than $7 million per claim. The third-party insurer must have an AM Best rating of A++ or better.

1.5 Existing Conditions

A. If the surface on which the new synthetic turf is to be installed is an existing asphaltic/concrete base, the Synthetic Turf Contractor will be responsible for any damage due to negligence to the concrete during removal/installation of the synthetic turf system provided there are no failures below the surface which contribute to the damage. The football goal posts, if any, are to be removed and reinstalled by the Owner or Prime Contractor to facilitate the installation of the new synthetic turf system.

B. If the surface on which the new synthetic turf to be installed is a new asphaltic/concrete base or a new base of compacted, porous aggregate, the Synthetic Turf Contractor will be responsible for any damage to the base during removal/installation of the synthetic turf system after the deficiencies (if any) have been corrected by the base contractor with respect to planarity, compaction, and drainage/permeability. New in ground equipment, football goal post (if any) and /or infield mix backfill within the contiguous synthetic turf limits or immediately adjacent thereto are to be installed prior to the installation of the synthetic turf system. Damage to the synthetic turf system during the installation of such materials is not the responsibility of the Synthetic Turf Contactor.

1.6 Schedule

A. The Synthetic Turf Contractor shall complete all work on the synthetic turf system in accordance with the published project schedule, or as mutually agreed upon.

B. The synthetic turf contractor will require unencumbered use of staging area within fifty (50) feet of the synthetic turf area(s) being installed in order to complete the work. The Synthetic Turf Contractor shall also be afforded unencumbered access through the construction site to reach the synthetic turf field area being installed.

1.7 Surface Area

A. The Synthetic Turf Contractor is to verify all measurements.

1.8 Utilities

A. Owner or Prime Contractor will supply necessary water, adequate lighting, and electricity for installation. Owner or Prime Contractor shall permit use of toilet and wash up facilities.

PART 2 - PRODUCTS

2.1 Outdoor & Indoor Synthetic Sports Turf

A. Basis of Design approved manufacturer / product is as follows:

1. Hellas Construction / Major Play - Fusion: 25700 I-45 N #160, Spring, Tx 77386
Phone Number: 800-233-5714
Hellasconstruction.com

2.3 Materials

A. Shall be tufted, polyethylene, grass-like fabric coated with a secondary backing of high-grade polyurethane. Refer to grid in section 2.3H.

B. All components and their installation method shall be designed and manufactured for use on outdoor athletic fields. The materials as hereinafter specified should be able to withstand exposure in all climates, be resistant to insect infestation, rot, fungus, mildew, ultraviolet light and heat degradation, and shall have the basic characteristics of flow-through drainage, allowing free movement of surface runoff through the synthetic turf fabric where such water may flow to the existing base and into the field drainage system.

C. The finished playing surface shall appear as mowed grass and shall resist abrasion and cutting from normal use.

D. The polyethylene pile yarn shall be a proven athletic caliber yarn designed specifically for outdoor use and stabilized to resist the effect of ultraviolet degradation, heat, foot traffic, water, and airborne pollutants.

E. The system shall be tufted at the pile height and gauge listed in specification grid, refer to grid in section 2.3H.

F. The Primary Backing must be a multi-layer backing, contain UV stabilizers and must pass 3000 hours of QUV A testing, refer to grid in section 2.3H.

G. The Secondary Backing of high-grade polyurethane shall be applied to the Primary Backing. Secondary Backing adds resistance to water degradation and strengthens grip on fibers, refer to grid in 2.3H.

H. The entire backing shall be coated with holes perforated throughout the backing at the Synthetic Turf Manufacturer’s recommended interval to allow for drainage. Partially coated backings or latex coating materials shall not be acceptable.

Pile Yarn	Polyethylene Monofilament	METHOD
Linear Density (Denier)*	10,800	ASTM D 1577
Yarn Thickness	300 microns	ASTM D 3218
Pile Weight****	44 oz./yd^2	ASTM D 5848
Finished Pile Height****	2.25	ASTM D 5823
Product Weight (total)***	72 oz./yd^2	ASTM D 5848
Primary Backing Weight****	8 oz./yd^2	ASTM D 5848
Secondary Coating Weight+	20 oz./yd^2	ASTM D 5848
Fabric Width	15’ (4.57m)	ASTM D 5793
Tuft Gauge	1/2”	ASTM D 5793
Grab Tear Strength Avg.	> 200 lb. F	ASTM D 5034
Tuft Bind (Avg.)	> 10 lb. F	ASTM D 1335
Infiltrometer	> 25	ASTM D3885

Except where noted the above specifications are nominal.
* Values are +/- 8%. ***Values are +/- 10 oz. ****Values are +/- 5%. +Values are +/- 3 oz./yd2.

I. Infill materials must conform to the grid in section 2.3I

Property	Standard	Specification
Rubber Granule Comp	N/A	All black SBR
Rubber Granule Shape	EN 14955	Spherical, Moderate, Angular
Rubber Sieve Analysis	ASTM D 5644	10 / 20MESH (2.0mm – 0.85mm)
Sand Granule Shape	ASTM D442	Semi-rounded to rounded angularity
Sand Sieve Analysis	ASTM E11	20 / 40 MESH (0.85mm - 0.425 mm)
Infill Lbs. of Rubber	N/A	3.34 lbs.
Infill Lbs. of Sand	N/A	2.23 lbs.

J. Perimeter edge details, underground storm sewer piping and connections, and goal post foundations required for the system shall be as detailed and recommended by the Design Professional, and as approved by the Owner. The cost for these embedded items shall be included in the Sitework Contractor’s price along with the compacted, porous base.

PART 3 - EXECUTION

3.1 General

A. The installation shall be performed in full compliance with approved shop drawings.

B. Only factory-trained technicians skilled in the installation of athletic caliber synthetic turf systems shall undertake the placement of the system.

C. Subject to the requirements in Section 1.2(B), the surface to receive the synthetic turf shall be verified by the Synthetic Turf Contractor as ready for the installation of the synthetic turf

system and must be perfectly clean as installation commences and shall be maintained in that condition throughout the process.

3.2 Removal of Existing Turf surface:

A. Synthetic Turf Contractor shall remove the existing turf from the field as required to prepare for new turf. Properly dispose of existing turf from Project Site.

3.3 Installation

A. The completed base and adjacent curbs/perimeter nailer shall be inspected by the Engineer or Sitework Contractor by means of a laser and plotted on a 10-foot grid. Based upon the Contractor's inspection of the topographical survey, the Sitework Contractor shall fine grade the base suitably, including properly rolling and compacting the base to achieve a surface planarity within ¼" in 10-feet (+0, -1/4"). OWNER, ENGINEER, OR PRIME CONTRACTOR SHALL NOT APPROVE THE BASE FOR TOLERANCE TO GRADE WITHOUT OBTAINING THE TOPOGRAPHICAL SURVEY.

B. Subgrade and base shall be uniformly compacted to a minimum of 95% of maximum dry density. Care must be exercised to minimize segregation. Engineer/Sitework Contractor shall make written records available to Synthetic Turf Contractor's inspector for both drainage/permeability and compaction/planarity as obtained from a minimum 10' x 10' grid.

C. The Synthetic Turf Project Superintendent shall thoroughly inspect all synthetic turf materials delivered to the site for both mixing and quantity to assure that the entire installation shall have sufficient material to maintain proper mixing ratios.

D. Synthetic turf shall be loose laid across the field, stretched, and attached to the perimeter edge detail. Synthetic turf shall be of sufficient length to permit full cross-field installation. No head or cross seams will be allowed except as needed for inlaid fabric striping or to accommodate programmed cut-outs.

E. All seams shall be flat, tight, and permanent with no separation or fraying. Selvedge edges of all panels must be cut and discarded prior to being sewn together. A butt-stitch method of seaming must be implemented and a double-lock stitch with cord recommended by the Synthetic Turf Manufacturer shall be utilized. Bagger stitching is prohibited. Seaming tape is to be constructed of high tenacity, coated non-woven fabric. Inlaid markings shall be adhered to seaming tape with a high strength polyurethane adhesive applied per the Synthetic Turf Manufacturer's standard procedures for outdoor applications. All main fabric seams shall be transverse to the field direction (i.e., run perpendicularly across the field).

F. Infill materials shall be properly applied in numerous lifts using special broadcasting equipment. The synthetic turf shall be raked and brushed properly as the mixture is applied. The infill materials can only be applied when the synthetic turf fabric is dry.

G. g-Max (shock attenuation) must test below 125 at installation.

3.4 Field Markings and Decorations

A. Field markings and decorations shall be installed in accordance with approved project shop drawings.

3.5 Clean Up

A. Synthetic Turf Contractor shall provide the labor, supplies, and equipment, as necessary, for final cleaning of the surfaces.

B. The Synthetic Turf Contractor shall keep the area clean and clear of debris throughout the project.

C. Surfaces, recesses, enclosures, etc., shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by Owner.

END OF SECTION

SECTION 32 31 13 CHAIN LINK FENCING AND GATES

PART 1 - GENERAL

1.1 SCOPE

A. This section gives requirements for chain link fencing, including accessories and gates.

1.2 RELATED WORK

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete footings for support of fence posts.

1.3 DESCRIPTION

A. Fencing and gates have an overall height of 8 feet.

1.4 SUBMITTALS

A. Shop Drawings. Submit in accordance with Division 1, Shop Drawings, Product Data and Samples.

PART 2 – PRODUCTS

2.1 MATERIALS AND FABRICATION

A. Acceptable Manufacturers. Furnish fencing, including gates, miscellaneous items and accessories of a chain link fence brand and from a manufacturer listed, or an approved equal.

(1) Cyclone Invincible, American Steel and Wire Division, United States Steel Corporation.

B. Furnish fencing, including gates, miscellaneous items and accessories of a chain link fence.

C. Fabric. Furnish No. 9 gage steel wire woven in a two-inch (2") mesh. Twist wires at top and bottom selvages, with barbing accomplished by cutting wire on the bias to create sharp points.

D. Fence Cap. Standard size, finish and profile for specified fence post.

E. Line Posts: Provide at 2 3/8” OD set at 10’-0” O.C. maximum spacing. Reference drawings for post heights.

F. Gate Posts. Fabricate post of four-inch (4") outside diameter steel pipe weighing 9.1 pounds per linear foot. Equip post with No. 6 gage galvanized clips spaced at 14-inch (14") centers and with gate appurtenances.

G. End, Corner, Angle and Pull Posts. Provide three-inch (3") outside diameter, standard full weight tubular steel post weighing 5.79 pounds per linear foot.

H. Top Rails. Provide 1-5/8-inch (1-5/8”) outside diameter, standard full weight tubular steel post weighing 2.27 pounds per linear foot.

Gates:

(1) Frames. Furnish two-inch (2’) outside diameter galvanized pipe with pressed steel or malleable iron corner ells, securely riveted with four (4) rivets per corner, or welded corners hot-dipped after fabrication.

(2) Internal Bracing. Provide 1-5/8-inch outside diameter pipe and 3/8-inch adjustable truss rods.

(3) Hardware. Conform to Federal Specification RR-F-183. Furnish a malleable iron ball and socket bottom hinge and a 180-degree wrap-around type top hinge to allow gate to swing 90 degrees or 180 degrees. Provide a padlocking device, center rests, and semi-automatic catch to secure driveway gates in open position. Padlocks will not be provided by the Contractor.

I. Bottom Tension Wire. Provide seven (7) gauge Aluminum Coated Steel or seven (7) gauge galvanized coil tension wire.

J. Hog Rings. Use 11-gauge galvanized hog rings for fastening the fabric to the bottom tension wire.

K. End, Corner and Gate Post Bracing. 1-5/8-inch (1 5/8”) outside diameter tubular steel weighing 2.27 pounds per linear foot. Provide galvanized truss rods, 3/8-inch (3/8”) in diameter.

L. Fittings. Furnish cast iron, wrought iron or pressed steel fittings.

M. Extension Arms. Provide a pressed steel or malleable iron base with riveted, pressed steel extension, galvanized after assembly.

N. Stretcher Bars. Provide one (1) for each gate, pull and end post; two (2) for each corner post.

O. Accessories. Accessories are all parts required for complete installation of chain-link fence except for fabric, posts, rails, and gate frames. Use accessories of the manufacturer’s standard design. Provide accessories of steel, wrought iron, or malleable iron, and galvanized.

P. Fence Caps. Provide yellow 4 ½” diameter, pre-slit, corrugated plastic tubing fence guard, weather treated, and UV protected.

2.2 GALVANIZING

A. Fabric. Hot-dip galvanize after weaving.

PART 3 - EXECUTION

3.1 FENCE ERECTION

A. Erect the fence in accord with approved shop drawings and manufacturer’s recommendation.

1. Posts.

a. Spacing. Space posts erect in line, not more than 10-feet on center.

b. Setting. Set posts plumb in center of minimum 12-inch (12”) diameter footing with 36-inch (36") minimum embedment. Hold post in place until concrete has set. Round or bevel top of footing to provide positive drainage away from post. Place concrete as specified in Division 3, except that 2,000-psi concrete may be used.

c. Bracing. Space midway between the top rail and the ground and extend to first line post. Fasten to the post with malleable iron or pressed steel connections and provide a truss rod from the first line post back to the end, corner, or gatepost.

2. Gates Bottom Tension Wire Extension Arms Barbed Wire Stretcher Bars Miscellaneous and Accessory Items. Erect and install in accordance with approved shop drawings and manufacturer's recommendation.

3. Fabric. Install to clear top of ground at all locations, but not to exceed two-inches (2"). Fasten to line posts with bands spaced approximately 14-inches apart. Attach to top rail with tie wires spaced approximately 24-inches apart. Attach to bottom tension wire with hog rings at 24-inch (24") centers.

3.2 MISCELLANEOUS EARTHWORK REQUIREMENTS

A. Excavate or fill along fence line as required to meet specified clearance for bottom of fabric. Cut and fill in a manner to prevent ponding.

B. Excavated material may be used for fill if it is friable. Furnish borrow material to topsoil quality if excavated material is insufficient or unsuitable.

C. Remove surplus excavated material from the project site or spread the material uniformly as directed.

END OF SECTION

SECTION 32 31 19 – HEAVY DUTY WOOD DUMPSTER ENCLOSURE GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Heavy Duty Wood Dumpster Enclosure Gates.

1.2 RELATED SECTIONS

A. Section 04 22 00: Unit Masonry.

B. Section 03 30 00: Cast-In-Place Concrete

1.3 REFERENCES

A. ASTM International (ASTM):
1. ASTM A123 - Standard Specification For Zinc, Hot-Dip Galvanized, Coatings On Iron And Steel Products.
2. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
3. ASTM F2408 - Standard Specification for Ornamental Fences.

B. American Welding Society (AWS).

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data:
1. Manufacturer's data sheets on each product to be used.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Typical installation methods.

C. Verification Samples: Two representative units of each type, size, pattern and color.

D. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five (5) years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum five (5) years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

B. Protect from damage due to weather, and construction operations.

1.7 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard 5-year limited warranty, from the date of purchase, for defects in material and workmanship, including protection against cracking, peeling, blistering and corrosion. Refer to Manufacturer's warranty for details.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Fortress Building Products: 1720 North 1st Street; Garland, TX 75040

Phone No: 866-323-4766

A. Fencemaster: 11255 Eastex FWY, Houston, Texas 77093

Phone No: 713-766-5763

B. Architectural Fabricators: 3904 Searle Dr, Houston, Texas 77009

Phone No: 832-603-3761

2.2 BASE PRODUCT

A. Fortress Building Products or approved equal.

2.3 GATE COMPONENTS

A. Material: Grade A cold rolled 50,000 psi (345 MPa) steel. Conforming to ASTM A500 with G-90 zinc coating, inside and outside surfaces in accordance with ASTM A123 hot dipped electroplating process.

B. Dumpster Enclosure Swing Gates: Number of gates; Height, Width, Framing and gate picket panels. Reference Drawings.

2.4 FABRICATION

A. Gate panels shall be fully assembled and comply with requirements indicated for materials, thickness, design and details of construction.

B. Panels shall be mechanically attached to the rail thru the Slide Lock Technology.

C. All welded connections shall comply with AWS standards for recommended practice in shop welding.

D. All components shall be accurately cut and drilled to receive hardware, fasteners and accessories.

E. Panels shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Industrial weight under ASTM F2408.

2.5 FINISH

A. Materials shall be coated with the process of galvanization.

B. Metal parts shall be assembled and finished individually prior to shipment.

C. Color: To be selected by Architect from manufacturer's standards offerings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and authorities having jurisdiction, and in proper relationship with adjacent construction.

B. Concrete Set Posts:
1. Set gate post minimum of 36 inches (914 mm) deep coordinate with dumpster enclosure openings.

C. Gate Installation: Install in accordance with current printed instructions.
1. Do not mount gate from wall of a structure.
2. Provide gate post on both sides of each gate.
3. For double approach gate installation, provide concrete center drop to foundation depth and drop rod retainers at center.
4. Lubricate to ensure smooth operation and verify proper latch operation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturer's recommendations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

1. Repair scratches and other installation-incurred damage.
2. Using a spray paint of the appropriate color that includes a zinc additive, repaint and seal any scratches or holes drilled in gates, post, brackets, or additions to prevent rust from forming.

C. Remove all cutting and drilling chips that are attached to the gates, post, brackets or additions to prevent corrosion.

D. Clean up debris, unused material and remove from site.

END OF SECTION

SECTION 32 31 20 - ORNAMENTAL FENCE AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes Ornamental steel fencing panels fabricated with flat bars, tube steel, round rods into modular, open grille fencing panels, including steel fence posts and gates.
B. Related sections:
1. Section 03 30 00 - Cast-in-Place Concrete: Concrete footings for support of fence posts.

1.2 REFERENCES

A. ASTM International (ASTM):
1. ASTM A36 – Carbon Structural Steel.
2. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
3. ASTM D822 - Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
4. ASTM D2794 - Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
5. ASTM D3363 - Test Method for Film Hardness by Pencil Test.

1.3 SUBMITTALS

A. Provide in accordance with Section 01 33 00 - Submittal Procedures:
1. Product data for components and accessories.
2. Shop drawings showing layout, dimensions, spacing of components and anchorage and installation details.
3. Sample: 24” x 24” minimum size sample of fence panel illustrating design, fabrication workmanship, and selected color coating.
4. Copy of warranty specified in Paragraph 1.4 for review by Architect.

1.4 WARRANTY

A. Provide in accordance with Section 01 77 00 - Closeout Procedures:
1. Factory finish: 20-year warranty against cracking, peeling, and blistering under normal use.
2. General Contractor: 1-year for components and installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Fencemaster: 11255 Eastex Fwy, Houston, Texas 77093
Phone No: 713-766-5763

B. Lambert’s Ornamental Iron: 4201 Hahn Blvd., North Richland Hills, Texas 76117
Phone No: 817-577-3837

C. Ameristar / Assa Abloy: 1555 N. Mingo Road, Tulsa, Ok 74116
Phone No: 888-333-3422

2.2 MATERIALS

A. Steel bar stock: ASTM A36.
B. Steel tubing: ASTM A500, Grade B.
C. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, and water-reducing and plasticizing additives.

2.3 FENCE SYSTEM

A. Type: Ornamental steel fencing system consisting of modular open grille fencing panels and gates using welded steel bars and rods, supported by steel posts and gates and gate hardware.

B. Posts: Standard steel post, 14 gauge 4” square tube size. Lengths per drawing.

C. Entrance fence post height to be 6’-4” above finish grade.

D. Breezeway fence post height to be 8’-4” above finish grade.

2.4 GATES

A. Equip gates with manufacturer's standard hardware as required for complete functional operation.
B. Provide exit hardware to comply with applicable egress requirements.

2.5 ACCESSORIES

A. Fence pickets: Equip fence panels with top pickets by providing steel tube welded to back of vertical main bars and standard spacing.

B. Fasteners: Stainless steel bolts of type, size, and spacing as recommended by fence manufacturer for specific condition.

C. For exposed locations, provide anti-intruder bolts consisting of cup-head bolt and nut with clamping hexagon, such that tightening shears hexagon and render bolt impossible to release.

2.6 FACTORY FINISH

A. Steel fence panels and posts shall be hot-dip galvanized to 1.25 ounces per square foot minimum zinc coating in accordance with ASTM A123. Standard size components shall receive polyester powder coating. Large gate panels shall be coated with 2-part polyurethane coating.

B. Polyester powder coating: Electrostatically applied colored polyester powder coating heat cured to chemically bond finish to metal substrate.

1. Minimum hardness measured in accordance with ASTM D3363: 2H.

2. Direct impact resistance tested in accordance with ASTM D2794: Withstand 160 inch-pounds.

3. Weatherability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1-year exposure in South Florida with test panels tilted at 45 degrees.

C. Polyurethane coating: 1.0 mil dry film thickness of coating of steel test panel cured 30 minutes at 180 degrees F and aged 14 days shall resist the following test conditions without failure:

1. 5 percent salt spray for 500 hours.
2. 100 percent relative humidity for 1000 hours.
3. Water immersion for 100 hours.
4. 20 double rubs with cloth saturated with either lacquer thinner, acetone, MEK, gasoline, or xylene.
5. Exposure to lubricating oils, hydraulic fluids, and cutting oils.
6. 16 cycles of 24 hours at 100 percent humidity, 24 hours at 10 degrees F, and 24 hours at 77 degrees F.
7. Hardness: H to 2H.
8. Flexibility: [1/8 inch] [3 mm] conical mandrel.

D. Color: to be selected by Architect.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to fabrication, field verify required dimensions.

B. Cast concrete footings in accordance with Section 03 30 00 - Cast-in-Place Concrete as detailed on Drawings and approved shop drawings.

1. Minimum footing diameter:

a. Terminal and gate posts: 12 inches.

b. Intermediate line posts: 10 inches.

2. Allow 36” inches minimum embedment of posts.

3. Allow 6” inches [152 mm] minimum concrete beneath post bottom.

C. Provide setting holes for embedment of fence posts. Core drill existing concrete footings for embedment of fence posts. Hole shall be 2 inches minimum greater than post width.

3.2 INSTALLATION

A. Install fencing in accordance with manufacturer's installation instructions and approved shop drawings.

B. Install fence posts plumb and level by setting post in hole in concrete and grouting solid by embedding post directly in concrete footing. Temporarily brace fence posts with 2 by 4 wood supports until concrete grout is set.

C. Do not install bent, bowed, or otherwise damaged panels. Remove damaged components from site and replace.

D. Secure fence panels with stainless steel anti- intruder bolts to fence posts prior to setting posts in footings.

E. Gates:

1. Install gates and adjust hardware for smooth operation.

2. Provide concrete surface for length of operation of V-wheeled rolling gate. Anchor track to concrete with countersunk fasteners.

3. After installation, test gate. Open and close a minimum of five times. Correct deficiencies and adjust.

F. Touch-up damaged finish with paint supplied by manufacturer and matching original coating.

END OF SECTION

SECTION 32 31 23 VINYL FENCING AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Privacy Stone Simulated Vinyl Fence and Gates

1.2 RELATED SECTIONS

A. Section 03 30 00 Cast-in-Place Concrete: Concrete footings for support of fence posts.

1.3 SUBMITTALS

A. Submit under provisions of Division 01.
B. Product Data: Manufacturer's data sheets including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: submit shop drawings for each product and accessory required. Include information not fully detailed in manufacturer's standard product data.
D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
E. Verification Samples: For each finish product specified, two samples, minimum size 3 inches square, representing actual product, color and patterns.
F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
G. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning and maintenance of all components.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm engaged in the manufacture of vinyl fence and gates of types and sizes specified and whose products have been in satisfactory use in similar service for a minimum of five years.
B. Installer Qualifications: A firm with a minimum of two years of successful installation experience with projects utilizing vinyl fence and gates similar in type and scope to that required for this Project.
C. Pre-Installation Conference: Conduct pre-installation conference in accordance with Division 01. Date and time of the pre-installation conference shall be acceptable to the Owner and the Architect.

1. Prior to commencing the installation, meet at the Project site to review the material selections, installation procedures, and coordination with other trades.
2. Mock-ups shall be reviewed during the pre-installation conference.
3. Pre-Installation conference shall include the Contractor, the Installer and any trade that requires coordination with the work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the Project site in manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.
B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.6 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Lifetime Limited, Non-Prorated Warranty on Material and 5 Year Prorated Labor Warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Vinyl Fence Wholesaler: 14607 Felton Ct., St Paul, MN 55124 (Has a Texas Factory)
Phone: 507-206-4154

B. Hoover Fence Co: 4521 Warren Ravenna Rd., Newton Falls, Ohio 44444
Phone: 330-358-2335

C. Penn Fencing: 647 Pittsburgh Road, Butler, PA 16002
Phone: 888-728-4695

2.2 MATERIALS

A. PVC: Poly Vinyl Chloride (PVC) formulated to resist impact and for Ultra Violet (UV) stabilization. Extruded products meets or exceeds ASTM D 1784.

2.3 SIMULATED STONE FENCE

A. Style: Heavy Duty Simulated Stone Privacy Fence and Sound Wall

B. Basis of Design: Vinyl Fence Wholesaler Model #: FP96x96

C. 8’ Tall x 8’ Wide Sections

D. Construction: Made with proprietary Linear Low density Polyethylene Plastic (LLDPE) and reinforced with galvanized steel. Each post is foam filled with steel inserts wrapped in LLDPE.

E. Wind Rating: Can withstand constant hurricane force winds up to 110 mph and 130 mph gusts.

F. Sound Barrier: Blocks 98% of direct sound with a sound transmission class (STC) rating of 26.

G. Temperature: Very stable in temperature extremes. Withstands tests at -40°F to 140°F.

H. Color Options: Several natural granite colors. Brown, Grey, Beige, Dark Brown or Black.

I. Graffiti Resistant: Easily remove graffiti using a high-powered pressure washer.

J. Fade Resistant: Contains xenon-arc 12 UV inhibitors for a lifetime of vibrant colors.

K. Lifetime Warranty

2.4 POST CAPS

A. Vinyl Post Caps 6.5” x 6.5” x 3” height

B. Color to match fence and posts

2.5 GATE HARDWARE

A. Heavy Duty Gate hardware

B. Hinges

C. Latch

D. Drop Rod for Double Gates (Commercial)

E. Finish/Color: Powder coated – Black

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until conditions have been properly prepared.
B. Verification of Conditions: Examine locations where fencing is to be installed for any conditions detrimental to the proper and timely completion of the work.
C. If preparation is the responsibility of another installer, notify Architect of unsatisfactory reparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.
B. Prepare the grade and remove surface irregularities, if any, which may cause interference with the installation of the fence.
C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Touch-up, repair or replace damaged products before Substantial Completion.
B. Clean the work according to manufacturer’s written instructions. Post hole excavations shall be scattered uniformly away from the posts. Clean fence with mild household detergent and rinse well with clean water. Remove mortar from exposed posts using a 10 percent solution of muriatic acid followed immediately by several rinses of clean water.

3.4 PROTECTION

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 32 92 00 TURF AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Seeding
2. Sodding

1.2 DEFINITIONS

A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

H. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.

I. Surface Soil: Whatever soil is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Certification of grass seed.

1. Certification of each seed mixture for turfgrass sod. Product certificates.

1.4 QUALITY ASSURANCE

A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

1. Pesticide Applicator: State licensed, commercial.

B. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory.

1. The soil-testing laboratory shall oversee soil sampling.
2. Report suitability of tested soil for turf growth.

a. State recommendations for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
b. Report presence of problem salts, minerals, or heavy metals; if present, provide additional recommendations for corrective action.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

1.6 MAINTENANCE SERVICE

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:

1. Seeded Turf: 90 days from date of Substantial Completion.

a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

2. Sodded Turf: 90 days from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: State-certified seed of grass species as follows:

Full Sun: Hydroseeded Bermudagrass (Cynodon dactylon)

2.2 TURFGRASS SOD

A. Turfgrass Sod: Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Turfgrass Species: Sod of grass species as follows:

1. Full Sun: Bermudagrass (Cynodon dactylon)
2. Sun and Partial Shade: Bermudagrass (Cynodon dactylon) or Raleigh St Augustine (Stenotaphrum secundatum)
3. Shade: Raleigh St Augustine (Stenotaphrum secundatum)

2.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: O, with a minimum of 95 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.4 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch (19-mm)] sieve; soluble salt content of 8 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.5 FERTILIZERS

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 2 percent nitrogen and 15 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb./1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2.6 PLANTING SOILS

A. Planting Soil ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 4 percent organic material content. Existing, in-place surface soil. Verify suitability of soil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix soil with the soil amendments and fertilizers to produce planting soil.

2.7 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.

C. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range content 35 to

55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 3 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings.

2.8 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

PART 3 - EXECUTION

3.1 TURF AREA PREPARATION

A. Newly Graded Subgrades: Loosen subgrade to a minimum depth of [4 inches (100 mm. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply fertilizer directly to subgrade before loosening.
2. Thoroughly blend planting soil off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
3. Spread planting soil to a depth of 6 inches (150 mm)] but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

    a. Reduce elevation of planting soil to allow for soil thickness of sod.

B. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least 6 inches (150 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture.

    a. Apply fertilizer directly to surface soil before loosening.

3. Remove stones larger than 1 inch (25 mm)in any dimension and sticks, roots, trash, and other extraneous matter.
4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

D. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.2 Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or

otherwise disturbed after finish grading. HYDROSEEDING

A. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer. Revise first paragraph below to suit Project. Sowing rates vary with grass species and mixtures.

B. Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

C. Rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous blanket [1-1/2 inches (38 mm) in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

3.3 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches (38 mm) below sod.

3.4 TURF MAINTENANCE

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

B. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain height appropriate for species without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings.

C. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

3.5 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Landscape Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches (125 by 125 mm)

2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

END OF SECTION

SECTION 33 40 00 STORM SEWER SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes storm sewer system, cleanouts, and appurtenances from a point 5 feet outside building lines to the point of disposal.

B. Refer to Division 15 Sections for continuation of storm sewer system.

1.3 RELATED WORK

A. Related Work of Other Sections
1. Trench Safety
2. Earthwork: Excavation, backfill and compaction requirements
3. Soil Stabilization
4. Cement Concrete Paving
5. Division 15 Sections: Underground storm sewer piping within 5 feet of building
6. Division 16 Sections - Underground electrical service.

1.4 SUBMITTALS

A. Submit shop drawings for the system, showing pipe sizes, locations, elevations, and slopes for horizontal runs. Include detail of manholes, catch basins; grates, covers, and frames; piping, fittings, and connections.

B. Submit Record Documents locating actual horizontal and vertical location of installed storm sewer system piping, manholes, area drains, catch basins, cleanouts, and related work in accordance with requirements of Section 01 78 00 - Contract Closeout.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Corrugated PE Drainage Pipe and fittings NPS 10 (DN 250) and Smaller: AASHTO M 252M, Type S, with smooth waterway for coupling joints.

1. Silt-tight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings to form silt-tight joints.

2.2 CATCH BASINS

A. Normal-Traffic, Precast Concrete Catch Basins: ASTM C 478 (ASTM C 478M).precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.

1. Base Selection: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100 mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.

2. Riser Sections: 4-inch (100 mm) minimum thickness, 48-inch (1220 mm) diameter, and lengths to provide depth indicated.
3. Top Section: Eccentric-cone type, unless concentric-cone or flat-slap-top type is indicated. Top of cone of size that matches grade rings.
4. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
5. Grade Rings: Include two or three reinforced-concrete rings, of 6 to 9-inch (150- to 229-mm) total thickness, that match 24-inch-(610-mm-) diameter frame and grate.
6. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.

B. Frames and Grates: Gray iron ASTM A48 Class 35B, cast iron designed for heavy-duty service. Include 24-inch (610-mm) ID by 7- to 9-inch (178- to 229-mm) riser with 4-inch (100-mm) minimum width flange, and 26-inch-(660-mm-) diameter flat grate with small square or short-slotted drainage openings.

1. Grate Free Area: Approximately 50 percent, unless otherwise indicated.
2. Acceptable Manufacturers

a. Vulcan Foundry
b. Neenah Foundry Company
c. McKinley
d. Equivalent accepted by Architect

2.3 STORMWATER INLETS

A. Curb Inlets: Made with vertical curb opening, of materials and dimensions according to utility standards.

2.4 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350R. See Section 03 30 0 - Concrete Work for cast-in-place concrete, concrete reinforcing and related materials.

B. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cementitious ratio.

1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed steel.

C. Ballast and Pipe Supports: Portland cement design mix, 4000 psi (20.7 MPa) minimum, with 0.58 maximum water-cementitious ratio.

1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed steel.

2.5 PROTECTIVE COATINGS

A. Description: 1- or 2-coat, coal-tar epoxy; 15-mil (0.38-mm) minimum thickness, unless otherwise indicated; factory or field applied to the following surfaces:

1. Concrete Manholes: On exterior and interior surfaces.
2. Manhole Frames and Covers: On entire surfaces.

3. Catch Basins: On exterior and interior surfaces.
4. Catch Basin Frames and Grates: On entire surfaces.
5. Stormwater Inlets: On exterior and interior surfaces.
6. Stormwater Inlet Frames and Grates: On entire surfaces.

2.6 CLEANOUTS

A. PVC Cleanouts: Haevy-Duty PVC bodies (ASTM F 794 is made in NPS 4 to NPS 48 (DN 100 to DN 1200), for gasketed joints) with silt-tight gasketed adapters for corrugated PE pipe and round, gray-iron cover. Use units with top-loading classifications according to the following applications:

1. Extra-Heavy Duty H20 Loading: In paving and drives

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.

B. Laying Pipe: Lay pipe with full bearing for each pipe section throughout its length, to true grades and alignment and continuous slope in the direction of flow. Provide recesses in the excavation bottom to receive bells for pipe having bell and spigot ends. Lay pipe with bells facing up the slope with spigot end entered fully into adjacent bell. Seal joint in accordance with local authorities having jurisdiction.

C. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream.

D. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.

E. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

F. Install gravity-flow piping and connect to building's storm drains, of sizes and in locations indicated.

G. Terminate piping as indicated.

1. Install piping pitched down in direction of flow, at minimum slop of 1 percent, unless otherwise indicated.

2. Install piping with 35-inch (1000 mm) minimum cover.

H. Extend storm drainage piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.

I. Provide bedding and backfill constructed in accordance with the City of Houston Department of Public Works and Engineering "Standard Construction Specifications for Wastewater Collection Systems, Water Lines, Storm Drainage and Street Paving", dated September 1997, and Section 31 20 00 - Earthwork.

3.2 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. Join and install pipe and fittings according to installations indicated.

B. Install gaskets, seals, sleeves, and couplings according to referenced pipe specification and manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

C. Maintain swab or drag in line, and pull past each joint as it is completed.

3.3 CATCH-BASIN INSTALLATION

A. Set frames and grates to elevations indicated.

3.4 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

3.5 DRAINAGE SYSTEM INSTALLATION

A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

1. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 12 inches (450 by 450 by 300 mm) deep. Set with tops 1 inch (25mm) above surrounding grade.
2. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

B. Install drains in locations indicated.

1. Embed drains in 4-inch (100-mm) minimum depth of concrete around bottom and sides.
2. Set drain frames and covers with tops flush with pavement surface.

C. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.

D. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch (150-mm) overlap, with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 4000 psi (20.7 MPa).

E. Make branch connections from side into existing piping, NPS 4 to NPS 20 (DN 100 to DN 500). Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 4000 psi (20.7 MPa).

F. Make branch connections from side into existing piping, NPS 21 (DN 525) or larger, or to underground structures by cutting opening into existing unit large enough to allow 3 inches (76 mm) of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches (150 mm) of concrete for minimum length of 12 inches (300 mm) to provide additional support of collar from connection to undisturbed ground.

1. Use concrete that will attain minimum 28-day compressive strength of 4000 psi (20.7 MPa), unless otherwise indicated.
2. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

3.6 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of Project.

B. Defects requiring correction include the following:

1. Alignment: Less than full diameter of inside of pipe is visible between structures.
2. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
3. Crushed, broken, cracked, or otherwise damaged piping.
4. Infiltration: Water leakage into piping.
5. Exfiltration: Water leakage from or around piping.
6. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
7. Reinspect and repeat procedure until results are satisfactory.

C. Testing Lines: Inspect and test lines before backfilling to assure free flow without displacement or other damage. Remove obstructions, replace damaged components, and reinspect system until satisfactory. Plug ends of completed pipe and conduct low-pressure (4 psig) air test in accordance with ASTM C 924.

3.7 PROTECTION AND CLEANING

A. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

B. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.

1. Place plug in end of incomplete piping at end of day and when work stops.
2. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.

END OF SECTION

SECTION 33 43 00 POLYVINYL CHLORIDE PIPE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Polyvinyl chloride pressure pipe for water distribution in nominal diameters 4 inches through 16 inches.

B. Polyvinyl chloride sewer pipe for gravity sanitary sewers in nominal diameters 4 inches through 48 inches.

C. Polyvinyl chloride pressure pipe for gravity sanitary sewers and force mains in nominal diameters 4 inches through 36 inches.

1.2 MEASUREMENT AND PAYMENT

A. Unit Prices.

1. No separate payment will be made for PVC pipe under this section. Include cost in unit price for work included as specified in the following sections:

a. Water Main
b. Gravity Sanitary Sewers

1.3 REFERENCES

A. ANSI A21.5 (AWWA C 105) - Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.

B. ANSI A21.10 (AWWA C 110) - Ductile-Iron and Gray-Iron Fittings, 3 inches through 48 inches for Water and Other Liquids.

C. ANSI A21.11 (AWWA C 111) - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
D. ASTM D 1248 - Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.

E. ASTM D 1784 - Standard Specification for Rigid Polyvinyl Chloride Compound and Chlorinated Polyvinyl Chloride Compounds.

F. ASTM D 2241 - Standard Specification for Polyvinyl Chloride Plastic Pipe (SDR-PR).

G. ASTM D 2321 - Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.

H. ASTM D 2444 - Test Method for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight).

I. ASTM D 2680 - Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Polyvinyl Chloride Composite Sewer Piping.

J. ASTM D 3034 - Specification for Type PSM Polyvinyl Chloride Sewer Pipe and Fittings.

K. ASTM D 3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

L. ASTM D 3212 - Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

M. ASTM F 477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

N. ASTM F 679 - Specification for Polyvinyl Chloride Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

O. ASTM F 794 - Specification for Polyvinyl Chloride Large-Diameter Ribbed Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.

P. ASTM F 949 - Specification for Polyvinyl Chloride Corrugated Sewer Pipe with a Smooth Interior and Fittings.

Q. AWWA C 900 - Polyvinyl Chloride Pressure Pipe, 4 Inches Through 12 Inches for Water Distribution.

R. AWWA C 905 - Polyvinyl Chloride Water Transmission Pipe, Nominal Diameters 14 Inches Through 36 Inches.

S. PPI TR3 - Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.

T. UNI-B-11 - Recommended Standard Specification for Polyvinyl Chloride Water Transmission Pipe (Nominal Diameters 14 Inches through 36 Inches).

U. UNI-B-13 - Recommended Standard Performance Specification for Joint Restraint Devices for Use with Polyvinyl Chloride Pipe.

1.4 SUBMITTALS

A. Submit shop drawings showing design of new pipe and fittings indicating alignment and grade, laying dimensions, fabrication, fittings, flanges, and special details.

1.5 QUALITY CONTROL

A. Submit manufacturer's certifications that PVC pipe and fittings meet requirements of this Section and AWWA C 900 or AWWA C 905 for pressure pipe applications, or the appropriate ASTM standard specified for gravity sewer pipe.

B. Submit manufacturer's certification that PVC pressure pipe has been hydrostatically tested at the factory in accordance with AWWA C 900 or AWWA C 905 and this Section.

C. When foreign manufactured material is proposed for use, have material tested for conformance to applicable ASTM requirements by certified independent testing laboratory located in United States. Certification from any other source is not acceptable. Furnish copies of test reports to the Engineer for review. Cost of testing shall be borne by Contractor.

PART 2 PRODUCTS

2.1 MATERIAL

A. Use PVC compounds in the manufacture of pipe that contain no ingredient in an amount that has been

demonstrated to migrate into water in quantities considered to be toxic.

B. Furnish PVC pressure pipe manufactured from Class 12454-A or Class 12454-B virgin PVC compounds as defined in ASTM D 1784. Use compounds qualifying for a rating of 4000 psi for water at 73.4 degrees F per requirements of PPI TR3. Provide pipe which is homogeneous throughout, free of voids, cracks, inclusions, and other defects, uniform as commercially practical in color, density, and other physical properties. Deliver pipe with surfaces free from nicks and scratches with joining surfaces of spigots and joints free from gouges and imperfections which could cause leakage.

C. For PVC pressure pipe used for water mains, provide self-extinguishing PVC pipe that bears Underwriters' Laboratories mark of approval and is acceptable without penalty to Texas State Fire Insurance Committee for use in fire protection lines.

D. Gaskets:

1. Gaskets shall meet the requirements of ASTM F 477. Use elastomeric factory-installed gaskets to make joints flexible and watertight.

2. Pipes to be installed in potentially contaminated areas, especially where free product is found near the elevation of the proposed sewer, shall have the following gasket materials for the noted contaminants.

CONTAMINANT	GASKET MATERIAL REQUIRED
Petroleum (diesel, gasoline)	Nitrile Rubber
Other contaminants	As recommended by the pipe manufacturer

3. Do not use PVC gasket material for water mains in potentially contaminated areas.

E. Lubricant for rubber-gasketed joints: Water soluble, non-toxic, non-objectionable in taste and odor imparted to fluid, non-supporting of bacteria growth, having no deteriorating effect on PVC or rubber gaskets.

F. PVC pipe for water service shall bear National Sanitation Foundation Seal of Approval (NSF-PW).

2.2 WATER SERVICE PIPE

A. Pipe 4-inch through 12-inch: AWWA C 900, Class 150, DR 18; nominal 20-foot lengths; cast-iron equivalent outside diameters.

B. Pipe 16-inch: AWWA C 905; Class 235; DR 18; nominal 20-foot lengths; cast-iron equivalent outside diameter.

C. For large-diameter water mains, provide pipe manufactured by J-M Manufacturing Company, North American, Diamond Plastics Corporation, or I-Pex.

D. Joints: ASTM D 3139; push-on type joints in integral bell or separate sleeve couplings. Do not use socket type or solvent weld type joints.

E. Make curves and bends by deflecting the joints. Do not exceed maximum deflection recommended by the pipe manufacturer. Submit details of other methods of providing curves and bends for review by the Engineer.

F. Hydrostatic Test: AWWA C 900, AWWA C 905, ANSI A 21.10 (AWWA C 110); at point of manufacture; submit manufacturer's written certification.

2.3 BENDS AND FITTINGS FOR PVC PRESSURE PIPE

A. Bends and Fittings: ANSI A 21.10, ductile iron; ANSI A 21.11 single rubber gasket push-on type joint; minimum 150 psi pressure rating.

B. Coatings and Linings: Conform to requirements of Ductile-Iron Pipe and Fittings.

2.4 GRAVITY SANITARY SEWER PIPE

A. PVC gravity sanitary sewer pipe shall be in accordance with the provisions in the following table:

WALL CONSTRUCTION	MANUFACTURER	PRODUCT OPTIONS	ASTM DESIGNATION	SDR (MAX.)/ STIFFNESS (MIN.)	DIAMETER SIZE RANGE
Solid	J-M Pipe CertainTeed Can-Tex Carlon Diamond	Approved	D3034	SDR 26 / PS 115	6" to 10"
		Approved	D3034	SDR 35 / PS 46	12" & 15"
		Approved	F679	SDR 35 / PS 46	18" to 27"
		Approved	AWWA C900	DR 18 / N/A	4" to 12"
		Approved	AWWA C905	DR 18 / N/A	14" to 36"
Truss (Gasketed)	Contech	Preapproved	D2680	N/A /200 psi	8" to 15"
Profile	Contech A-2000	Preapproved	F949	N/A / 50 psi	12" to 36"
	ETI Ultra-Rib	Preapproved	F794	N/A / 46 psi	12" to 48"
	Lamson Vylon	Preapproved	F794	N/A / 46 psi	21" to 48"

B. When solid wall PVC pipe 18 inches to 27 inches in diameter is required in SDR 26, provide pipe conforming to ASTM F 679, except provide wall thickness as required for SDR 26 and pipe strength of 115 psi.

C. For sewers up to 12-inch-diameter crossing over waterlines, or crossing under waterlines with less than 2 feet separation, provide minimum 150 psi pressure-rated pipe conforming to ASTM D 2241 with suitable PVC adapter couplings.

D. Joints: Spigot and integral wall section bell with solid cross section elastomeric or rubber ring gasket conforming to requirements of ASTM D 3212 and ASTM F 477, or ASTM D 3139 and ASTM F 477. Gaskets shall be factory-assembled and securely bonded in place to prevent displacement. The manufacturer shall test a sample from each batch conforming to requirements ASTM D 2444.

E. Fittings: Provide PVC gravity sewer sanitary bends, tee, or wye fittings for new sanitary sewer construction. PVC pipe fittings shall be full-bodied, either injection molded or factory fabricated.

Saddle-type tee or wye fittings are not acceptable.

2.5 SANITARY SEWER FORCE MAIN PIPE

A. Provide PVC pressure pipe conforming to the requirements for water service pipe and conforming to the minimum working pressure rating specified in Sanitary Sewage Force Mains.

B. Acceptable pipe joints are integral bell-and-spigot, containing a bonded-in elastomeric sealing ring meeting the requirements of ASTM F 477. In designated areas requiring restrained joint pipe and fittings, use EBAA Iron Series 2000PV, Uniflange Series 1350 restrainer, or equal joint restraint device conforming to UNI-B-13, for PVC pipe 12-inch diameter and less.

C. Fittings: Provide ductile iron fittings as per Paragraph 2.03, except furnish fittings with one of the following internal linings:

1. Nominal 40 mils (35 mils minimum) virgin polyethylene complying with ASTM D 1248, heat fused to the interior surface of the fitting, as manufactured by American Cast Iron Pipe "Polybond", or U.S. Pipe "Polyline".

2. Nominal 40 mils (35 mils minimum) polyurethane, Corro-pipe II by Madison Chemicals, Inc.

3. Nominal 40 mils (35 mils minimum) ceramic epoxy, Protecto 401 by Enduron Protective Coatings.

D. Exterior Protection: Provide polyethylene wrapping of ductile iron fittings as required.

E. Hydrostatic Tests: Hydrostatically test pressure rated pipe in accordance with Paragraph 2.02E.

F. Manufacturers: Approved manufacturers of pressure rated, solid wall PVC pipe for sanitary sewer force mains are:
1. J-M Manufacturing Company, Inc.
2. CertainTeed Corporation
3. Diamond Plastics Corporation

PART 3 E X E C U T I O N

3.1 PROTECTION

A. Store pipe under cover out of direct sunlight and protect from excessive heat or harmful chemicals in accordance with the manufacturer's recommendations.

3.2 INSTALLATION

A. Conform to requirements of Water Mains, Gravity Sanitary Sewers, and Sanitary Sewage Force Mains, as applicable.

B. Install PVC pipe in accordance with Excavation and Backfill for Utilities, ASTM D 2321, and manufacturer's recommendations.

C. Water service pipe 12 inches in diameter and smaller: Installed to clear utility lines and have minimum 4 feet of cover below lowest property line grade of street, unless otherwise required by Drawings.

D. For water service, exclude use of PVC within 200 feet (along the public right-of-way) of underground storage tanks or in undeveloped commercial acreage. Underground storage tanks are primarily located on service stations but can exist at other commercial establishments.

E. Avoid imposing strains that will overstress or buckle the pipe when lowering pipe into trench.

F. Hand shovel pipe bedding under the pipe haunches and along the sides of the pipe barrel and compact to eliminate voids and ensure side support.

END OF SECTION

SECTION 33 44 00 GRAVITY SANITARY SEWERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Gravity sanitary sewers and appurtenances, including stacks and service connections.

1.2 MEASUREMENT AND PAYMENT

A. Unit Prices.

1. Payment for pipe installation is on a linear foot basis. Measurement will be taken along the center line of the pipe from center line to center line of manholes. Payment will be made for each linear foot installed complete in place including sewer pipe, excavation, bedding, backfill and special backfill, shoring, earthwork, connections to existing manholes and pipe, stacks, cleanouts, accessories, and post TV inspection.

2. Unit Price Items identify line segments between stations as shown on the Drawings.

1.3 SUBMITTALS

A. Submit proposed methods, equipment, materials and sequence of operations for sewer construction. Plan operations to minimize disruption of utilities to occupied facilities or adjacent property.

C. Test Reports: Submit test reports and inspection videos as specified in Part 3 of this Section.

1.4 QUALITY ASSURANCE

A. Qualifications. Install a sanitary sewer that is watertight both in pipe-to-pipe joints and in pipe-to-manhole connections. Perform testing in accordance with Acceptance Testing for Sanitary Sewers.

B. Regulatory Requirements.

1. Install sewer lines to meet the minimum separation distance from any potable water line, as scheduled below. The separation distance is defined as the distance between the outside of the water pipe and the outside of the sewer pipe. When possible, install new sanitary sewers no closer to water lines than 9 feet in all directions. Where this separation distance cannot be achieved, new sanitary sewers shall be installed as specified in this section.

2. Make notification to the Engineer if water lines are uncovered during sanitary sewer installation where the minimum separation distance cannot be maintained.

3. Lay gravity sewer lines in straight alignment and grade.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Inspect pipe and fittings upon arrival of materials at the job site.

B. Handle and store pipe materials and fittings to protect them from damage due to impact, shock, shear or free fall. Do not drag pipe and fittings along the ground. Do not roll pipe unrestrained from delivery

trucks.

C. Use mechanical means to move or handle pipe. Employ acceptable clamps, rope or slings around the outside barrel of pipe and fittings. Do not use hooks, bars, or other devices in contact with the interior surface of the pipe to lift or move lined pipe.

PART 2 PRODUCTS

2.1 PIPE

A. Provide piping materials for gravity sanitary sewers of the sizes and types indicated on the Drawings or as specified.

B. Unlined reinforced concrete pipe is not acceptable.

2.2 PIPE MATERIAL SCHEDULE

A. Unless otherwise shown on the Drawings, use pipe materials that conform to requirements specified in one or more of the following Sections:
1. Ductile - Iron Pipe and Fittings.
2. Centrifugally Cast Fiberglass Pipe.
3. High Density Polyethylene Pipe.
4. PVC Pipe.
5. Extra Strength Clay Pipe.
6. Reinforced Concrete Pipe.

B. Where shown on the Drawings, provide pipe meeting the minimum class, dimension ratio, or other criteria indicated.

C. Pipe materials other than those listed above shall not be used for gravity sanitary sewers.

2.3 APPURTENANCES

A. Stacks. Conform to the requirements of Sanitary Sewer Service Stubs or Reconnections.

B. Service Connections. Conform to requirements of Sanitary Sewer Service Stubs or Reconnections.

C. Roof, street or other type of surface water drains shall not be connected or reconnected into the sanitary sewer lines.

2.4 BEDDING, BACKFILL, AND TOPSOIL MATERIAL

A. Bedding and Backfill: Conform to requirements of Excavation and Backfill for Utilities, Utility Backfill Material, and Cement Stabilized Sand.

B. Topsoil: Conform to requirements of Topsoil.

PART 3 EXECUTION

3.1 PREPARATION

A. Prepare traffic control plans and set up street detours and barricades in preparation for excavation if construction will affect traffic.

B. Perform work in accordance with OSHA standards. Employ a trench safety system as specified in Trench Safety System for excavations over 5 feet deep.

D. Immediately notify the agency or company owning any utility line which is damaged, broken or disturbed. Obtain approval from the Engineer and agency or utility company for any repairs or relocations, either temporary or permanent.

E. Remove old pavements and structures including sidewalks and driveways in accordance with requirements of Removing Existing Pavements and Structures.

F. Install and operate dewatering and surface water control measures in accordance with the requirements of Control of Ground Water and Surface Water.

G. Do not allow sand, debris or runoff to enter sewer system.

3.2 DIVERSION PUMPING

A. Install and operate required bulkheads, plugs, piping, and diversion pumping equipment to maintain sewage flow and to prevent backup or overflow. Obtain approval for diversion pumping equipment and procedures from the Engineer.

B. Design piping, joints and accessories to withstand twice the maximum system pressure or 50 psi, whichever is greater.

C. No sewage shall be diverted into any area outside of the sanitary sewer.

D. In the event of accidental spill or overflow, immediately stop the overflow and take action to clean up and disinfect spillage. Promptly notify the Engineer so that required reporting can be made to the Texas Natural Resources Conservation Commission and the Environmental Protection Agency by the City Engineer.

3.3 EXCAVATION

A. Earthwork. Conform to requirements of Excavation and Backfill for Utilities. Use bedding as indicated on Drawings.

B. Line and Grade. Establish the required uniform line and grade in the trench from benchmarks identified by the Engineer. Maintain this control for a minimum of 100 feet behind and ahead of the pipe-laying operation. Use laser beam equipment to establish and maintain proper line and grade of the work. Use of appropriately sized grade boards which are substantially supported is also acceptable. Protect the boards and location stakes from damage or dislocation.

C. Trench Excavation. Excavate pipe trenches to depths shown on Drawings and as specified in Excavation and Backfill for Utilities.

3.4 PIPE INSTALLATION BY OPEN CUT

A. Install pipe in accordance with the pipe manufacturer's recommendations and as specified in the

following paragraphs.

B. Install pipe only after excavation is completed, the bottom of the trench fine graded, bedding material is installed, and the trench has been approved by the Engineer.

C. Install pipe to the line and grade indicated. Place pipe so that it has continuous bearing of barrel on bedding material and is laid in the trench so the interior surfaces of the pipe follow the grades and alignment indicated. Provide bell holes where necessary.

D. Install pipe with the spigot ends toward the direction of flow.

E. Form a concentric joint with each section of adjoining pipe so as to prevent offsets.

F. Keep the interior of pipe clean as the installation progresses. Where cleaning after laying the pipe is difficult because of small pipe size, use a suitable swab or drag in the pipe and pull it forward past each joint immediately after the joint has been completed. Remove foreign material and debris from the pipe.

G. Provide lubricant, place and drive home newly laid sections with come-a-long winches so as to eliminate damage to sections. Install pipe to "home" mark where provided. Use of back hoes or similar powered equipment will not be allowed unless protective measures are provided and approved in advance by the Engineer.

H. Keep excavations free of water during construction and until final inspection.

I. When work is not in progress, cover the exposed ends of pipes with an approved plug to prevent foreign material from entering the pipe.

J. Where a gravity sanitary sewer is to be installed under an existing water line with a separation distance of at least 2 feet and less than 9 feet, install the new sewer pipe so that one full joint length of pipe is centered on the water line crossing. Embed the sewer pipe in cement stabilized sand for a minimum distance of 9 feet on each side of the crossing.

K. Where a gravity sanitary sewer is to be installed under an existing water line with a separation distance of less than 2 feet, install the new sewer using pressure-rated pipe as shown on the Drawings. Maintain a minimum 6-inch separation distance.

L. Where the length of stubs is not indicated, install a 4-foot length and seal the free end with an approved plug.

3.5 PIPE INSTALLATION OTHER THAN OPEN CUT

A. For installation of pipe by augering, jacking, or tunneling, conform to requirements of specification sections on tunneling augering, jacking and microtunneling work as appropriate.

3.6 INSTALLATION OF APPURTENANCES

A. Service Connections. Install service connections to conform to requirements of Sanitary Sewer Service Stubs or Reconnections.

B. Stacks. Construct stacks to conform to requirements of Sanitary Sewer Service Stubs or Reconnections.

C. Construct manholes to conform to requirements of Cast-in-Place Manholes, Precast Concrete Manholes, and Fiberglass Manholes, as applicable. Install frames, rings, and covers to conform to

requirements of Frames, Grates, Rings, and Covers.

3.7 INSPECTION AND TESTING

A. Visual Inspection: Check pipe alignment in accordance with Acceptance Testing for Sanitary Sewers.

B. Mandrel Testing. Use a Mandrel Test to test flexible pipe for deflection. Refer to Acceptance Testing for Sanitary Sewers.

C. Pipe Leakage Test. After backfilling a line segment and prior to tie-in of service connections, visually inspect gravity sanitary sewers where feasible, and test for leakage in accordance with Acceptance Testing for Sanitary Sewers. Maintain piezometer installed to conform with Control of Ground Water and Surface Water, until acceptance testing is completed.

3.8 BACKFILL AND SITE CLEANUP

A. Backfill and compact soil in accordance with Excavation and Backfill for Utilities.

B. Backfill the trench in specified lifts only after pipe installation is approved by the Engineer.

C. Repair and replace removed or damaged pavement, curbs, gutters, and sidewalks as specified in Pavement Repair and Resurfacing.

D. Provide hydromulch seeding in areas of commercial, industrial or undeveloped land use over the surface of ground disturbed during construction and not paved or not designated to be paved. Grade surface at a uniform slope to natural grade as indicated on the Drawings. Provide a minimum of 4 inches of topsoil as specified in Topsoil and apply hydromulch according to requirements of Hydromulch Seeding.

E. Provide sodding in areas of residential land use over the surface of ground disturbed during construction and not paved or not designated to be paved. Grade surface at a uniform slope to natural grade as indicated on the Drawings. Provide a minimum of 4 inches of topsoil per Topsoil. Sod disturbed areas in accordance with Sodding.

3.9 POST-INSTALLATION TELEVISION INSPECTION

A. Prior to final acceptance of newly constructed gravity sanitary sewers, perform cleaning and closed circuit television inspection. Cleaning shall include utilizing variable pressure water nozzles (3000 psi) and collection, removal, transportation and disposal of any sand, debris, and liquid wastes to legal disposal sites.

B. Select and use closed-circuit television equipment that will produce a color video tape. Produce a video tape using a pan-and-tilt, radial viewing, pipe inspection camera that pans plus and minus 275 degrees and rotates 360 degrees. Use a camera with an accurate footage counter which displays on the monitor the exact distance of the camera from the starting manhole. Use a camera with camera height adjustment so that the camera lens is always centered at one-half the inside diameter, or higher, in the pipe being televised. Provide a lighting system that allows the features and condition of the pipe to be clearly seen. A reflector in front of the camera may be necessary to enhance lighting in dark or large diameter pipe.

C. Perform television inspection of gravity sanitary sewers as follows:

1. Videos shall pan beginning and ending manholes to demonstrate that debris has been removed. Camera operator shall slowly pan each service connection and where sewer

transitions from one pipe material to another.

2. Video tapes shall be continuous for pipe segments between manholes. Do not leave gaps in the video taping of a segment between manholes and do not show a single segment on more than one video tape.

3. No flow is allowed in the gravity sanitary sewer while performing post-installation television inspection.

D. Provide video tapes in the VHS format, recorded at Standard Play (SP). Two labels are required. One label shall be placed on the spine and the other on the face of each video tape. Permanently label each video tape with the following information.

Spine of Tape

Wastewater File No.: _____ Contractor's Name: _____

Inspection Type: [ ] Survey [ ] Pre-Installation [ ] Post-Installation

Tape No.: _____ Date Televised: _____ Date Submitted: _____

Basin No:

Face of Tape

Manhole No. From	Manhole No. To	Pipe Diameter	Pipe Length	Street

E. For each video tape provide a completed TV Inspection Report, as attached at the end of this section. The TV Inspection Report is a written/narrated log of pipe conditions and service connections, indexed to a footage counter.

F. Upon completion of video tape reviews by the Engineer, the Contractor will be notified regarding final acceptance of the sewer segment.

END OF SECTION

TELEVISION INSPECTION CODES

HEADER INFORMATION

LOCATION

A	STREET ROW, HEAVY TRAFFIC
B	STREET ROW, LIGHT TRAFFIC
C	EASEMENT, POOR ACCESS
D	EASEMENT, GOOD ACCESS
E	PARKING LOT, POOR ACCESS
F	PARKING LOT, GOOD ACCESS
G	ALLEY, POOR ACCESS
H	ALLEY, GOOD ACCESS
I	OPEN AREA, POOR ACCESS
J	OPEN AREA, GOOD ACCESS

SURFACE COVER

A	ASPHALT STREET
B	CONCRETE STREET
C	SHELL STREET
D	SIDEWALK
E	TREES/SHRUBS
F	CLOSE TO FENCE
G	OPEN AREA
H	MOVABLE BUILDING
I	UNMOVABLE BUILDING
J	OVERHEAD UTILITIES
K	WATERWAY OR RAILWAY
L	HIGHWAY OR RUNWAY
M	PIPE ABOVE GROUND

PIPE TYPE

ABS	ACRYLONITRILE BUTADIENE STYRENE
BRK	BRICK
CIP	CAST IRON PIPE
CMP	CORRUGATED METAL PIPE
CON	POURED IN PLACE CONCRETE
CPP	CURED IN PLACE PIPE
DIP	DUCTILE IRON PIPE
FRP	FIBERGLASS REINFORCED PIPE
PLP	PLASTIC LINED CONCRETE PIPE
PEP	POLYETHYLENE PIPE
PVC	POLYVINYLCHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
RPM	REINFORCED PLASTIC MORTAR PIPE
URC	UNREINFORCED CONCRETE PIPE
VCP	VITRIFIED CLAY PIPE

WEATHER
DRY - WET

CODE DESCRIPTIONS

CRACKS

RC-RADIAL LC-LONGITUDINAL

CODES	DESCRIPTION	USE IN
A (1)	< 1/2" W, < 1' L	CRK
B (2)	< 1/2" W, 1' - 2' L	CRK
C (3)	< 1/2" W, > 2' L	CRK
D (4)	> 1/2" W, < 1' L	CRK
E (5)	> 1/2" W, 1' - 2' L	CRK
F (6)	> 1/2" W, > 2' L	CRK
G (7)	HOLE IN PIPE - SMALL	
H (8)	PIPE MISSING - < 60/	
I (9)	PIPE MISSING - > 60/	

JOINTS

MJ - MISALIGNED JOINT BJ - BROKEN JOINT

CODES	DESCRIPTION	USE IN
A (3)	DRP JT > 90% CLEAR	MJ
B (6)	DRP JT 80 - 90% CLEAR	MJ
C (9)	DRP JT < 80% CLEAR	MJ
D (3)	SHF JT > 90% CLEAR	MJ
E (6)	SHF JT 80 - 90% CLEAR	MJ
F (9)	SHF JT < 80% CLEAR	MJ
G (1)	WD JT 2" - 3"	MJ
H (2)	WD JT 3" - 4"	MJ
I (3)	WD JT > 4"	MJ
J (2)	BRK JT - LIGHT	BJ
K (4)	BRK JT - MEDIUM	BJ
L (6)	BRK JT - HEAVY	BJ
N (0)	VISIBLE GASKET	MJ
O (0)	LEAKING AT JOINT	MJ

LATERALS (L)

CODES	DESCRIPTION
A (1)	PRT SER 0" - 1"
B (2)	PRT SER 1" - 2"
C (3)	PRT SER 2" - 3"
D (4)	PRT SER 3" +
E (5)	DEFECTIVE - SERVICE CONN.
F (6)	DEAD/UNUSED SERVICE
G (7)	FACTORY SERVICE
H (0)	PLUMBER SERVICE

ROOTS (R)

CODES	DESCRIPTION
A (1)	ROOTS - LIGHT
B (2)	ROOTS - MEDIUM
C (3)	ROOTS - HEAVY

DEBRIS (D)

CODES	DESCRIPTION
A	DEBRIS - LIGHT
B	DEBRIS - MEDIUM
C	DEBRIS - HEAVY
D	GREASE - LIGHT
E	GREASE - MEDIUM
F	GREASE - HEAVY

INFLOW/INFILTRATION (I)

CODES	DESCRIPTION
A (3)	I/I - LIGHT (0-1 GPM)
B (6)	I/I - MEDIUM (1-5 GPM)
C (9)	I/I - HEAVY (> 5 GPM)
D (2)	I/I - SOME EVIDENCE
E (4)	I/I - CONSIDERABLE EVIDENCE
F (6)	I/I - GREAT EVIDENCE
G (0)	I/I - NO EVIDENCE

ALIGNMENT (A)

CODES	DESCRIPTION
A	BEGIN 1/4 PIPE WATER
B	BEGIN 1/2 PIPE WATER
C	CAMERA UNDERWATER
D	END CAMERA UNDERWATER
E	END 1/2 PIPE WATER
F	END 1/4 PIPE WATER

STRUCTURAL

DS - DETERIORATED; OS - OVALITY; CS - COLLAPSED

CODES	DESCRIPTION	USE IN
A (3)	LINE DET - LIGHT	DS
B (6)	LINE DET - MEDIUM	DS
C (9)	LINE DET - HEAVY	DS
D (3)	OVAL < 5%	OS
E (6)	OVAL > 5% & < 10%	OS
F (9)	OVAL > 10%	OS
G (9)	COLLAPSED	CS
H (0)	PIPE DET - HEAVY	DS
L (0)	PIPE DET - LIGHT	DS
M (0)	PIPE DET - MEDIUM	DS
N (0)	PIPE DET - NONE	DS
O	LINE DET - NONE	DS

SECTION 33 45 00 CEMENT STABILIZED BASE COURSE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Foundation course of cement stabilized crushed stone.

B. Foundation course of cement stabilized bankrun gravel.

1.2 MEASUREMENT AND PAYMENT

A. Unit Prices.

1. Payment for cement stabilized base course is on a square yard basis. Separate pay items are used for each different required thickness of base course.

2. Payment for asphaltic seal cure is by the gallon.

1.3 REFERENCES

A. ASTM C 131 - Standard Test Method for Resistance to Degradation of Small-Size Course Aggregate by Abrasion and Impact in the Los Angeles Machine.

B. ASTM C 150 - Standard Specification for Portland Cement.

C. ASTM C 698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb Rammer and 12-in. Drop.

D. ASTM D 1556 - Density of Soil in Place by the Sand-Cone Method.

E. ASTM D 1557 - Laboratory Compaction Characteristics of Soil Using Modified Effort

F. ASTM D 2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

G. ASTM D 3017 - Test Method for Moisture Content of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth).

H. ASTM D 4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

I. TxDOT Tex-101-E - Preparation of Soil and Flexible Base Materials for Testing.

J. TxDOT Tex-110-E - Determination of Particle Size Analysis of Soils.

K. TxDOT Tex-120-E - Unconfined Compressive Strength.

1.4 SUBMITTALS

A. Submit samples of crushed stone, gravel, and soil binder for testing.

C. Submit manufacturer's description and characteristics for pug mill and associated equipment, spreading machine, and compaction equipment for approval.

1.5 TESTS

A. Tests and analysis of aggregate and binder materials will be performed in accordance with ASTM D 1557 and ASTM D 4318.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Make stockpiles from layers of processed aggregate so as to eliminate segregation of materials. Load material by making successive vertical cuts through entire depth of stockpile.

B. Store cement in weatherproof enclosures. Protect from ground dampness.

PART 2 PRODUCTS

2.1 CEMENT

A. ASTM C 150 Type I; bulk or sacked.

2.2 WATER

A. Clean; clear; and free from oil, acids, alkali, or vegetable matter.

2.3 AGGREGATE

A. Crushed Stone: Material retained on the No. 40 Sieve meeting the following requirements:

1. Durable particles of crusher-run broken limestone, sandstone, or granite obtained from an approved source.

2. Los Angeles abrasion test percent of wear not to exceed 40 when tested in accordance with ASTM C 131.

B. Gravel: Durable particles of bankrun gravel or processed material.

C. Soil Binder: Material passing the No. 40 Sieve meeting the following requirements when tested in accordance with ASTM D 4318:

1. Maximum Liquid limit: 35.

2. Maximum Plasticity index: 10.

D. Mixed aggregate and soil binder shall meet the following requirements:

1. Grading in accordance with Tex-101-E and Tex-110-E within the following limits:

Sieve	Percent Retained			
	Crushed Stone	Processed G. 1	Gravel G. 2	Bankrun Gravel
1-3/4 inch	0 to 10	0 to 5	-	0 to 5
1/2 inch	-	-	0	-
No. 4	45 to 75	30 to 75	15 to 35	30 to 75
No. 40	55 to 80	60 to 85	55 to 85	65 to 85

2. Obtain prior permission from the Engineer for use of additives to meet above requirements.

2.4 ASPHALTIC SEAL CURE

A. Cutback Asphalt: MC30 conforming to requirements of - Prime Coat.
B. Emulsified Petroleum Resin: EPR-1 Prime.

2.5 MATERIAL MIX

A. Design mix for minimum average compressive strength of 200 psi at 48 hours using Tex-120-E unconfined compressive strength testing procedures. Provide minimum cement content of 1-1/2 sacks, weighing 94 pounds each, per ton of mix.

B. Increase cement content if average compressive strength of tests on field samples fall below 200 psi. Refer to Part 3 concerning field samples and tests.

C. Mix in stationary pug mill equipped with feeding and metering devices for adding specified quantities of base material, cement, and water into mixer. Dry mix base material and cement sufficiently to prevent cement balls from forming when water is added.

D. Resulting mixture shall be homogeneous and uniform in appearance.

2.6 SOURCE QUALITY CONTROL

A. Testing for unconfined compressive strength will be performed by Test Method Tex-120-E as follows:

1. Three samples will be molded each day or for each 300 tons of production.

2. Compressive strength shall be the average of three tests for each production lot.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade is ready to support imposed loads.

B. Verify lines and grades are correct.

3.2 PREPARATION

A. Prepare subgrade in accordance with requirements of Embankment and Roadway Excavation.

C. Correct subgrade deviations in excess of plus or minus 1/4 inch in cross section or in 16-foot length by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling.

D. Prepare sufficient subgrade in advance of base course for efficient operations.

3.3 PLACEMENT

A. Do not mix and place cement stabilized base when temperature is below 40 degrees F and falling. Base may be placed when temperature taken in shade and away from artificial heat is above 35 degrees F and rising.

B. Place material on prepared subgrade in uniform layers to produce thickness indicated on Drawings. Depth of layers shall not exceed 6 inches. Do not dump material in piles or windrows.

C. Spread with approved spreading machine. Conduct spreading so as to eliminate planes of weakness or pockets of nonuniformly graded material resulting from hauling and dumping operations.

D. Provide construction joints between new material and stabilized base that has been in place 4 hours or longer. Joints shall be approximately vertical. Form joint with a temporary header or make vertical cut of previous base immediately before placing subsequent base.

E. Use only one longitudinal joint at center line under main lanes and shoulder unless shown otherwise on Drawings. Do not use longitudinal joints under frontage roads and ramps unless indicated on Drawings.

F. Place base so that projecting reinforcing steel from curbs remain at approximate center of base. Secure a firm bond between reinforcement and base.

3.4 COMPACTION

A. Start compaction as soon as possible but not more than 60 minutes from start of moist mixing. Compact loose mixture with approved tamping rollers until entire depth is uniformly compacted. Do not allow stabilized base to mix with underlying material.

B. Correct irregularities or weak spots immediately by replacing material and recompacting.

C. Apply water to maintain moisture between optimum and 2 percent above optimum moisture as determined by ASTM D 1557. Mix in with a spiked tooth harrow or equal. Reshape surface and lightly scarify to loosen imprints made by equipment.

D. Remove and reconstruct sections where average moisture content exceeds ranges specified at time of final compaction.

E. Finish by blading surface to final grade after compacting final course. Seal with approved pneumatic tired rollers which are sufficiently light to prevent surface hair line cracking. Rework and recompact at areas where hair line cracking develops.

F. Compact to minimum density of 95 percent of the maximum dry density at a moisture content of treated material between optimum and 2 percent above optimum as determined by ASTM D 698, unless otherwise indicated on the Drawings.

G. Maintain surface to required lines and grades throughout operation.

3.5 CURING

A. Moist cure for minimum of 7 days before adding pavement courses. Restrict traffic on base to local property access. Keep subgrade surface damp by sprinkling.

B. If indicated on Drawings, cover base surface with a curing membrane as soon as finishing operation is complete. Apply with approved self-propelled pressure distributor at following rates, or as indicated on Drawings:

1. MC30: 0.1 gallon per square yard.

2. EPR-1 Prime: 0.15 gallon per square yard.

C. Do not use cutback asphalt during the period of April 16 to September 15.

3.6 TOLERANCES

A. Completed surface shall be smooth and conform to typical section and established lines and grades.

B. Top surface of base course: Plus or minus 1/4 inch in cross section, or in 16-foot length.

3.7 FIELD QUALITY CONTROL

A. A minimum of one core will be taken at random locations per 1000 linear feet per lane of roadway or 500 square yards of base to determine in-place depth.

C. Contractor may, at his own expense, request additional cores in the vicinity of cores indicating nonconforming in-place depths. If the average of the tests falls below the required depth, place and compact additional material at no additional cost to the HISD.

D. Compaction testing will be performed in accordance with ASTM D 1556 or ASTM D 2922 and ASTM D 3017 at randomly selected locations. Remove and replace areas that do not conform to compaction requirements at no additional cost to the City.

E. Fill cores and density test sections with new compacted cement stabilized base.

3.8 NONCONFORMING BASE COURSE

A. Remove and replace areas of base course found deficient in thickness by more than 10 percent, or that fail compressive strength tests, with cement-stabilized base of thickness shown on Drawings.

B. Nonconforming base course sections shall be replaced at no additional cost to the HISD.

3.9 UNIT PRICE ADJUSTMENT

A. Unit price adjustments shall be made for in-place depth determined by cores as follows:

1. Adjusted unit price shall be ratio of average thickness as determined by cores to thickness bid upon, times unit price.

2. Adjustment shall apply to lower limit of 90 percent and upper limit of 105 percent of unit price.

3.10 PROTECTION

A. Maintain stabilized base in good condition until completion of work. Repair defects immediately by replacing base to full depth.

B. Protect the asphalt membrane, if used, from being picked up by traffic. The membrane may remain in place when proposed surface courses or other base courses are to be applied.

END OF SECTION

FORT BEND COUNTY

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Bid Package 1: Demolition, Paving & Sitework

09/07/2022

TDLR #: TABS 2022005864
ILMS# 21076845

FORT BEND COUNTY COMMISSIONERS

KP GEORGE, County Judge

VINCENT MORALES, JR., Precinct 1

GRADY PRESTAGE, Precinct 2

ANDY MEYERS, Precinct 3

KEN DEMERCHANT, Precinct 4

PROJECT TEAM

IDG+ ARCHITECTS

440 Benmar Dr., Suite 3335
Houston, Texas
PH: 832-448-2462
Project No: 6001-02

ARCHITECT	IDG+ ARCHITECTS, INC
STRUCTURAL ENGINEERS	RDP ENGINEERS
MEP ENGINEERS	MARSHALL ENGINEERING CORPORATION
CIVIL ENGINEERS	NEDU ENGINEERING SERVICES, INC.

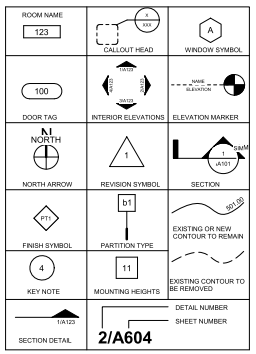
ABBREVIATIONS

ACC	ACCESSIBLE
A/C	AIR CONDITIONING,AIR CONDITIONED
ACOUS	ACOUSTIC, ACOUSTICAL
AD	AREA DRAIN
ADH	ADHESIVE
ADJ	ADJACENT OR ADJUSTABLE
ADMIN	ADMINISTRATIVE, ADMINISTRATION
AFF	ABOVE FINISH FLOOR
ALUM	ALUMINUM
ALT	ALTERNATE
ANOD	ANODIZED
AP	ACCESS PANEL
APPROX	APPROXIMATE
ARCH	ARCHITECT, ARCHITECTURAL
ASPH	ASPHALT
AUTO	AUTOMATIC
AUX	AUXILIARY
AVG	AVERAGE
BD	BOARD
BLDG	BUILDING
BRK	BRICK
BLK(G)	BLOCK(ING)
BM	BEAM
BOL	BOLLARD
BOT	BOTTOM
BRKT	BRACKET
BSMT	BASEMENT
BUR	BUILT-UP ROOF
BVL	BEVELED, BEVEL
CAB	CABINET
CC	CENTER TO CENTER
CEM	CEMENT, CEMENTITIOUS
CER	CERAMIC
CG	CORNER GUARD
C.I.	CAST IRON
CIP	CAST IN PLACE
CJ	CONTROL JOINT
CJT	CONSTRUCTION JOINT
CL	CENTER LINE
CLG	CEILING
CLO	CLOSET
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS, CONTINUATION
CONTR	CONTRACTOR
COOL	COOLER
CORR	CORRIDOR
CPT	CARPET
CT	CERAMIC TILE
CTR	COUNTER
CWG	CLEAR WIRE GLASS
CUST	CUSTODIAL
DBL	DOUBLE
DEPT	DEPARTMENT
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIV	DIVISION
DN	DOWN
DS	DOWNSPOUT
DW	DISHWASHER
DWG	DRAWING
DWR	DRAWER
DF	DRINKING FOUNTAIN
EHD	ELECTRIC HAND/ HAIR DRYER
E	EAST
EA	EACH
EJC	EXPANSION JOINT COVER
EJ	EXPANSION JOINT
EL	ELEVATION
ELEV	ELEVATOR
ELEC	ELECTRIC, ELECTRICAL
EMER	EMERGENCY
ENCL	ENCLOSURE
ENGR	ENGINEER
ENTR	ENTRANCE
E.D.F	ELECTRIC DRINKING FOUNTAIN
EQ	EQUAL
EQUIP	EQUIPMENT
EST	ESTIMATE
EW	EACH WAY
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPOSED, EXPANSION, OR EXPANDED
EXT	EXTERIOR
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
F TO F	FACE TO FACE
FF	FINISH FLOOR
FHC	FIRE HOSE CABINET
FIN	FINISH OR FINISHED
FIXT	FIXTURE
FLR	FLOOR
FLRG	FLOORING
FLUOR	FLUORESCENT
FP	FIREPROOF
FT	FOOT, FEET
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GEN	GENERATOR
GL	GLASS OR GLAZING
GYP	GYPSUM
H	HIGH
HB	HOSE BIBB
HDW	HARDWARE
HEX	HEXAGON, HEXAGONAL
HGR	HANGER
HGT	HEIGHT
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HP	HIGH POINT
HR	HOUR
HW	HOT WATER
HVAC	HEATING, VENTILATION & AIR CONDITIONING
ID	INSIDE DIAMETER
IDF	INTERMEDIATE DATA FRAME
INCAN	INCANDESCENT
INCL	INCLUSIVE, INCLUDE
INFO	INFORMATION
INSUL	INSULATION
INT	INTERIOR
JUNC	JUNCTION
JST	JOIST
JT	JOINT
KS	KNEESPACE
LAB	LABORATORY
LAM	LAMINATE, LAMINATED
LAV	LAVATORY
LB(S)	POUND(S)
LDG	LANDING
L	LONG, LENGTH
LF	LINEAR FEET
LH	LEFT HAND
LOC	LOCATION
LP	LOW POINT
LT	LIGHT
LTG	LIGHTING
LVR	LOUVER
MACH	MACHINE
MAINT	MAINTENANCE
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MED	MEDIUM
MEMB	MEMBRANE
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MET	METAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MO	MASONRY OPENING, MOTOR OPERATED
MOD	MODIFY, MODIFIED
MTD	MOUNTED
MTG	MOUNTING
MW	MICROWAVE
MTL	METAL
N	NORTH
NA	NOT APPLICABLE
NAT	NATURAL
NFPA	NATIONAL FIRE PROTECTION ASSOC.
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NR	NOT RATED
NTS	NOT TO SCALE
OA	OVERALL
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OFF	OFFICE
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OTS	OPEN TO STRUCTURE
PART	PARTITION
PB	PARTICLE BOARD
PERF	PERFORATE, PERFORATED
PL	PLATE
PLAS	PLASTER
PLAM	PLASTIC LAMINATE
PLYWD	PLYWOOD
PLBG	PLUMBING
PNL	PANEL
PR	PAIR
PREP	PREPARATION
PT	PAINT
PTD	PAINTED
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
R	RADIUS
RA	RETURN AIR
RCP	REFLECTED CEILING PLAN
RCPT	RECEPTACLE
RCVG	RECEIVING
RD	ROOF DRAIN
RE	REFER, REFERENCE
REC	RECEPTION
REF OR REFRIG	REFRIGERATOR
REINF	REINFORCE, REINFORCING
REQD	REQUIRED
RET	RETURN
REV	REVISION
RH	RIGHT HAND
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
RR	RESTROOM
RB	RESILIENT BASE
S	SOUTH
SA	SUPPLY AIR
SC	SEALED CONCRETE
SCHED	SCHEDULE
SECT	SECTION
SECY	SECRETARY
SERV	SERVICE, SERVING
SF	SQUARE FEET
SHLVG	SHELVING
SHT	SHEET
SHWR	SHOWER
SIM	SIMILAR
SLDNG	SLIDING
SND	SANITARY NAPKIN DISPENSER
SNDU	SANITARY NAPKIN DISPOSAL UNIT
SQ	SQUARE
SPEC	SPECIFICATIONS
SPKR	SPEAKER
ST	STREET
SS	STAINLESS STEEL
STA	STATION
STC	SOUND TRANSMISSION CLASS
STD	STANDARD
STL	STEEL
STOR OR STO	STORAGE
STRUC	STRUCTURAL
SUSP	SUSPENDED
SW	SWITCH
SYM	SYMMETRICAL
SYN	SYNTHETIC
SURF	SURFACE
TAS	TEXAS ACCESSIBILITY STANDARDS
TB	TACKBOARD
TC	TOP OF CURB
TEL	TELEPHONE
TEMP	TEMPERATURE
TERR	TERRAZZO
THK	THICK(NESS)
TLT	TOILET
TRANS	TRANSPORTATION
TRD	TREAD
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL, TOP OF SLAB
TPD	TOILET PAPER DISPENSER
TYP	TYPICAL
UL	UNDERWRITERS LABORATORY
UNFN	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UTIL	UTILITY
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST	VESTIBULE
V.I.F.	VERFY IN FIELD
VWC	VINYL WALL COVERING
VP	VISION PANEL
W	WIDTH, WEST
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WD	WOOD
WGL	WIRE GLASS
WP	WATERPROOF
WT	WEIGHT
WTW	WALL TO WALL
WWF	WELDED WIRE FABRIC

SHEET REFERENCES

MATERIALS & SYMBOLS

COMMON BRICK
STRUCTURAL CLAY TILE
CONCRETE MASONRY UNITS
CAST OR CUT STONE
MARBLE
CONCRETE
EARTH
GRAVEL
SAND
WOOD(ROUGH)
WOOD(BLOCKING)
PLYWOOD
TERRAZZO
EXPOSED AGGREGATE
CEMENT TOPPING
RIGID INSULATION
EXTRUDED SHAPES
BREAK METAL SHAPES
BATT OR BLANKET INSULATION
CORK OR COMPOSITE
RUBBER OR NEOPRENE
STEEL IN SECTION
BRASS OR BRONZE
STAINLESS STEEL OR ALUMINUM
SHEET METAL (ALL METALS SMALL SCALE)
METAL ELEVATION
CAST IRON
CERAMIC TILE
QUARRY TILE
RESILIENT TILE
CARPET & PAD
PLASTER ON METAL LATH
GYPSUM BOARD
PLASTER OR DRYWALL PARTITION
SOLID PLASTER PARTITION
INSULATED PARTITION SOUND OR THERMAL
WOOD FRAME PARTITION
RIGID INSULATION
STEEL SHAPES



ARCHITECTURAL

G000	COVER SHEET
G001	DRAWING INDEX
G002	ACCESSIBILITY STANDARDS
G003	CODE ANALYSIS

GENERAL

	SURVEY
	PLAT (SHEET 1 OF 2)
	PLAT (SHEET 2 OF 2)
C1	GENERAL NOTES
C2	DEMOLITION PLAN
C3	GRADING PLAN
C3-1	UTILITY PLAN
C4	DRAINAGE PLAN
C5	DETENTION AND DRAINAGE CALCULATIONS
C6	PAVING LAYOUT
C7	SWPPP LAYOUT
C8	SWPPP DETAILS
C9	STORM DETAILS
C10	WATER & SANITARY DETAILS
C11	PAVING DETAILS

CIVIL

LANDSCAPE

SD 200A	DEMOLITION PLAN CONCESSION BUILDING

STRUCTURAL

AD100	DEMOLITION SITE PLAN
AD102	EXISTING PHOTOS
AD103	EXISTING PHOTOS
AD200A	CONCESSION BUILDING DEMOLITION PLANS
A100	SITE PLAN
A109	SITE DETAILS
A110	SITE DETAILS

TECHNOLOGY

DM-100	DEMOLITION FLOOR PLAN MECHANICAL/PLUMBING
MEP100	ELECTRICAL SITE PLAN

MECHANICAL

PLUMBING

ELECTRICAL

VICINITY MAP

SCOPE OF WORK

BID PACKAGE 1: DEMOLITION & PAVING SCOPE OF WORK AS FOLLOW BUT NOT LIMITED TO

- THE DEMOLITION OF THE EXISTING CONCESSION BUILDING IN ITS ENTIRETY AS SHOWN IN THE DRAWINGS
- DEMOLITION OF THE EXISTING PARKING AND REPLACE WITH A NEW CONCRETE PARKING LOT AS SHOWN ON THE DRAWINGS
- THE DEMOLITION OF THE EXISTING SITE WALKWAYS ACROSS THE SITE AS SHOWN ON THE DRAWINGS
- SITEWORK AS SHOWN IN THE DRAWINGS

PROJECT LOCATION

NORTH

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE: HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

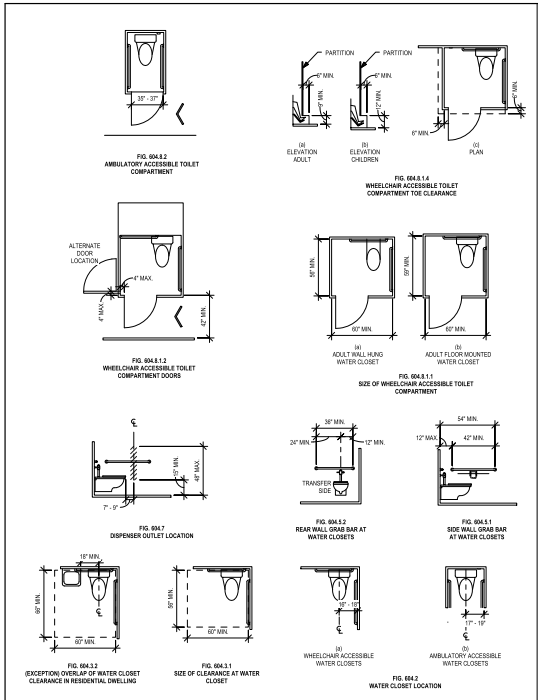
Drawing Date:	07/26/2021
Drawn:	IK
Checked:	BM, CD
Scale:	12" = 1'-0"
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

DRAWING INDEX

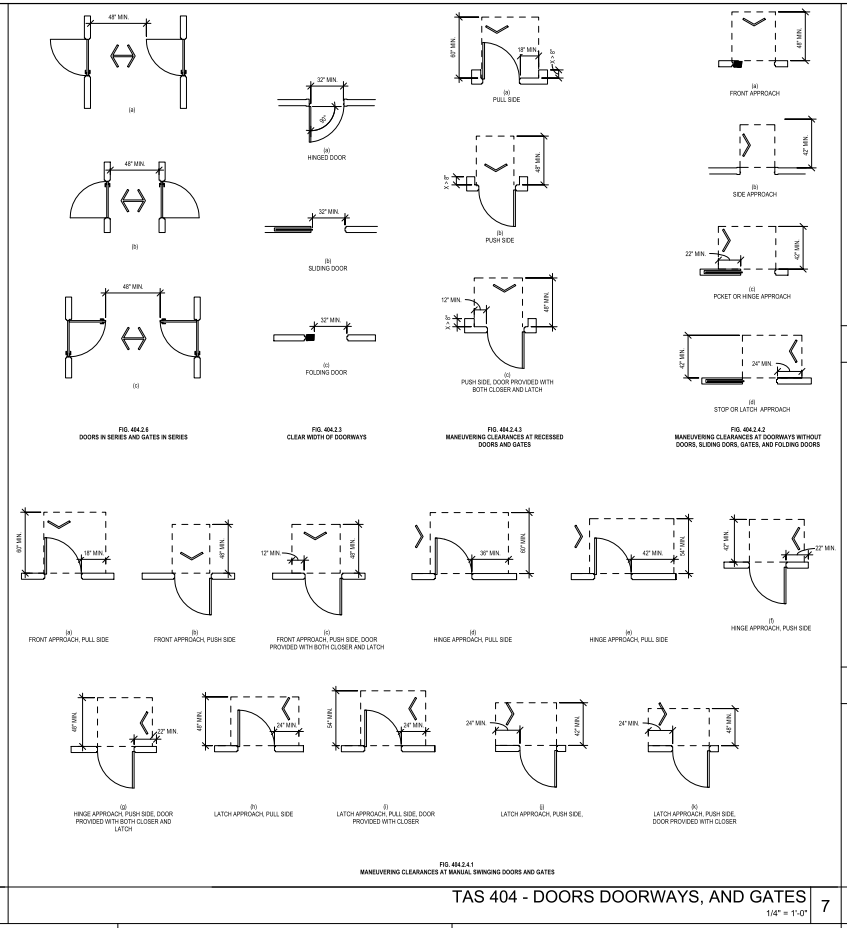
G001



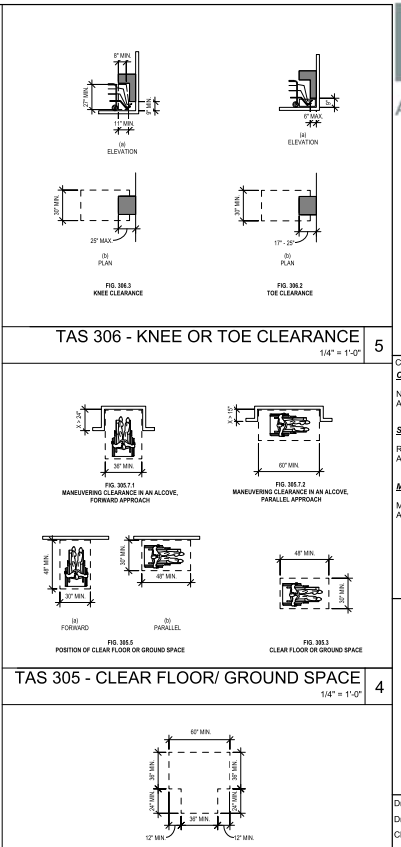
	AGES 3 & 4	AGES 5 THROUGH 8	AGES 9 THROUGH 12
WATER CLOSET CENTERLINE	12 IN. (305 MM.)	12 TO 15 IN. (305 TO 380 MM.)	15 TO 18 IN. (380 TO 455 MM.)
TOILET SEAT HEIGHT	11 TO 12 IN. (280 TO 305 MM)	12 TO 15 IN. (305 TO 380 MM.)	15 TO 17 IN. (380 TO 430 MM.)
GRAB BAR HEIGHT	18 TO 20 IN. (280 TO 305 MM.)	20 TO 25 IN. (510 TO 635 MM.)	25 TO 27 IN. (635 TO 685 MM.)
DISPENSER HEIGHT	14 IN. (355 MM.)	14 TO 17 IN. (355 TO 430 MM.)	17 TO 19 IN. (430 TO 485 MM.)

ADVISORY SPECIFICATIONS FOR WATER CLOSETS SERVING CHILDREN AGES 3 THROUGH 12

TAS 604 - WATER CLOSETS AND TOILET COMPARTMENTS 1/4" = 1'-0" | 11



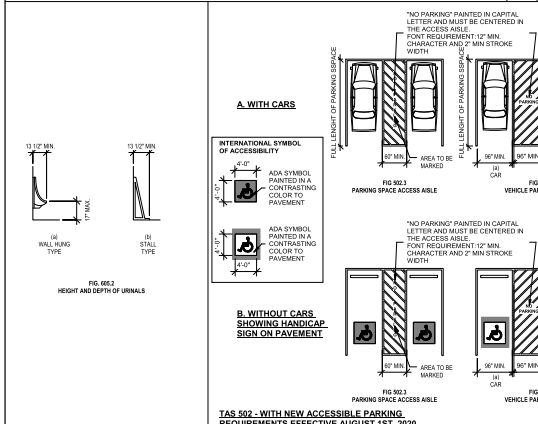
TAS 404 - DOORS DOORWAYS, AND GATES 1/4" = 1'-0" | 7



TAS 306 - KNEE OR TOE CLEARANCE 1/4" = 1'-0" | 5

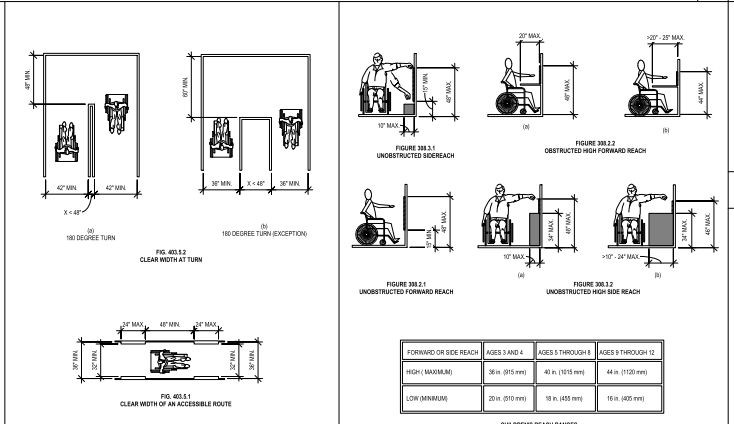
TAS 305 - CLEAR FLOOR/ GROUND SPACE 1/4" = 1'-0" | 4

TAS 304 - TURNING SPACE 1/4" = 1'-0" | 3



TAS 605 - URINALS 1/4" = 1'-0" | 10

TAS 502 - PARKING SPACES 1/4" = 1'-0" | 9

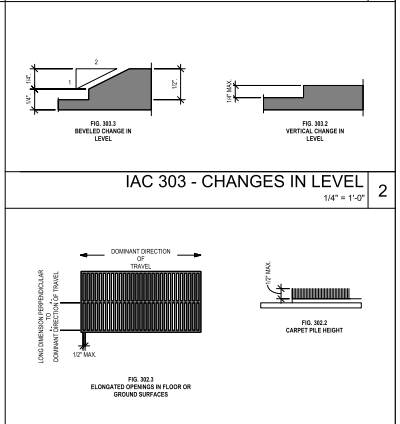


TAS 403 - WALKING SURFACES 1/4" = 1'-0" | 8

FORWARD OR SIDE REACH	AGES 3 AND 4	AGES 5 THROUGH 8	AGES 9 THROUGH 12
HIGH (MAXIMUM)	36 in. (915 mm)	40 in. (1015 mm)	44 in. (1120 mm)
LOW (MINIMUM)	20 in. (510 mm)	18 in. (455 mm)	16 in. (405 mm)

CHILDREN'S REACH RANGES

TAS 308 - REACH RANGES 1/4" = 1'-0" | 6



IAC 303 - CHANGES IN LEVEL 1/4" = 1'-0" | 2

TAS 302 - FLOOR OR GROUND SURFACES 1/4" = 1'-0" | 1

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
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Revisions:

DESCRIPTION	
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ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

ACCESSIBILITY STANDARDS

G002

CODE ANALYSIS

1. PROJECT DESCRIPTION:
Project Name: Baseball Fields Upgrade Phase II: South Post Oak Sportsplex
Location: 5535 Hobby Road
Houston, TX 77053
Project No: 6000-02
Analysis By: Peggy Nordmann
Date(s): 08/04/2021

2. GOVERNING AGENCY(s):

Fort Bend County
City of Houston

3. GOVERNING CODE(s):

2012 International Building Code w/ Local Amendments
2012 Uniform Mechanical Code w/ Local Amendments
2012 Uniform Plumbing Code w/ Local Amendments
2012 International Fire Code w/ Local Amendments
2015 International Energy Conservation Code w/ 2001 Supplement
2020 National Electric Code w/ State Mandates
2015 International Existing Building Code w/ Local Amendments
2015 International Fire Code w/ Local Amendments
2012 Texas Accessibility Standards
Fort Bend County Fire Marshall
2013 ANSI/ASHRAE/IES Standard 90.1

4. ZONING DISTRICT:

Not Applicable

5. FIRE DISTRICT:

City of Houston Fire Marshall

6. BUILDING DESIGN CATEGORY:

Category II-B, Table 1604.5

7. WIND LOAD:

150 mph (3 Second Wind Gust), Figure 1609.3(1)

8. SNOW LOAD:

0 , Figure 1608.2

9. SEISMIC USE GROUP:

Risk Category Group III, Section 1604.5

10. OCCUPANCY CLASSIFICATION: Primary: ASSEMBLY - (A-5) Section 305.1

11. SPECIAL OCCUPANCY PROVISIONS:

Not Applicable

12. CONSTRUCTION TYPE:
Table 601

Assembly (A-5): Type IIB (NON-SPRINKLED)

All wood blocking to be fire-retardant

13. PROPERTY RESTICTIONS AND REQUIREMENTS:

Plan North: 10'-0" Building Line - City of Houston
Plan East: No Restrictions
South: No Restrictions
West: No Restrictions

14. ALLOWABLE FLOOR AREA and HEIGHT:
See Table 503

UL - Unlimited

CONSTRUCTION TYPE -	HEIGHT ABOVE GRADE PLANE
TYPE II-B	-

15. ALLOWABLE FLOOR AREA MODIFICATIONS:

A-5 Occupancy:
Allowable floor area for non-sprinkled Type II - B = UL sf per floor
Actual floor area = 13,327 SF

A = Allowable Area per Story
S = Stories above grade
UL = Unlimited
NP = Not permitted
1 = Allowable building height and story increase due to automatic sprinkler system installation. Section 504.2
2 = Allowable building area increase due to street frontage. Section 506.2
3 = Allowable building area increase due to automatic sprinkler system installation. Section 506.3
4 = Unlimited area buildings. Section 507
W = Width of public way or open space (feet) in accord. w/ Section 506.2.1

Equation 5.1: Aa = [At + (At x If) + (At x Is)]
Equation 5.2: If = [F(P - .25)W/30

* Section 506.2, ** Section 506.1,

16. BUILDINGS AT BASEBALL FIELDS

Building "A" Concession Stand
4,422 SF, One Story
Construction Type II B (non-sprinklered)
Fire Separation Distance (Table 602):
North: 29#
East: 29'
South: 93'
West: 23'

Building "B" West Press Box
112 SF, Second Story only (No First Floor)
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance:
North: Exceeds 30'
East: 23'
South: Exceeds 30'
West: Exceeds 30'

Building "C" East Press Box
112 SF , Second Story only (No First Floor)
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance:
North: Exceeds 30'
East: Exceeds 30'
South: Exceeds 30'
West: Exceeds 20'

Building "D" Batting Cage Building
10,156 SF, One Story
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance
North: 10' - 7" (No exterior wall openings)
East: Exceeds 30'
South: Exceeds 30'
West: Exceeds 30'

Building "E" Existing Storage Building
297 SF, One Story
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance
North: Exceeds 30'
East: Exceeds 30'
South: 10' - 7" (No exterior wall openings)
West: Exceeds 30'

17. FIRE RESISTANCE RATING REQ. FOR EXT. WALLS BASED ON FIRE SEPARATION DISTANCE:
See Table 602

Wall Protection	Fire Rating (Hour(s))
< 5'	1
≥ 5' to < 10' 1 (0 for IIB)	1
≥ 10' to < 30'1 (0 for IIB)	0
≥ 30'	0

18. MAXIMUM AREA OF EXTERIOR WALL OPENINGS:

Wall Opening	% of Unprotected Wall	% of Protected Wall
< 3'	Not Permitted	Not Permitted
3' to < 5'	Not Permitted	15
5' to < 10'	10	25
10' to < 15'	15	45
15' to < 20'	25	75
20' to < 25'	45	No Limit
25' to < 30'	70	No Limit
30' or more	No Limit	No Limit

Roof Covering Classification: Table 1505.1

Type C (for IIB)

19. OCCUPANCY SEPARATION REQUIREMENTS:

No Separation Required

Nota A - Occupancy separation not required between storage and business

20. BUILDING FIRE RESISTIVE REQUIREMENTS:
See Table 601

All 0 if using IIB - including roof assembly (Note e)

21. PROTECTION OF INTERIOR WALLS
See Table 803.11

Finish Requirements - Class C

22. SPECIAL FIRE RESISTANCE PROVISIONS:

Not Applicable

23. DESIGN LOADS (UNIFORM AND CONCENTRATED):
See Table 1607.1,

Category	Uniform Load(psf)	Concentrated Load(lbs)
Corridors	100	-
Fire Escapes	100	-
Lobby	100	-
Classrooms	40	1,000
Offices	50	2,000
Corridors above 1st floor	80	2,000
Sidewalks	250	8,000
Stairs	100	Note f
Walkways / Elevated Platforms	60	-

24. OCCUPANT LOAD:

See Table 1004.1.2 (Maximum Floor Area Allowances per Occupant)

Space Use
Assembly (A-5)

Occupant Load Factor (sf)

Building "A" Concession
Concession Stand
1. Concession - 7/62 SF/200 GSF = 4
2. Storage - 62 SF/300 GSF = 1
Meeting Rooms
3. Meeting Room I - 441 SF/15 NSF = 30
4. Meeting Room II - 441 SF/15 NSF = 30
5. Janitor/HVAC/Storage 333/300 GSF = 2
Occupant Load Total : 67 Persons

Building "B" Press Box
1. Press Box - 112 SF/100 GSF = 2
Building "B" Occupant Load Total: 2 persons

Building "C" Press Box
1. Press Box - 112 SF/100 GSF = 2
Building "C" Occupant Load Total: 2 persons

Building "D" Batting Cage
1. Batting Cages - 9,405 SF/50 GSF = 188
Building "D" Occupant Load Total: 188 Persons

Building "E" Existing Storage building
1. Storage - 62 SF/300 GSF = 1
Building "E" Occupant Load Total: 1 Person

SPORT COMPLEX BUILDINGS (A, B, C, D, E)

Total Occupant Load: 260 persons

25. EXIT WIDTH CALCULATION :

Building "A"
Concession Stand
Exit Width (1005.3.2)
(Occup.) 5 X 0.2"= 1" Required
36"x1 = 36" Provided
Meeting Rooms I & II (441 SF Each)
(Occup.) 30 X 0.2"= 6" Required
36"x1 = 36" Provided

Building "B" & "C" (Each) Press Box
(Occup.) 2 X 0.2"= .40" Required
36"x1 = 36" Provided

Building "D" Batting Cages
(Occup.) 188 X 0.2"= 37.6" Required
36"x2 = 72" Provided

Building "E" Existing Storage Building
(Occup.) 1 X 0.2"= .2" Required
72"x1 = 72" Provided

.....

Exit Travel Distance (1015)
A-3 Non-Sprinklered: 200' (Table 1016.2)
S-2 Non-sprinklered: 300'

Common Path of Egress Travel (Table 1021.2 (2))
Occ. A to not Exceed 75'
Occ S to not Exceed 75'

26. CORRIDOR EGRESS
Minimum Corridor Egress Ceiling Height:. Section 1003.2
All Occupancies 7'-6" (COH Amendment).
Calculated Egress Exit Required Width: Table 1005.3.2
Actual Egress Exit Width: See Plans
yy exits doors of 36" = yy" total egress
Minimum Egress Door Width and Height: Section 1005
Occ. A: 32" Clear & 80" Height (48" max. width for swinging door leaf)
Minimum Building Occupant Load Required Exits: Section 1014
Condition 1: Two exits required when occupancy exceeds Table 1015.1
1015.1.1: Three or more exits provided from a floor or space with occup. load of 501-1,000
Section 1012.1 - Minimum Number of Exits (see below)
Occupant load 1-500 persons per story 2 min. number of exits per story
Maximum Space Occupant Load for (1) Egress: Table 1015.1
Occ. A - 49 max. occupant load for space with one means of egress (COH Amendments)
Egress Exit Access: Section 1016.2
Non-Sprinklered: Where two exits or exit access doorways are required, from any portion of the exit access, the exit doors or exit access doorways shall be placed a distance apart equal to not less than one-third of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit door or exit access doorways.

Minimum Corridor Egress Width: Section 1018.1

Maximum Egress Length: Table 1017.2

Maximum Dead End Corridor: Section 1018.4

27.INTERIOR ENVIRONMENT
Minimum Habitable Room Width: Section 1208.1
7'-0" in any dimension
Minimum Habitable Spaces Ceiling Height: Section 1208.2
All Occupancies 7'-6"
Minimum Support Spaces Ceiling Height: Section 1208.2,
All Occupancies 7'-0"

28. PLUMBING **FIXTURE REQUIREMENTS:**
Fixture Count Requirements: See Table 2902.1, page 579

Occ. A-5
Water Closets
MALE 1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500
FEMALE 1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520
DRINKING FOUNTAIN 1 per 1000
MALE LAVATORIES 1 per 200
FEMALE LAVATORIES 1 per 150
2902.1.1: The occupant load shall be composed of 50% of each sex, unless statistical data approved by the building official indicate a different distribution of the sexes.

2014 Illinois Plumbing Code: Appendix A, Table B

ACTUAL OCCUPANCY = 400	MEN 200					WOMEN 200					UNISEX				TOTAL BUILDING	
	REQUIRED	EXISTING	DEMO	NEW	TOTAL	REQUIRED	EXISTING	DEMO	NEW	TOTAL	EXISTING	DEMO	NEW	TOTAL	REQUIRED	PROVIDED
WATER CLOSET	1	1	1	2	2	6	2	2	6	6	0	-	1	1	7	9
URINAL	-	2	2	2	2	-									-	9
TOTAL WC'S & URINALS	1	3	3	4	4	6	2	2	6	6	0	-	1	1	7	11
LAVATORY	1	2	2	3	3	1	2	2	3	3	0	-	1	1	2	7
DRINKING FOUNTAIN															1	2
MOP SINK															1	1

29. PARKING REQUIREMENTS:

See City of Houston Amendments
2012 Texas Accessibility Standard section 208 Table 208.2

Classification Parking Requirements:

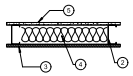
Class 6 (Recreational and Entertainement) L. Sport Complex
1 Space for every 40 SF of Seating
VAN Accessible Spaces 1 for every 8 accessible spaces must be "VAN" Accessible

Actual Building Parking Spaces:

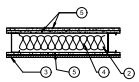
Classification Actual Spaces Space 1 for every 40 SF of seating
Total Parking Required: 18
Total Parking Provided with accessibe spaces: 123 + 5 accessible = 128 Parking Spaces

DESIGN NO. U404

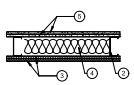
Bearing Wall Rating - 1 and 2 Hr (See items 2, 3 and 5)
Nonbearing Wall Rating - 1 and 2 Hr (See items 2, 3 and 5)



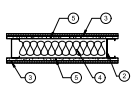
1 Hr. Configuration



2 Hr. Configuration



2 Hr. Configuration B



2 Hr. Configuration C

1. Steel Floor and Ceiling Runners- - (Not Shown) - Channel shaped, 3-1/58 in. wide by 1-1/4 in. deep, fabricated from min 20 MSG (0.0329 in., min bare metal thickness) galvanized steel spaced max 16 in. OC. For bearing walls, studs shall be designed in accordance with the current edition of the Specification for the Design of Cold-Formed Steel Structural Members by the American Iron and Steel Institute. All design details enhancing the structural integrity of the bearing wall assembly, including the axial design load of the studs, shall be as specified by the steel stud designer and/or producer and shall meet the requirements of all applicable local code agencies. Steel studs attached to floor and ceiling runners with 3/8 in. long Type S-12 steel screws on both sides of the studs or by welded or bolted connections designed in accordance with the AISI specifications. For nonbearing walls, studs to be cut 3/8 to 3/4 in. less than assembly height and friction-fitted into floor and ceiling runners.

2. Steel Studs- - 3-5/8 in. wide, fabricated from min 20 MSG (0.0329 in., min bare metal thickness) galvanized steel spaced max 16 in. OC. For bearing walls, studs shall be designed in accordance with the current edition of the Specification for the Design of Cold-Formed Steel Structural Members by the American Iron and Steel Institute. All design details enhancing the structural integrity of the bearing wall assembly, including the axial design load of the studs, shall be as specified by the steel stud designer and/or producer and shall meet the requirements of all applicable local code agencies. Steel studs attached to floor and ceiling runners with 3/8 in. long Type S-12 steel screws on both sides of the studs or by welded or bolted connections designed in accordance with the AISI specifications. For nonbearing walls, studs to be cut 3/8 to 3/4 in. less than assembly height and friction-fitted into floor and ceiling runners.

3. Cementitious Backer Units* - - 1/2 in. or 5/8 in. thick, applied vertically or horizontally with vertical joints centered over studs. Fastened to studs and runners with corrosion resistant, chamfered, ribbed wafer head screws with a minimum head diameter of .400 inch. For nonbearing systems, fastened to studs and bottom runners; with the uppermost screws placed 1/2 in. to 2 in. below the bottom edge of the leg of the top runner. Horizontal joints need not be backed by framing. 1 Hr System - Screws shall be min 1-1/4 in. Long and spaced a max of 8 in. OC. All vertical joints staggered one stud cavity from gypsum board vertical joints on the opposite side of studs. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. 2-Hr System - For the base layer in Configuration B, the screws shall be min 1-1/4 in. long and spaced a max of 12 in. OC. For the face layers, screws shall be 1-5/8 in. long and spaced a max of 8 in. OC. All face layer joints offset min 12 in. from underlying base layer joints. Joints in either layer need not be staggered from joints on the opposite side of the wall.
UNITED STATES GYPSUM CO - DUROCK Exterior Cement Board, or DUROCK Brand Cement Board.

4. Batts and Blankets* - Min 3 in. thick mineral wool insulation batts, friction-fitted between studs .
THERMAFIBER INC -Type SAFB.

5. **Gypsum Board*** - 5/8 in. thick, with square or tapered edges, applied vertically or horizontally with vertical joints centered over studs. Horizontal joints need not be backed by framing. Fastened with Type S-12 screws. *1-Hr System* - For vertical application, fastened to studs and runners with 1 in. long screws spaced max 8 in. OC at vertical edges and spaced max 12 in. OC in the field. For horizontal application, fastened to studs and runners with 1 in. long screws spaced max 8 in. OC. Vertical joints staggered one stud cavity from cement board vertical joints on opposite side of studs. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. *2-Hr System* - Base layer with an overlying gypsum board face layer fastened with 1 in. long screws spaced max 16 in. OC to studs and runners. Base layer with an overlying cement board face layer, fastened with 1 in. long screws spaced max 12 in. OC to studs and runners. Face layers fastened with 1 - 5/8 in. long screws spaced max 16 in. OC to studs and runners with screws offset 8 in. from face layer screws. Face layer joints offset min 12 in. from base layer joints. Joints in either layer need not be staggered from joints on the opposite side of the wall.
CANADIAN GYPSUM COMPANY -Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC or WRX.
UNITED STATES GYPSUM CO -Type AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC or WRX.

U.L. RATINGS
1" = 1'-0" | 1

IDG Architects — Ft. Bend Co.-South Post Oak Sportsplex — Baseball Fields Upgrades – Phase II — Proj. No. 6001-02

61496 OPTI2323528 Version 2
HARDWARE GROUP NO. 001

PROVIDE EACH RU DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	SFIC MORTISE CYL.	80-132 X CAM/COLLAR AS REQ'D	626	SCH
1	EA.	NOTE	REMAINDER OF HARDWARE BY DOOR MFR.		

-Coordinate hardware with door MFR.

HARDWARE GROUP NO. 205

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA.	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	RAIN DRIP	142A DW + 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 209

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA.	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ (MOUNT ON INT.)	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	39A	A	ZER
1	EA.	THRESHOLD	655A	A	ZER

IDG Architects — Ft. Bend Co. - South Post Oak Sportsplex — Baseball Fields Updates – Phase II — Proj. No. 6001-02

HARDWARE GROUP NO. 214

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA.	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
2	EA.	MANUAL FLUSH BOLT	FB458	626	IVE
1	EA.	DUST PROOF STRIKE	DP2	626	IVE
1	EA.	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	OH STOP	9033 SERIES X SIZE & MOUNTING AS REQ	630	GLY
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ (Active Leaf)	689	LCN
2	EA.	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA.	RAIN DRIP	142A DW + 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	MEETING STILE	8193AA (2 PCS - 1 SET) HEIGHT AS REQ	AA	ZER
2	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 301

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA.	PRIVACY W/COIN TURN	L9044 17A LS83-363	626	SCH
1	EA.	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA.	GASKETING	4885 PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

HARDWARE GROUP NO. 501C

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA.	CLASSROOM LOCK	L9070HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	GASKETING	4885 PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

IDG Architects — Ft. Bend Co.-South Post Oak Sportsplex — Baseball Fields Upgrades – Phase II — Proj. No. 6001-02

HARDWARE GROUP NO. 715

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA.	PANIC HARDWARE	99-NL LENGTH AS REQ	626	VON
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	SFIC RIM CYLINDER	80-159 7"	626	SCH
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	RAIN DRIP	142A DW + 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 805L

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA.	CLASSROOM DEADBOLT	B563HD	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA.	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA.	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA.	RAIN DRIP	142A DW + 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. J902

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA.	PADLOCK LCYL-SFIC	KS41F1200	696	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1			BALANCE OF HARDWARE BY GATE SUPPLIER		

- CANE BOLT BY GATE SUPPLIER.

END OF SECTION 08 71 00

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466
Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

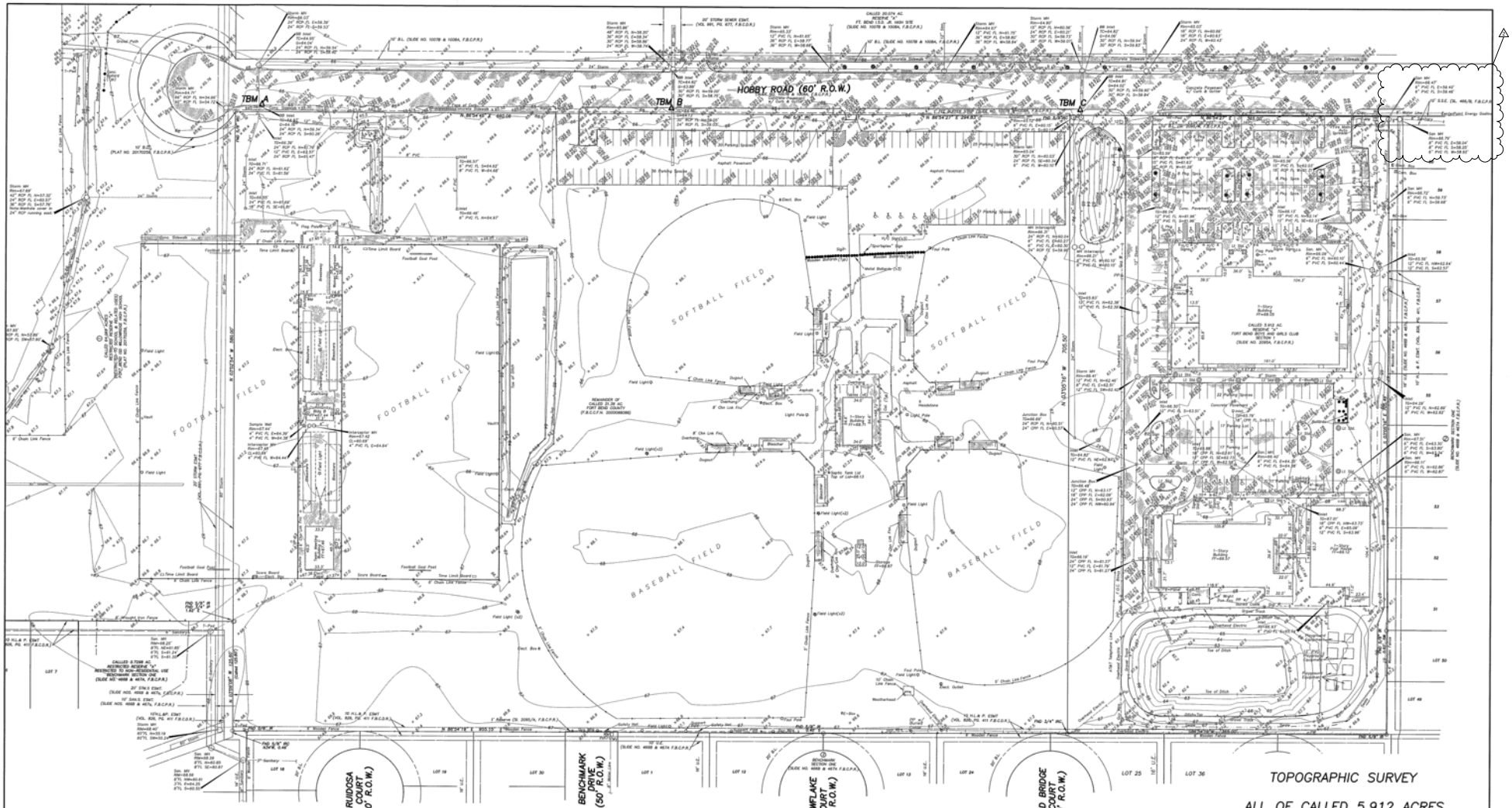
Drawing Date:	07/26/2021
Drawn:	PN, IK,
Checked:	BM, CD
Scale:	1" = 1'-0"
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

CODE ANALYSIS

G003



LEGEND

	PROPERTY CORNER		WOOD FENCE
⊙ FND	FOUND MONUMENTATION		BARBED WIRE FENCE
○ SET	SET MONUMENTATION W/CAP		CHAIN LINK FENCE
GM	GAS METER		WROUGHT IRON FENCE
PP	POWER POLE		OVERHEAD ELECTRIC
Guy	GUY WIRE		SANITARY SEWER LINE
MH	MANHOLE		STORM SEWER LINE
CO	CLEANOUT		WATERLINE
WV	WATER VALVE		GAS LINE
FH	FIRE HYDRANT		TELEPHONE LINE
WM	WATER METER		EASEMENT
Tel Box	PHONE EQUIPMENT		AERIAL EASEMENT
TV	CABLE EQUIPMENT		BUILDING LINE
LS	LIGHT STANDARD		PARKING SETBACK
LE	LIGHT		CENTER OF SWALE
	TRAFFIC SIGN		TOP OF BANK
	TREE		
	PIPE BOLLARD		
	PIPELINE MARKER	452.6	EXIST. NATURAL GROUND ELEVATION
	CURB LINE		
	EDGE ASPHALT	452.67	EXIST. ASPHALT OR CONCRETE ELEVATION
	CURB INLET		
	AREA INLET		
	EDGE OF BUILDING	452.67 / 452.17	TOP OF CURB ELEVATION / GUTTER ELEVATION

CEDER
OAK
ASHBERRY
HACKBERRY

50 25 0 50 100 150

NOTES:

1. THE BEARINGS SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD '83
2. THIS PROPERTY LIES IN UNSHADED ZONE "X" AS PER THE FLOOD INSURANCE RATE MAPS, COMMUNITY PANEL NO. 480296 1005 M, EFFECTIVE DATE MAY 2, 2019.
3. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT. THE SURVEYOR HAS NOT ATTEMPTED TO ABSTRACT THE PROPERTY. EASEMENTS, SETBACK LINES, AND AGREEMENTS MAY EXIST WHICH ARE NOT SHOWN HEREON.
4. BENCHMARK: HARRIS COUNTY FLOODPLAIN RM NO. 010225, BRASS DISK STAMPED RM 010225, LOCTAED 4.5 MILES WEST ON FM 2234 FROM THE INTERSECTION OF SH 288 & FM 2234 TO A BRIDGE BETWEEN HIRAM–CLARK AND PARK MANOR ST. MONUMENT IS ON THE EAST END OF A HEADWALL ON THE NORTH R.O.W. OF FM 2234. ELEV.=64.42' (NAVD'88, 2001 ADJ.)
5. TBM A: BOX CUT ON CURB OF A "BB" INLET LOCATED ON THE SOUTH RIGHT–OF–WAY OF HOBBY ROAD, APPROXIMATELY 58 FEET WEST OF THE HOBBY ROAD CUL–DE–SAC. ELEV.=64.97' (NAVD'88, 2001 ADJ.)
6. TBM B: BOX CUT ON CURB OF A "BB" INLET LOCATED ON THE SOUTH R.O.W. OF HOBBY ROAD APPROXIMATELY 550 FEET WEST OF THE HOBBY ROAD CUL–DE–SAC. ELEV.=64.86' (NAVD'88, 2001 ADJ.)
7. TBM C: BOX CUT ON TOP OF CURB AT CENTERLINE OF CURB INLET, APPROXIMATELY 500' WEST OF CENTERLINE OF SENTINEL ROAD. ELEV.=64.81' (NAVD'88, 2001 ADJ.)
8. TBM D: BOX CUT ON THE NORTHWEST CORNER OF A CURB INLET ON THE NORTH CURB LINE OF HOBBY STREET, APPROXIMATELY 250 FEET EAST OF CHIMNEY ROCK ROAD. ELEV.=66.63' (NAVD'88, 2001 ADJ.)
9. THE LOCATION OF UNDERGROUND SANITARY AND STORM LINES IS BASED ON VISIBLE AND APPARENT EVIDENCE. THE LOCATION AND SIZE OF UNDERGROUND WATER LINES IS BASED ON COMPILED DRAWINGS. UNDERGROUND GAS, COMMUNICATIONS, AND ELECTRICAL LINES CANNOT ALWAYS BE LOCATED AND MAY NOT ALL BE SHOWN ON THIS SURVEY. LOCATIONS SHOWN ARE BASED ON UTILITY MARKINGS AT THE TIME OF THIS SURVEY AND ANY COMPILED MAPS PROVIDED.

I hereby certify that this plat correctly represents the results of a topographic survey made on the ground under my supervision on the 27th day of April, 2021

Randy S. McClendon
Registered Professional Land Surveyor
Texas Registration No. 4079

NOTE: Without an original signature, this product is strictly preliminary, and shall not be recorded for any purpose and shall not be used or viewed or relied upon as a final survey document.

TOPOGRAPHIC SURVEY

ALL OF CALLED 5.912 ACRES
RESERVE "A"
FORT BEND BOYS AND GIRLS CLUB, SEC.1
(SLIDE NO. 2095A, F.B.C.P.R.) &
REMAINDER OF CALLED 21.38 AC.
(F.B.C.C.F.N. 2000098088)
J. POINTEVENT SURVEY NO. 3, A–305
FORT BEND COUNTY, TEXAS

TEJAS SURVEYING, INC.
FIRM NO. 10031300
1810 FIRST OAKS STREET, SUITE 220
RICHMOND, TEXAS 77406
Website: mrsurveyor.com

SCALE: 1"=50'	FIELD BOOK: 21–02	DATE: 05–19–2021
GF NO. XXXXXXXXX	ADDRESS: HOBBY ROAD, HOUSTON, TX 77053	REV: 10–20–2021
PHONE: (281) 240–9099	CAD FILE: TP\61\61–2105T	JOB NO. 61–2105–EAST

STATE OF TEXAS
COUNTY OF FORT BEND

We, Diane Duncum, President and Linda Worthy, Secretary of Board of Trustees, being officers of the Fort Bend Independent School District, owners of the 26.789 Acre Tract described in the above and foregoing map of FORT BEND I.S.D. JR. HIGH SITE, do hereby make and establish said subdivision and development plat of said property according to all lines, dedications, restrictions and notations on said maps or plat and hereby dedicate to the use of the public forever, all streets (except those streets designated as private streets), alleys, parks, water courses, drains, easements and public places shown thereon for the purposes and considerations therein expressed; and do hereby bind myself (or ourselves), my (or our) heirs and assigns to warrant and forever defend the title to the land so dedicated.

FURTHER, We, do hereby dedicate for public utility purposes an unobstructed aerial easement five (5) feet in width from a plane twenty (20) feet above the ground level upward, located adjacent to all public utility easements shown hereon.

FURTHER, We, do hereby covenant and agree that all of the property within the boundaries of this plat shall be restricted to provide that drainage structures under driveways shall have a net drainage opening area of sufficient size to permit the free flow of water without backwater and in no instance have a drainage opening of less than one and three quarters (1 3/4) square feet (18" diameter).

FURTHER, We, do hereby dedicate to the public a strip of land twenty (20) feet wide on each side of the center line of any and all bayous, creeks, gullies, ravines, draws, and drainage ditches located in said subdivision, as easements for drainage purposes. Fort Bend County or any other governmental agency shall have the right to enter upon said easement at any and all times for the purposes of construction and maintenance of drainage facilities and structures.

FURTHER, We, do hereby covenant and agree that all of the property within the boundaries of this subdivision and adjacent to any drainage easement, ditch, gully, creek or natural drainage way shall hereby be restricted to keep such drainageways and easements clear of fences, buildings, excessive vegetation and other obstructions to the operations and maintenance of the drainage facility and that such abutting property shall not be permitted to drain directly into this easement except by means of an approved drainage structure.

FURTHER, We, do hereby certify that We are the owners of all property immediately adjacent to the boundaries of the above and foregoing subdivision of FORT BEND I.S.D. JR. HIGH SITE where building setback lines or public utility easements are to be established outside the boundaries of the above and foregoing subdivision and do hereby make and establish all building setback lines and dedicate to the use of the public. all public utility easements shown in said adjacent acreage.

IN TESTIMONY WHEREOF, The Fort Bend Independent School District has caused these presents to be signed by Diane Duncum, its President, thereunto authorized, attested by its Secretary, Linda Worthy, and its common seal hereunto affixed this *9th* day of *December*, 1986.

Fort Bend Independent School District

By: *Diane Duncum*
President: Diane Duncum

Attest: *Linda F. Worthy*
Secretary: Linda Worthy

STATE OF TEXAS

COUNTY OF FORT BEND

BEFORE ME, the undersigned authority, on this day personally appeared Diane Duncum and Linda Worthy known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledge to me that they executed the same for the purposes and considerations therein expressed and in the capacity therein and herein set out, and as the act and deed of said corporation.

GIVEN UNDER MY HAND AND SEAL OF OFFICE. THIS *16* day of *December*, 1986.

Notary Public in and for
Fort Bend County, Texas
Rose Beamben

My Commission Expires *3-31-89*

I, Franklin R. Schodek, am authorized under the laws of the State of Texas to practice the profession of surveying and hereby certify that the above subdivision is true and correct, was prepared form an actual survey of the property made under my supervision on the ground and that all boundary corners, angle points, points of curvature and other points of reference have been marked with iron (or other suitable permanent ferrous metal) pipes or rods having an outside diameter of not less than five eighths (5/8) inch and a length of not less than three (3) feet.

November 10, 1986

Franklin R. Schodek
Texas Registration No.1535

GENERAL NOTES:

1. One-foot reserve dedicated to the public in fee as a buffer separation between the side or end of streets where such streets abut adjacent acreage tracts. the condition of such dedication being that when the adjacent property is subdivided in a recorded plat, the one-foot reserve shall thereupon become vested in the public for street right-of-way purposes and the fee title thereto shall revert to and revest in the dedicator, his heirs, assigns, or successors.
2. "BL" indicates Building Line.
3. "HL&P" indicates Houston Lighting & Power Company.
4. The top of all floor slabs shall be a minimum of [illegible] feet above sea level. In addition to this minimum, no floor slab shall be less than 1.5 feet above natural ground.
5. No improvements, including structures, fences, vegetation, etc., shall be constructed or placed within the drainage easement. The drainage district shall not be held responsible for any damage or vegetation placed upon the drainage easement. The drainage district shall have the right to remove any structure or vegetation which it deems to be interferring with drainage and the purose of these drainage easements.
6. The shall be a **10.0** foot side building line on this tract.
7. There are no pipelimes crossing this tract.

FORT BEND I.S.D. JR. HIGH SITE

BEING THE FORT BEND INDEPENDENT SCHOOL DISTRICT 26.789 ACRE TRACT IN THE J. POINTEVENT SURVEY, ABSTRACT 305, FORT BEND COUNTY, TEXAS

OWNER: FORT BEND INDEPENDENT SCHOOL DISTRICT
P.O. BOX 1004
SUGARLAND, TEXAS 77478
713-980-1300

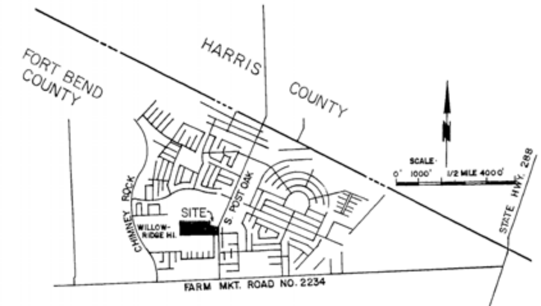
ENGINEER: HENRY STEINKAMP, JR. INC.
909 FIFTH STREET
ROSENBERG, TEXAS 77471
713-342-2241

OCTOBER, 1986

This is to certify that the City Planning Commission of the City of Houston, Texas as approved this plat and subdivision of FORT BEND I.S.D. JR. HIGH SITE in conformance with the laws and the State of Texas and the ordinances of the City of Houston as shown hereon and authorized the recording of this plat this *17th* day of *April* 1989.

BY: *Burdette Keeland*
Chairman:
Burdette Keeland

BY: *M. Marcotte*
Michael S. Marcotte, P.E.
Acting Secretary



VICINITY MAP

I, James H. Suchma, a Professional Engineer registered in the State of Texas do hereby certify that construction was completed on *November 26*, 1986.

This project was under continous inspection during construction and was constructed in accordance with and includes all items in the plans and specifications as approved by Fort Bend County and complies with all Fort Bend County requirements.

James H. Suchma, P.E.

I, James H. Suchma, a Professional Engineer registered in the State of Texas do hereby certify that this plat meets all requirements of Fort Bend County.

James H. Suchma, P.E.

I, Ron D. Drachenberg, FORT BEND COUNTY ENGINEER, DO HEREBY CERTIFY THAT THE PLAT OF THIS SUBDIVISION COMPLIES WITH ALL OF THE EXISTING RULES AND REGULATIONS OF THIS OFFICE AS ADOPTED BY THE FORT BEND COUNTY COMMISSIONERS COURT. HOWEVER, NO CERTIFICATION IS HEREBY GIVEN AS TO THE EFFECT OF DRAINAGE FROM THIS SUBDIVISION ON THE INTERCEPTING DRAINAGE ARTERY OR PARENT STREAM OR ON ANY OTHER AREA OR SUBDIVISION WITHIN THE WATERSHED.

Ron D. Drachenberg
FORT BEND COUNTY ENGINEER
Ron D. Drachenberg

APPROVED BY THE COMMISSIONERS COURT OF FORT BEND COUNTY, TEXAS, THIS *2* DAY OF *October*, 1989.

PRECINCT 1, COUNTY COMMISSIONER
Robert L. O'Shieles

PRECINCT 2, COUNTY COMMISSIONER
Ben Dopham

PRECINCT 3, COUNTY COMMISSIONER
Alton Pressley

PRECINCT 4, COUNTY COMMISSIONER
Bob Lutts

COUNTY JUDGE
Jodie Stavinoha

I, DIANE WILSON, COUNTY CLERK IN AND FOR FORT BEND COUNTY, HEREBY CERTIFY THAT THE FOREGOING INSTRUMENT WITH ITS CERTIFICATE OF AUTHENTICATION WAS FILED FOR RECORDATION IN MY OFFICE ON *October 2*, 19*89*, AT *11:01* O'CLOCK *A*.M. IN SLIDE NUMBER (S) *1007B, 1008A* OF THE PLAT RECORDS OF SAID COUNTY.

WITNESS MY HAND AND SEAL OF OFFICE, AT RICHMOND, TEXAS. THE DAY AND DATE LAST ABOVE WRITTEN.

Dianne Wilson
COUNTY CLERK

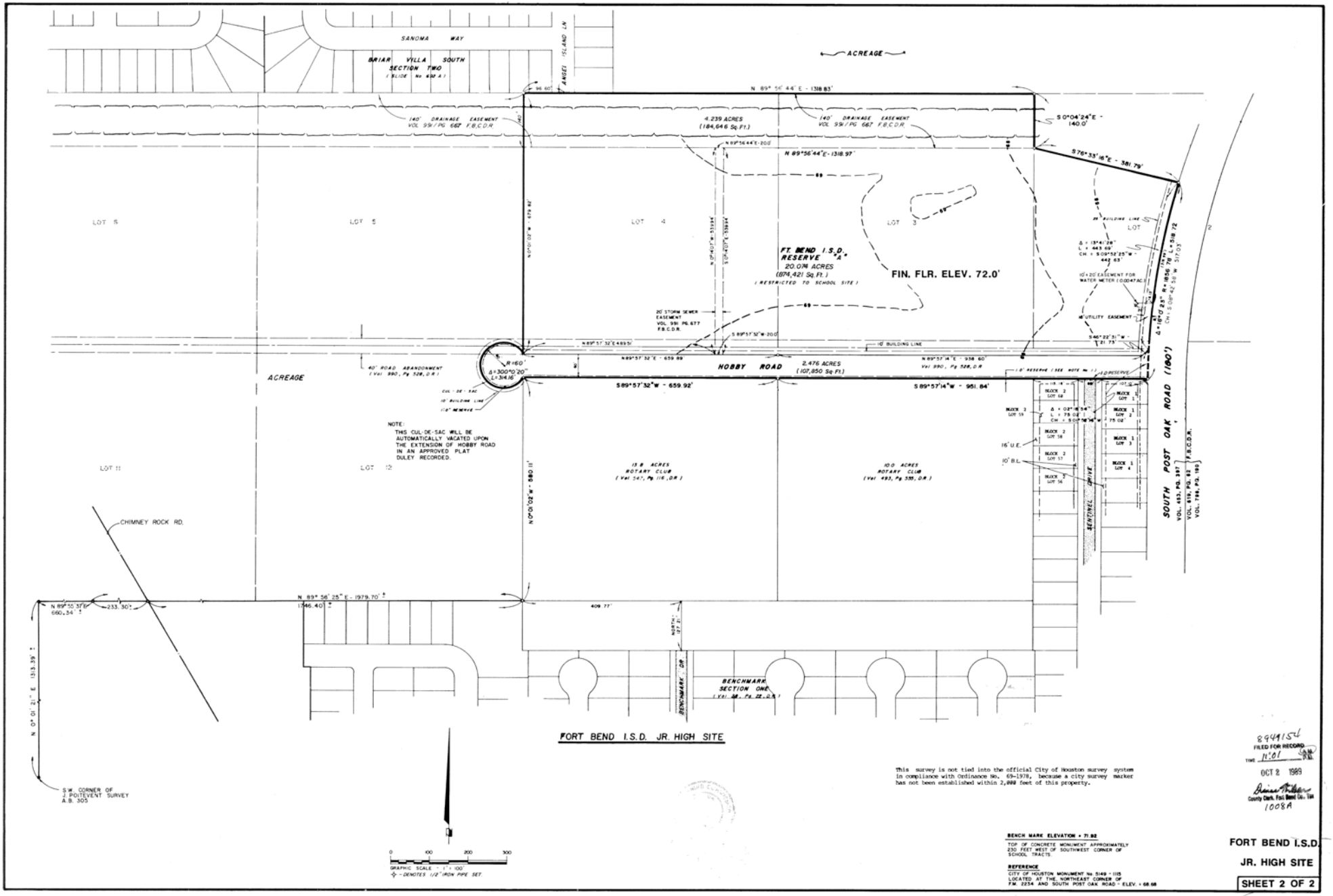
FORT BEND COUNTY, TEXAS

BY: *Gladys Navarro*
DEPUTY

8949154
FILED FOR RECORD
11:01 A.M.
OCT 2 1989
County Clerk, Fort Bend Co. Tex
1007B

SHEET 1 OF 2

1007B



FORT BEND I.S.D. JR. HIGH SITE

This survey is not tied into the official City of Houston survey system in compliance with Ordinance No. 69-1978, because a city survey marker has not been established within 2,000 feet of this property.

BENCH MARK ELEVATION = 71.92

TOP OF CONCRETE MONUMENT APPROXIMATELY 230 FEET WEST OF SOUTHWEST CORNER OF SCHOOL TRACTS.

REFERENCE

CITY OF HOUSTON MONUMENT No. 5149 - 1115
LOCATED AT THE NORTHEAST CORNER OF F.M. 2254 AND SOUTH POST OAK ROAD - ELEV. = 68.68

8 9 4 9 1 5

FILED FOR RECORD
TIME 11:01 A.M.
OCT 2 1989
County Clerk, Fort Bend Co., Tex.
1008A

FORT BEND I.S.D.
JR. HIGH SITE

SHEET 2 OF 2

FORT BEND I.S.D.
JR. HIGH SITE

GENERAL NOTES– INSIDE CITY LIMITS

1. CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING, AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS. WATER LINES, STORM DRAINAGE, AND STREET PAVING PUBLISHED BY HOUSTON PUBLIC WORKS.
2. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713–223–4567/811 OR 800–344–8377 AND LONE STAR NOTIFICATION CENTER AT 800–669–8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE §18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS, STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEM, WATER LINES, STORM DRAINAGE, AND STREET PAVING AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING, REFERENCED ABOVE, AT NO ADDITIONAL COST.
4. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, HOUSTON PUBLIC WORKS @ 832–394–9098 OR VIA FAX AT 832–395–4424 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
5. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.
6. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.
7. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.
8. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS AND RECORD AS–BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT WHO WILL MAKE THE CHANGES ON THE ORIGINAL TRACINGS, LABEL EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND RETURN IT TO THE OFFICE OF THE CITY ENGINEER.

STREET, BRIDGE AND R.O.W NOTES

1. HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN IS CONSISTENT WITH THE MINIMUM STANDARDS ESTABLISHED IN THE "INFRASTRUCTURE DESIGN MANUAL" REFERENCED AT: https://edocs.publicworks.houstontx.gov/engineering–and–construction/design–manuals.html
2. FILL AREAS ON PLANS SHALL BE FILLED IN LAYERS NOT EXCEEDING 8" IN DEPTH AND EACH COMPACTED TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY PRIOR TO INSTALLATION OF WATER LINE AND FILL AREA SHALL BE SEEDED AND FERTILIZED WITHIN 10 WORKING DAYS.
3. UTILITY CONTRACTOR SHALL PROVIDE TEMPORARY SILT BARRIER FENCE ON ALL NON–CURBED INLETS WHICH WILL REMAIN IN PLACE AFTER UNDERGROUND CONTRACT IS COMPLETE.
4. CONTRACTOR SHALL PROVIDE SILT BARRIER FENCE ON ALL STAGE 1 CURB INLETS.
5. EXISTING PAVEMENTS, CURBS, DRIVEWAYS, AND SIDEWALKS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO CITY OF HOUSTON STANDARDS, WITH LATEST ADDENDA AND AMENDMENTS THERETO.
6. CONDITION OF THE ROAD AND/OR RIGHT–OF–WAY UPON COMPLETION OF JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO SATISFACTION OF THE OWNING AUTHORITY.
8. EXPOSED 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BARS 24" LONG 24" C–C DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB WITH "PO ROC" OR EQUAL.
9. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG AREAS OF EXCAVATION.
10. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING AS SPECIFIED IN CITY OF HOUSTON ORDINANCE #87–1457.
11. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF HOUSTON STANDARDS AT ALL INTERSECTIONS WHERE SIDEWALKS EXIST AND THE EXISTING CURB OR SIDEWALK IS DAMAGED OR REMOVED DURING CONSTRUCTION.
12. WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS. WATER LINES, STORM DRAINAGE AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN SHOULD BE CONSISTENT WITH THE MINIMUM STANDARD ESTABLISHED IN THE "DESIGN MANUAL FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORMS DRAINAGE AND STREET PAVING".
13. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGES TO EXISTING WATER, WASTEWATER, STORM SEWER AND TRAFFIC SIGNAL CONDUITS, ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" WITH LATEST ADDENDA AND AMENDMENTS THERETO, AT NO COST TO THE CITY OF HOUSTON.
14. PRIOR TO STREET CONSTRUCTION, THE CONTRACTOR SHALL CONTACT HOUSTON PUBLIC WORKS AT (PHONE) 832–394–9578 AND COMPLY WITH ALL REQUIREMENTS FOR THE ISSUANCE OF NECESSARY PERMITS/WORK ORDERS FOR STREET CONSTRUCTION.
15. DOUBLE REFLECTORIZED BLUE TRAFFIC MARKERS SHALL BE PLACED 6–INCHES OFFSET OF THE CENTERLINE OF ALL FIRE HYDRANT LOCATIONS BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A BUTTON PLACED ON EACH STREET.

STORM CONSTRUCTION NOTES

1. STORM SEWER SHALL BE REINFORCED CONCRETE PIPE (C–76, CLASS III), AND SHALL BE INSTALLED, BEDDED, AND BACK FILLED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 2317–02, 02317–3, 02317–05, 02317–06, AND 02317–07 (OCT. 2002) AS APPLICABLE UNLESS OTHERWISW SHOWN ON THE DRAWINGS.
2. ALL STORM SEWER CONSTRUCTED IN SIDELOT EASMENT SHALL BE R.C.P (C–76, CLASSIII) AND SHALL BE EMBEDDED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 02317–02, 02317–03, 02317–05, 02317–06, AND 02317–07 AS APPLICABLE.
3. ALL SEWER UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE BACKFILLED WITH 1–1/2 SACK CEMENT/C.Y. STABLIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. THE REMAINING DEPTH OF TRENCH SHALL BE BACKFILLED WITH SUITABLE EARTH MATERIAL.
4. ALL TRENCH BACKFILL SHALL BE IN 8" LIFTS, WITH TESTS TAKEN AT 100 FOOT INTERVALS IN EACH LIFT, AND MECHNICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMACTION TEST (ASTM D–698/AASHTO T99).
5. CIRCULAR AND ELLIPTICAL REINFORCED CONCRETE PIPE SHALL BE INSTALLED USING RUBBER GASKET JOINT CONFORMING TO ASTM C443 AND ASTM C877 RESPECTIVELY.
6. ALL STORM SEWER PIPES AND INLET LEADS SHALL BE 24" AND LARGER R.C.P. (C–76, CLASSIII).
7. ALL PRPOSED PIPE STUB–OUTS FROM MANHOLES AND INLET LEADS ARE TO BE PLUGGED WITH 8" BRICK WALLS UNLESS OTHERWISE NOTED.
8. MINIMUM HORIZONTAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 48–INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES. MINIMUM VERTICAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 18–INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES.
9. ADJUST MANHOLE COVERS TO GRADE CONFORMING TO REQUIREMENTS OF SECTION 02086–ADJUSTING MANHOLES, INLETS, AND VALAVE BOXES TO GRADE.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING, AND RESTORING ANY BACK SLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF THIS WORK.
11. ALL DITCHES SHALL BE GRADED TO PROPOSED ELEVATIONS TO INSURE PROPER DRAINAGE. ALL OUTFALLS SHALL BE PROPERLY BACKFILLED AND COMPACTED. ALL DISTURBED AREA SHALL BE REGRADED, SEEDED, AND FERTILIZED.
12. ALL DRIVEWAYS WILL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURES.

AT&T TEXAS/SWBT FACILITIES

1. THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THEIR FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.
2. THE CONTRACTOR SHALL CALL 1–800–344–8377 (TEXAS 811)A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.
3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON–MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.
4. WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.
5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN CONDUIT IN THE AREA.
6. PLEASE CONTACT THE AT&T TEXAS DAMAGE CONTROL MANAGER MR. ROOSEVELT LEE JR. AT (713)567–4552 OR E–MAIL HIM AT rl7259@ATT.COM, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR OUR AT&T TEXAS/SWBT FACILITIES.

CAUTION: UNDERGROUND GAS FACILITIES

THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1–800–545–6005 OR 811 A MINIMUMOF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES LOCATED.

- o WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 207–5463 OR (713–945–8037) (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- o WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON–MECHANIZED EXCAVATION PROCEDURES.
- o WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- o FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659–3552 OR (713) 207–4200

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

CENTERPOINT ENERGY ELECTRIC NOTES

WARNING: OVERHEAD ELECTRICAL FACILITIES

OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND

OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.

PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT ENERGY AT 713–207–2222.

ACITIVITIES ON/OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207–6348 OR (713) 207–5769.

SWPPP CONSTRUCTION NOTES

1. CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES AND REINFORCED FILTER FABRIC BARRIER ALONG ROAD AND SIDE DITCHES AT LOCATIONS SHOWN ON THE TYPICAL STORM WATER POLLUTION PREVENTION (SWPP) PLANS TO KEEP SILT AND/OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM WATER INLETS AND DITCHES EVENTUALLY POLLUTING THE RECEIVING WATERS.
2. DURING THE EXCAVATION PHASE OF THE PROJECT, CONTRACTOR SHALL SCHEDULE THE WORK IN SHORT SEGMENTS SO THAT EXCAVATED MATERIAL CAN BE QUICKLY HAULED AWAY FROM THE SITE AND TO PREVENT IT FROM STAYING UNCOLLECTED ON THE EXISTING PAVEMENT. ANY LOOSE EXCAVATED MATERIAL WHICH FALLS ON PAVEMENTS OR DRIVEWAYS SHALL BE SWEPT BACK INTO THE EXCAVATED AREA.
3. CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS AND DRIVEWAYS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT OR ROCK TRACKED FROM THE EXCAVATED AREA.
4. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIALS AS CONSTRUCTION PROGRESSES.
5. CONTRACTOR SHALL INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOUR OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.
   DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.
   AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.
   STRUCTURAL CONTROL MEASURES.
   LOCATIONS WHERE VEHICLES ENTER OR EXIST THE SITE.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING EXISTING DITCHES AND/OR CULVERTS FOR UNOBSTRUCTED DRAINAGE AT ALL TIMES. WHERE SODDING IS DISTURBED BY EXCAVATION ON BACKFILLING OPERATIONS, SUCH AREAS SHALL BE REPLACED BY SEEDING OR SODDING. SLOPES 4:1 OR STEEPER SHALL BE REPLACED BY BLOCK SODDING.

WATER CONSTRUCTION NOTES

1) WATER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON INFRASTRUCTURE DESIGN MANUAL, STANDARD SPECIFICATION, AND CONSTRUCTION DETAILS.
2) ALL 4" THROUGH 12" WATER LINE TO BE AWWA C–900 PVC DR–18 BLUE PRESSURE RATED WATER MAIN WITH 2" AND SMALLER WATER SERVICE LINE TO BE CONTINUOUS TYPE K COPPER TUBING PER COH STANDARD SPECIFICATION SECTION 02503. ALL 4" THRU 54" DI PIPE WATER LINES SHALL BE AWWA C151 WITH INSIDE LINING WITH AWWA C104 AND DOUBLE WRAPPED WITH 8–MIL POLYETHYLENE SHEETS.
3) CONCRETE THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY TO PREVENT PIPE MOVEMENT. USE RESTRAINED JOINTS WHERE PREVENTING MOVEMENT OF 16" OR GREATER PIPE IS NECESSARY DUE TO THRUST.
4) ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT OF ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12" OVER PIPE AND BACKFILLED WITH CEMENT STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE.
5) ALL WATER LINE AND SEWER LINE CROSSINGS SHALL BE CONSTRUCTED PER CITY OF HOUSTON AND TCEQ REGULATIONS.
6) ALL WATER VALVES SHALL BE SUPPLIED AND INS TALLED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA C–500 AND SHALL BE OF THE RESILIENT SEAT TYPE.
7) ALL WATER LINES TO BE DISINFECTED IN CONFORMANCE WITH AWWA C–651 AND THE TEXAS STATE DEPARTMENT OF HEALTH. AT LEAST ONE BACTERIOLOGICAL SAMPLE SHALL BE COLLECTED FOR EVERY 1,000 LINEAR FEET OF WATER LINE AND SHALL BE REPEATED IF CONTMINATION PERSISTS.
8) ALL BELOW GRADE VALVES SHALL BE GASKETED, HUB–END GATE VALVES WITH A CAST IRON BOX, EXCEPT WHERE FLANGES ARE CALLED OUT ON THE PLANS.
9) 4" THRU 12" FIT TINGS SHALL BE CEMENT MORTAR LINED COMPACT DUCTILE IRON PRESSURE FITTINGS PER ANSI A21.53, OR PUSH ON FITTINGS PER ANSI A21.10 PRESSURE RATED AT 250 PSIG.
10) HYDROSTATIC TESTING: ALL WATER PIPE SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON STANDARD CONSTRUCTION SPECIFICATIONS. TESTS ARE TO BE PERFORMED ON THE ENTIRE FOOTAGE OF WATER PIPE LINE INCLUDED IN THE PROJECT.
11) ALL WATER LINES TO HAVE 4' MINIMUM COVER TO FINISHED GRADE AND MINIMUM 12" CLEARANCE TO OTHER UTILITIES AT CROSSING UNLESS OTHERWISE NOTED ON PLANS. ALL WATER LINE INSTALLED OVER 8' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS.
12) CONTRACTOR SHALL KEEP WATER PIPE CLEAN AND CAPPED (OR OTHERWISE EFFECTIVELY COVERED) OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.

GRADING NOTES

1) GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE STARTING CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
2) BEFORE STARTING CONSTRUCTION, CONTRACTOR SHALL VERIFY BENCHMARK ELEVATION AND NOTIFY ENGINEER IF ANY DISCREPANCY AND/OR CONFLICT IS FOUND.
3) CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS AND NO PONDING IN PAVED AREAS, AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
4) CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION.
5) ALL EXISTING CONCRETE PAVING, SIDEWALK, AND CURB DEMOLITION SHALL BE REMOVED AND DISPOSED OF BY CONTRACTOR. DISPOSAL SHALL BE AT AN APPROVED OFF–SITE, LAWFUL LOCATION, UNLESS DIRECTED OTHERWISE BY THE OWNER.

SANITARY NOTES:

1. ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON "STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC" AND ALL CURRENT AMENDMENTS THERETO AND BE SUBJECT TO A STANDARD EXFILTRATION TEST. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF SEWER LINE INCLUDED IN THE PROJECT. REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE, TITLE 30 CHAPTER 317, "DESIGN CRITERIA FOR SEWERAGE SYSTEMS" SHALL GOVERN WHERE CONFLICTS EXIST EXCEPT WHERE CITY REQUIREMENTS ARE MORE STRINGENT.
2. ALL MANHOLES ARE TO BE PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02082–01, 02082–02, 02082N–02, 02082–03, AND 02082N–03 UNLESS OTHERWISE NOTED. USE 2010 VERSION AS APPLICABLE.
3. SANITARY SEWER MANHOLES WILL HAVE BEDDING AND BACKFILL PER CITY OF HOUSTON STANDARD DETAILS DRAWING NO. 02317–08 UNLESS OTHERWISE NOTED.
4. THE SANITARY SEWER PVC PIPE SHALL BE ASTM D 3034 TYPE PSM SDR 26 GRAVITY SEWER PIPE, ASTM D2241 SDR 26 PRESSURE RATED SEWER PIPE OR AWWA C–900 DR–18 GREEN PVC PRESSURE RATED SEWER PIPE BASED ON CONSTRUCTION CONDITION REQUIREMENT AND CONFORMING TO ASTM D1784 AND CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02506 POLYVINYL CHLORIDE PIPE.
5. WHEN SS PRESSURE RATED PVC PIPE IS USED ON WATERLINE (WL) CROSSING UNDER CONDITION 1 OF COH IDM TABLE 7.3, THE SAME TYPE OF D2241 SDR 26 PVC PIPE OR C–900 GREEN DR–18 PVC GREEN PRESSURED TO BE UTILIZING IN–BETWEEN TWO SS MH'S. OR TO UTILIZE A DI TRANSITION ADAPTER FOR THE CONNECTING OF ASTM D–3034 PVC GRAVITY PIPE TO DI–OD AWWA C–900 PVC PIPE CENTERED AT WL WHEN CONNECTING TWO DIFFERENT TYPES OF PVC PIPES FOR SEWER CONSTRUCTION.
6. AWWA C–900 DR–18 PVC PIPE USES EITHER AWWA C900 DR–18 PVC FITTINGS OR DIP FITTINGS.
7. ALL SANITARY SEWER LINES UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL HAVE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02317–01, 02317–02, OR 02317–03 AS APPLICABLE, WITH 1 ½ SACK CEMENT/CY STABILIZED SAND BACKFILL UP TO THE BOTTOM OF THE PAVEMENT SUBGRADE. 100 PSI PERFORMANCE RESULTS ARE STILL REQUIRED.
8. ALL SANITARY SEWERS CROSSING WATER LINES WITH A CLEARANCE BETWEEN 12 INCHES AND 9 FEET SHALL HAVE A MINIMUM OF ONE 18' JOINT OF 150 PSI DUCTILE IRON OR (GREEN) C900 PVC PIPE MEETING ASTM SPECIFICATION D2241 CENTERED ON WATER LINE. WHEN WATER LINE IS BELOW SANITARY SEWER PROVIDE MINIMUM 2 FOOT SEPARATION.
9. CONTRACTOR SHALL PROVIDE A MINIMUM HORIZONTAL CLEARANCE OF 9' FEET BETWEEN WATER LINES AND SANITARY SEWER MANHOLES AND LINES.
10. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING WILL BE SET 3" – 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER PAVING WITH SLOPED BACKFILL ADDED FOR STORM WATER TO DRAIN AWAY FROM MANHOLE RIM.
11. IN WET STABLE TRENCH AREAS USE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBER 02317–02 (2002).
12. DEFLECTION TEST: DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI–RIGID SEWER PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5% IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID MANDREL, IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED AS PER 30 TAC 317.2 LATEST AMENDMENT AND WITHOUT MECHANICAL PULLING DEVICES. NO BALL–TYPE MANDREL IS ALLOWED.
13. INFILTRATION, EXFILTRATION OR LOW–PRESSURE AIR TEST: EITHER OF THE FOLLOWING TESTS SHALL BE PERFORMED AS PER TAC, TITLE 30 317.2 WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY SEWERS.
   A. INFILTRATION OR EXFILTRATION TEST: TOTAL LEAKAGE AS DETERMINED BY A HYDROSTATIC HEAD TEST SHALL NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO (2) FEET.
   B. LOW–PRESSURE AIR TEST: PERFORM TEST ACCORDING TO UNI–B–6–90 OR OTHER APPROPRIATE PROCEDURES. FOR SECTIONS OF PIPE LESS THAN 36" (INCH) AVERAGE INSIDE DIAMETER, THE MINIMUM ALLOWABLE TIME FOR PRESSURE DROP FROM 3.5 P.S.I.G. TO 2.5 P.S.I.G. SHALL BE AS FOLLOWS:

   6" 340 SECONDS OR 0.855(L) FOR TEST LENGTHS GREATER THAN 398'

   8" 454 SECONDS OR 1.520(L) FOR TEST LENGTHS GREATER THAN 298'

   10" 567 SECONDS OR 2.374(L) FOR TEST LENGTHS GREATER THAN 239'

   15" 850 SECONDS OR 5.342(L) FOR TEST LENGTHS GREATER THAN 159'

   18" 1020 SECONDS OR 7.693(L) FOR TEST LENGTHS GREATER THAN 133'

   WHERE L = LENGTH OF LINE OF SAME PIPE SIZE IN FEET.
14. "SAN. S. E." INDICATES "SANITARY SEWER EASEMENT"
15. FOR SANITARY MANHOLE (MH) RIMS SET INSIDE OF OR @ CURB & GUTTER PAVEMENT AND/OR BELOW T.C., MH RIMS WILL BE SET FLUSHED WITH AN ABUTTING PAVED SURFACE. THE (VALCUN, NEENAH OR EQUAL) HEAVY DUTY BOLTED SOLID MH COVER SHALL BE PROPERLY (AND SECURELY) ATTACHED AND SEALED TO ITS COMPATIBLE GASKETED FRAME BY USING BOTH A NEOPRENE GASKET AND (AT LEAST) 4 COUNTER–SUNK HEX–HEAD COARSE THREADED ½"–13 UNC STAINLESS STEEL BOLTS. THE HEAVY DUTY FRAME MH COVER SHALL BE SOLID (NO AIR HOLES). SAID FRAME SHALL BE BOTH EMBEDDED INTO THE MH'S TOP ALSO SECURELY ANCHORED TO THE UNDERLYING MH STRUCTURE WITH EITHER SECURELY ATTACHED EMBEDDED ANCHOR BOLTS OR THE CONCRETE MH'S EXPOSED REBARS WELDED TO THE FRAME OR OTHER EQUALLY SECURED METHODS TO PREVENT MH COVER/FRAME BLOW–OFFS/EJECTIONS.

TRAFFIC NOTES

Contractor or owner shall submit traffic control plans with the Mobility Permit application. The plans shall be drawn to scale and sealed by a licensed professional engineer in the state of Texas.

The general notes that shall be included on the traffic control plan can be found in Chapter 15 (15.12 Traffic Control Plan) of the City of Houston's (City) Infrastructure Design Manual (IDM). Below are several key notes from the IDM to be aware of:

1. The Contractor shall provide and install traffic control devices in conformance with Part VI of the Texas Manual on Uniform Traffic Control Devices (TMUTCD) latest edition with revisions during the entire construction period.
2. No work shall be performed in residential areas from 7:00PM to 7:00AM.
3. Contractor shall maintain approved number of lanes of traffic in each direction during construction working hours. Traffic Control plans shall include one–way and/or detour plans. Contractor shall maintain ADA complaint pedestrian access to bus stops and adequate bus access to the bus stop.
4. Contractor shall cover open pavement excavations for minor utility work with anchored steel plates during non–working hours, open lanes for normal traffic flow when feasible.
5. Contractor shall secure lane/sidewalk/bicycle facility closure permits from Transportation & Drainage Operations (Mobility Permit Section at www.gims.houstontx.gov) before implementing the traffic control plan. The application must be submitted at least ten business days prior to the implementation of the traffic control plan and/or beginning construction work. The Contractor shall provide traffic control plans, construction sequencing, and construction schedule with the application.
6. Contractor shall have approved traffic control plan and permit at the job site for inspection at all times
7. Access to driveways adjacent to the construction work zone shall be maintained at all times as much as possible. Additional cones and/or delineators may be required to delineate the driveway access route through the construction work zone. A minimum of one travel lane shall be maintained across the driveway, unless prior written approval is obtained from the City of Houston.
8. Additional off duty police officers/flaggers may be requested to direct traffic when lanes are blocked at the direction of the City even if they are not specifically identified on the project plans.

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 4002-006

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES INC.
ENGINEERS, PROJECT MANAGERS, ESTIMATORS, INSPECTORS
6464 SAVOY DR, SUITE 610
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PHONE:(713) 268 - 1666, FAX: (713) 268 - 1667
TBPE NO.: F-8029

2/18/22

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

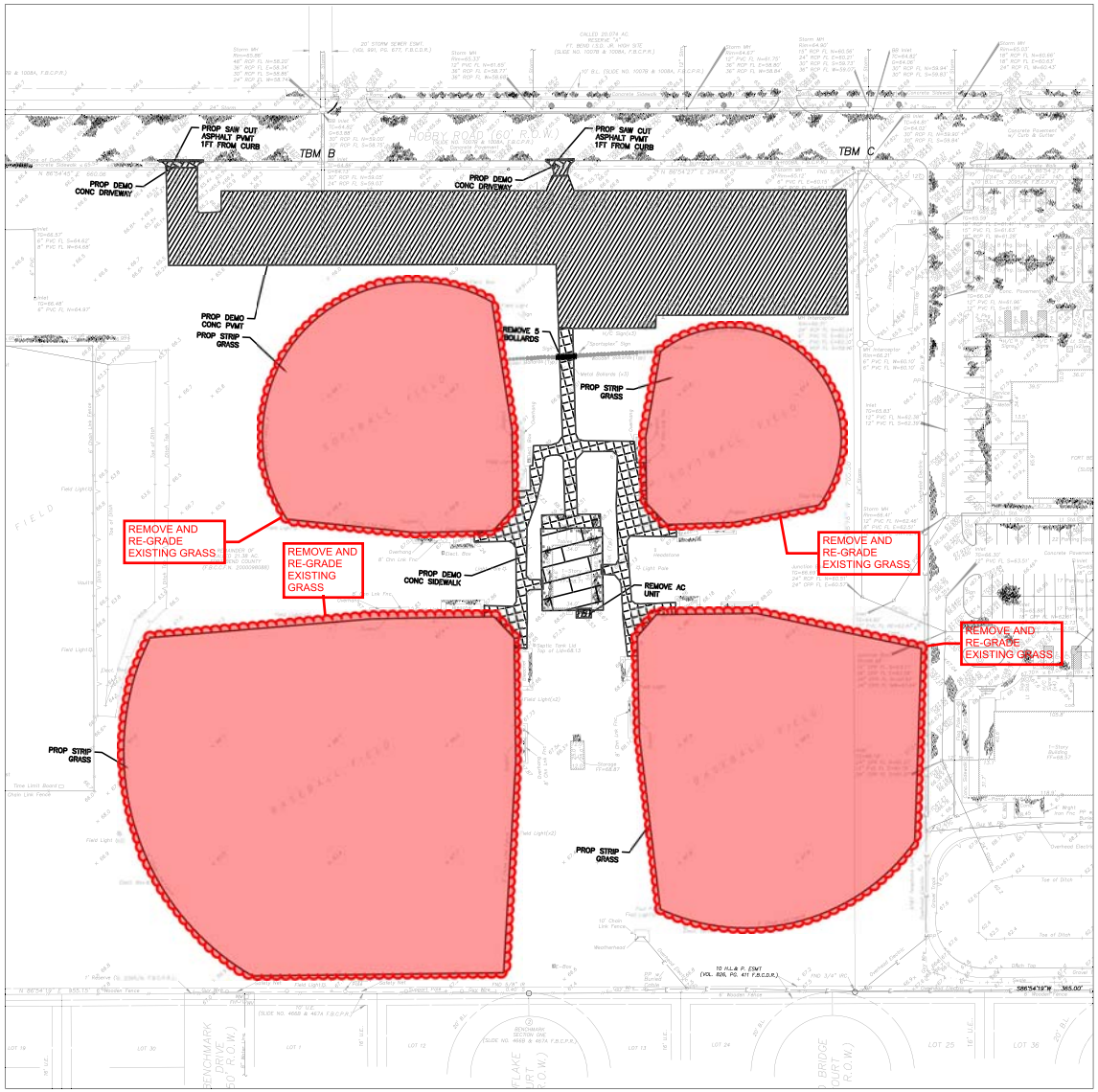
Drawing Date:	08/09/2021
Drawn:	MK
Checked:	NO
Scale:	1/32" = 1'-0"
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
CITY COMMENT	02/18/2022
ISSUE FOR BID	09/07/2022

GENERAL NOTES

C1



N

0' 10' 20' 40'

SCALE: 1"=20'

REMOVE AND RE-GARDE EXISTING GRASS

REMOVE EXISTING PAVEMENT AREA

REMOVE EXISTING SIDEWALK

REMOVE EXISTING BUILDING

REMOVE EXISTING DRIVEWAY

PROPOSED SAWCUT

IDG+ ARCHITECTS

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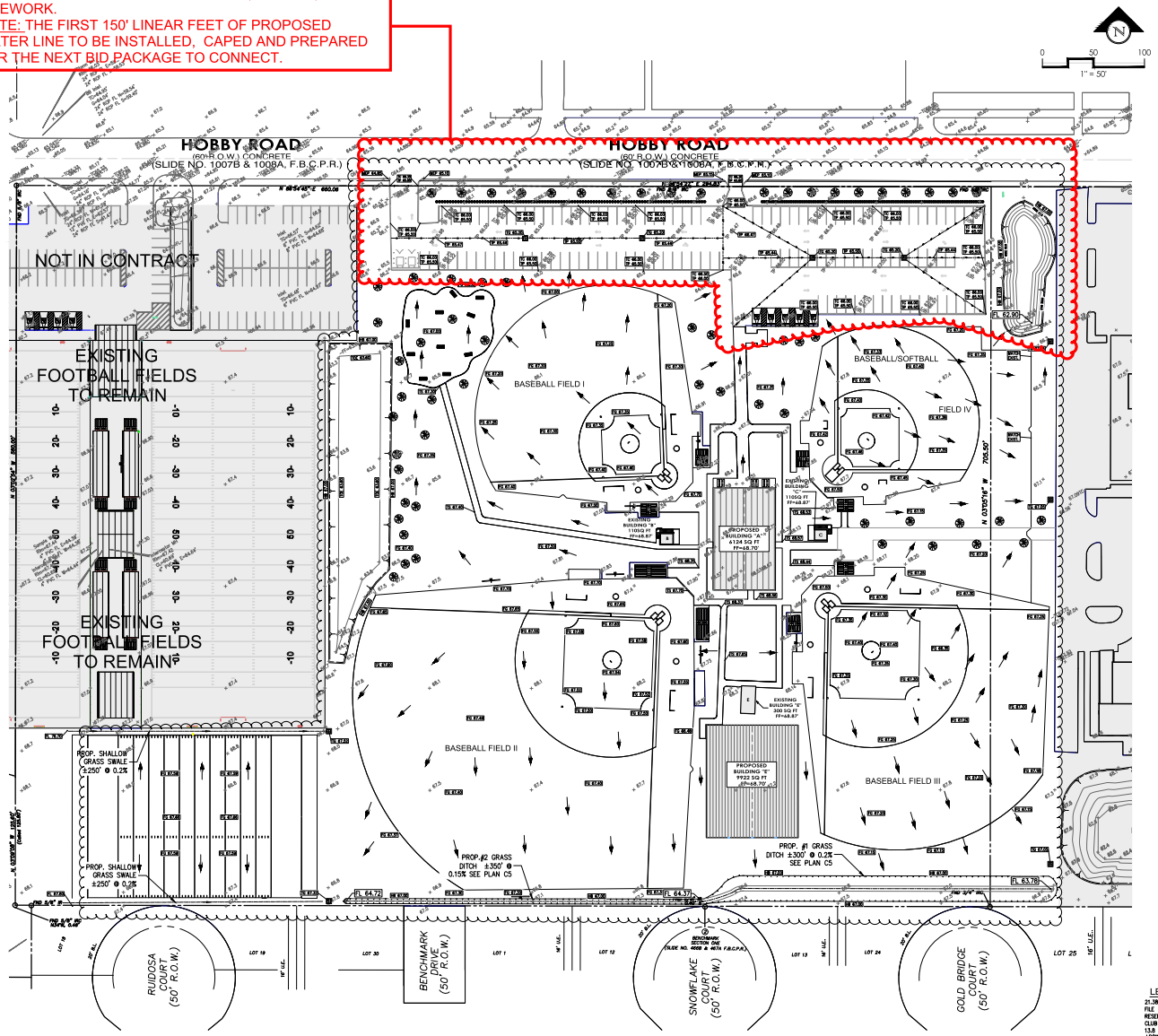
DEMOLITION PLAN

C2

BID PACKAGE 1 **ONLY** : DEMOLITION & (PARKING) PAVING, SITEWORK.
NOTE: THE FIRST 150' LINEAR FEET OF PROPOSED WATER LINE TO BE INSTALLED, CAPED AND PREPARED FOR THE NEXT BID PACKAGE TO CONNECT.



GENERAL NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

1. SHOULD THE CONTRACTOR AT ANY TIME DISCOVER AN ERROR IN A DRAWING OR A DISCREPANCY OR VARIATION BETWEEN THESE DRAWINGS AND THE SITE (FIELD CONDITION), THE CONTRACTOR SHALL NOT PROCEED WITH THE WORK AFFECTED UNTIL THE ENGINEER HAS BEEN NOTIFIED AND PROCEED ONLY AFTER CLARIFICATION HAS BEEN MADE.
2. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITY LINES IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION AND SHALL NOTIFY THE THE FOLLOWING AGENCIES AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION.
   A. TEXAS ONE CALL AT 713-223-4567 (HOUSTON) / 800-344-8377 (TEXAS 811)
   B. LONE STAR ONE CALL AT 800-669-8344
3. PRIOR TO ANY CONSTRUCTION ACTIVITY, CONTRACTOR IS TO ACQUIRE ALL REQUIRED CONSTRUCTION PERMITS FROM APPROPRIATE AUTHORITIES. CONTRACTOR SHALL NOTIFY ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, OR PERSONS IN CHARGE OF PUBLIC AND PRIVATE UTILITY LINES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK OR CONNECTING TO ANY EXISTING UTILITY LINES.
4. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES AND REGULATIONS REQUIRED BY AUTHORITIES HAVING JURISDICTION OVER SUCH WORK, INCLUDING ALL INSPECTIONS AND PERMITS REQUIRED BY FEDERAL, STATE AND LOCAL AUTHORITIES IN SUPPLY, TRANSPORTATION AND INSTALLATION OF MATERIALS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING SITE TRENCH SAFETY REQUIREMENTS IN ACCORDANCE WITH CITY/ COUNTY STANDARDS, OSHA REGULATIONS AND THE STATE OF TEXAS LAWS FOR ALL EXCAVATION.
6. IN ORDER TO MAINTAIN CLEAN STREETS AND PREVENT SITUATION OF DRAINAGE CHANNELS, PRACTICE SEDIMENT CONTROL DURING CONSTRUCTION, AS SOON AS EARTHWORK COMMENCES WHICH DESTROYS THE NATURAL VEGETATIVE COVER ON ANY PORTION OF A BUILDING TRACT, ONE OF TWO BASIC SEDIMENT CONTROL METHODS – HAY BALES OR FENCING – SHALL BE INSTALLED IN SUCH A WAY AS TO FILTER ALL STORM WATER RUNOFF FROM THE TRACT VIA SHEET FLOW. STORM SEWERS OR DRIVEWAYS. THE SEDIMENT CONTROL SYSTEM SHALL REMAIN IN PLACE IN GOOD REPAIR UNTIL ALL AREA OF THE TRACT ARE COVERED BY BUILDINGS, PAVING, OR PLANT MATERIALS.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A SET OF "AS-BUILT" PLANS FOR ALL WORK PERFORMED ON AND OFF SITE. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL PROVIDE AS-BUILT PLANS IDENTIFYING ALL DEVIATIONS OR VARIATIONS FROM ORIGINAL PLANS TO THE OWNER AND THE ENGINEER.
8. IF ADJACENT GRADE IS CHANGED FOR ANY REASON AROUND A FIRE HYDRANT, VALVE BOX, OR MANHOLE, CONTRACTOR MUST ADJUST THE ELEVATION OF THE FACILITY ACCORDINGLY.

OVERHEAD LINES EXIST ON THE PROPERTY

WE HAVE NOT ATTEMPTED TO MARK THOSE LINES SINCE THEY ARE CLEARLY VISIBLE, BUT CONTRACTOR SHALL LOCATE THEM PRIOR TO BEGINNING CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE, PROHIBITS ALL ACTIVITIES IN WHICH PERSON OR EQUIPMENT MAY COME WITHIN (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. CONTRACTORS ARE LEGALLY RESPONSIBLE FOR SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CIVIL AND CRIMINAL LIABILITY.

RIGHT-OF-WAY

A. ANY DAMAGE TO EXISTING UTILITIES, ROADS, DRIVEWAYS, SIDEWALKS, OR OTHER APPURTENANCES WITHIN THE RIGHT-OF-WAY SHALL BE REPAIRED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE OWNING/ OPERATING AUTHORITY, WITH MATERIAL EQUAL TO OR SUPERIOR TO EXISTING MATERIAL, AND WITH NO COST TO THE PUBLIC, ENGINEER, OR THE OWNER.

B. ANY AREAS OF GRASS WITHIN THE RIGHT-OF-WAY WHICH ARE DISTURBED OR DUG UP DURING CONSTRUCTION SHALL BE REPLACED WITH SOD PRODUCTS WHICH MATCHES THE GRASS REMOVED.

C. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.

D. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.

GRADING AND DRAINAGE NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

1. PRIOR TO STARTING CONSTRUCTION, CONTRACTOR SHALL VERIFY BENCHMARK ELEVATION AND NOTIFY ENGINEER IF ANY DISCREPANCY AND/OR CONFLICT IS FOUND.
2. CONTRACTOR/BUILDER SHALL FIELD-VERIFY EXISTING ELEVATIONS AND SET FINISH FLOOR (FF) ELEVATION AT LEAST 18 INCHES ABOVE THE BASE FLOOD ELEVATION, ACCORDING TO FEMA MAPS & TOPOGRAPHIC SURVEY DATA. 12 INCHES ABOVE THE NEAREST SANITARY SEWER MANHOLE RIM, OR, IF NO SEWER IS AVAILABLE, THE FINISHED FLOOR SHALL NOT BE LESS THAN 4 INCHES ABOVE THE CROWN OF THE STREET. NOTIFY ENGINEER IF FF ELEVATION IS DIFFERENT THAN THAT SHOWN ON PLAN.
3. PROPOSED FF ELEVATION IS MINIMUM. BUILDER MAY SET SLAB @ A HIGHER ELEVATION, BUT NOTIFY ENGINEER PRIOR TO SETTING FORM.
4. FINISHED GRADE ELEVATIONS @ SIDE & REAR PROPERTY LINES SHALL MATCH EXISTING GRADE ELEVATIONS U.O.N.
5. THE GROUND IMMEDIATELY ADJACENT TO THE FOUNDATION SHALL BE SLOPED AWAY FROM THE BUILDING AT A 5% SLOPE FOR A MINIMUM DISTANCE OF 10 FEET MEASURED PERPENDICULAR TO THE FACE OF THE WALL U.O.N.
6. IMPERVIOUS SURFACES WITHIN 10 FEET OF THE BUILDING FOUNDATION SHALL BE SLOPED A MINIMUM OF 2% AWAY FROM THE BUILDING U.O.N.
7. ON GRADED SITES, THE FOUNDATION SHALL EXTEND ABOVE THE GUTTER OR DRAINAGE DEVICE A MINIMUM OF 12 INCHES PLUS 2% U.O.N.
8. THE AREA OF FLOOR USED FOR PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOORWAY.
9. A SLOPED SURFACE IS REQUIRED TO EFFECTIVELY DRAIN WATER AWAY FROM THE FOUNDATION WALLS, INCLUDING AREAS UNDER STEPS AND DECKS U.O.N.
10. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS AND NO PONDING IN PAVED AREAS, AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
11. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE SATISFACTION OF THE OWNING AUTHORITY.
12. RUNOFF FROM CONSTRUCTION SITE SHALL BE FILTERED SO AS TO PREVENT SAND, MUD AND DIRT OF ANY KIND FROM ENTERING PUBLIC STORM DRAINAGE SYSTEM.
13. THIS PROPOSED DRAINAGE SCHEME WILL NOT RESULT IN ANY STORMWATER RUNOFF ONTO ADJOINING PROPERTIES DURING A 2-YEAR STORM EVENT.
14. CONTRACTOR SHALL MAINTAIN DRAINAGE DURING CONSTRUCTION SO AS TO ENSURE THAT NO RUNOFF FROM CONSTRUCTION SITE TRAVERSES ADJOINING PROPERTIES AT ANYTIME.
15. SET STORM SEWER MANHOLE RIMS TO MATCH FINISH GRADE.
16. ALL EXCAVATED SOIL FROM FOUNDATIONS SHALL BE REMOVED FROM CONSTRUCTION SITE AND MAY NOT BE USED AS FILL ON SITE, UNLESS SPECIFICALLY CALLED FOR BY EXCAVATION DRAWINGS.
17. CONSTRUCTION SITE IS TO BE MAINTAINED FREE OF ANY OPEN TRENCHES, PITS, HOLES, OR OTHER EXCAVATIONS THAT MAY HOLD WATER.
18. CONSTRUCT THE EMERGENCY SPILLWAY OR EARTH SWALE IN CUT OR STRUCTURALLY STABILIZED SOILS.

LEGEND

	PROPERTY LINE
	LOT LINE
HP HP HP HP	HIGH POINT / TOP OF GRADE BREAK
	BUILDING (SETBACK) LINE
	EASEMENT
	PAVING RUNOFF PATH
	DITCH/SWALE FLOWLINE
FIRE LANE	FIRE LANE
EXIST. PROP.	BASIN GRADE SLOPE
	PROPOSED CATCH BASIN / JUNCTION BOX
EXIST=FILLED PROP.=OPEN	MANHOLE
	EXISTING GRADE ELEVATIONS
	PROPOSED GRADE ELEVATIONS
	POWER POLE / LIGHT POLE

EX./PROP. MEP/MEC/MEG	EXISTING / PROPPOSED MATCH EXISTING PAVEMENT/CURB/GRADE
MWSE	MAXIMUM DESIGN WATER SURFACE ELEVATION
FF	ELEVATION @ FINISHED FLOOR SLAB
DR	ELEVATION @ DOORWAY (OUTSIDE)
TS	ELEVATION @ TOP OF SIDEWALK
TC	ELEVATION @ TOP OF CURB
TP	ELEVATION @ TOP OF PAVEMENT
FG	ELEVATION @ FINISH GRADE
TG	ELEVATION @ TOP OF GRATE
HP	ELEVATION @ HIGH POINT

LEGAL DESCRIPTION

21.38 ACRES (931,379 SQ. FT.) (F.B.C.C. FILE NO. 2000090088) BEING ALL OF RESERVE "A" FORT BEND BOYS AND GIRLS CLUB SEC. 1 (SL. 2095/A, F.B.C.P.R.) AND 13.8 ACRES (VOL. 547, PG. 116, F.B.C.D.R.) LP/ENTEVENT SURVEY NO. 3, A-305 FORT BEND COUNTY, TEXAS

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Project No: 4002-006

CONSULTANTS:

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TBPE NO.: F-8029

STATE OF TEXAS
NIKEMDI I. CHALETE
79423
REGISTERED
PROFESSIONAL ENGINEER
4/20/22

STRUCTURAL ENGINEER

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MEP ENGINEER

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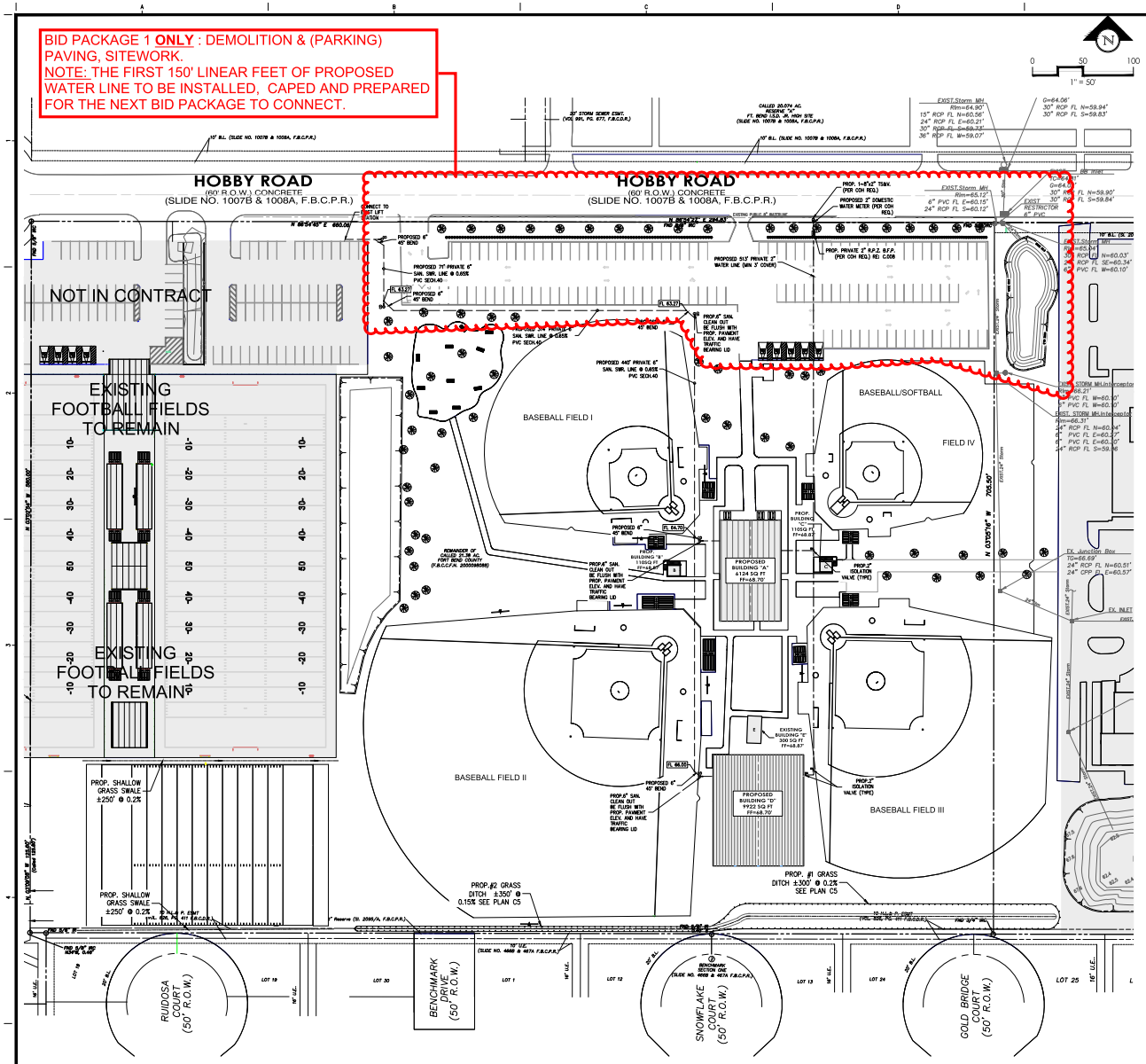
100% CD	02/18/2022
CITY COMMENT	04/20/22
ISSUE FOR BID	09/07/2022

GRADING PLAN

C3

Wednesday, April 20, 2022 3:40 PM, Reda, ARCH full bleed D (24.00 x 36.00 Inches), Z:\PROJECTS\2021\M21120-FBC_HOBBY\CAD & BIM DRAWINGS\CIVIL 04-07-22\GRADING.dwg

BID PACKAGE 1 **ONLY** : DEMOLITION & (PARKING) PAVING, SITEWORK.
NOTE: THE FIRST 150' LINEAR FEET OF PROPOSED WATER LINE TO BE INSTALLED, CAPED AND PREPARED FOR THE NEXT BID PACKAGE TO CONNECT.



GENERAL UTILITIES NOTES
(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

1. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL UTILITY TIE IN LOCATIONS, MATERIAL, SIZE, ELEVATION AND FIELD CONDITIONS. NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THOSE SHOWN ON THE DRAWINGS.
2. NO CONNECTIONS SHALL BE MADE TO EXISTING PUBLIC WATER LINES OR PUBLIC SANITARY SEWERS UNTIL ALL PROPOSED WATER OR SEWER LINES HAVE BEEN THOROUGHLY CLEANED, TESTED (AS REQUIRED) AND APPROVED BY THE APPROPRIATE AUTHORITIES.
3. ALL UTILITIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST LOCAL AND FEDERAL PERTAINING REGULATIONS AND STANDARDS.
4. ALL SANITARY AND WATER CROSSINGS SHALL BE IN COMPLIANCE WITH TCEQ PERTAINING PROVISIONS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR SAFELY SHORING ALL TRENCHES, IN COMPLIANCE W/ OSHA.

SANITARY SEWER SYSTEM NOTES
(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

LINE SIZE AND DEPTH

1. SERVICE LEADS SHALL BE 6–INCHES IN DIAMETER (MINIMUM).
2. SEWER LINE SHALL BE LAID WITH THE TOP OF THE PIPE A MINIMUM OF 3–FEET BELOW THE SURFACE OF THE NATURAL GROUND WITHOUT SIDE DITCHES, U.O.N. WHERE THE MINIMUM COVER IS NOT POSSIBLE, THE SEWER SHALL BE LAID WITH CLASS 150 (150 PSI) PRESSURE PIPE WITH CEMENT–STABILIZED SAND BACKFILL PER PERTAINING STANDARD DETAILS.
3. SERVICE LEADS SHALL HAVE A GRADES AS FOLLOWING:
   4–6 INCH: MINIMUM 1.00% (1/8" PER FOOT) GRADE, RECOMMENDED 2.00% (1/4" PER FOOT)
   8–UP INCH: MINIMUM 0.50% (1/16" PER FOOT) GRADE, RECOMMENDED 1.00% (1/4" PER FOOT)

PIPE MATERIAL

SANITARY SEWER PIPE USED FOR CONNECTION TO SEWER IN PUBLIC RIGHT–OF–WAY SHALL BE C900 P.V.C. PIPE MEETING ASTM SPECIFICATION D3034 WITH RUBBER GASKET JOINTS. ALL OTHER PRIVATE SANITARY SEWER PIPE MATERIAL SHALL CONFORM TO ONE OF THE FOLLOWING STANDARDS U.N.O.:

A) POLYVINYL CHLORIDE (PVC) SCHEDULE 40 TO BE USED FOR PIPE SIZES 6 INCHES AND SMALLER.
B) POLYVINYL CHLORIDE (PVC) STANDARD DIMENSION RATIO (SDR) 35 OR 26 TO BE USED FOR PIPE SIZES 8 INCHES AND LARGER. SEE NOTE BELOW.

– PIPE SHALL BE BEDDED WITH A MINIMUM OF ONE FOOT OF CEMENT STABILIZED SAND. CEMENT STABILIZED SAND SHALL BE LAID IN 6" LIFTS COMPACTED TO 95% STANDARD PROCTOR OF MAXIMUM DRY DENSITY.
– A CHEMICAL WASTE SYSTEM SHALL BE COMPLETELY SEPARATED FROM THE SANITARY SYSTEM.

MANHOLES

4. ALL MANHOLE FRAMES AND COVERS ARE TO BE FLUSH WITH PROPOSED FINISHED WALKS, PAVED AREAS, SWALES, etc. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING TO BE SET 3" TO 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER GRADING OPERATIONS.
5. MANHOLES LOCATED WITHIN THE 100–YEAR FLOODPLAIN AND MANHOLES LOCATED WITHIN DRIVEWAYS SHALL BE SEALED AND VENTED PER TCEQ REQUIREMENTS. ENGINEERING JUDGMENT AND AESTHETICS SHOULD BE CONSIDERED.
6. WHEN ROUTING A SERVICE LEAD TO A MANHOLE, THE WALL PENETRATION SHALL NOT BE GREATER THAN 10–INCHES IN DIAMETER AND SHALL BE SEALED USING APPROVED WATER STOP AND GROUT.
7. ALL SEWER LINES ENTERING A MANHOLE AT A FLOWLINE HIGHER THAN 2' OR 24" ABOVE THE MANHOLE INVERT MUST BE PROVIDED WITH A DROP PIPE OUTSIDE OF THE MANHOLE.
8. ALL MANHOLES ARE TO BE CONSTRUCTED TO ALLOW FOR A MINIMUM OF 1 FOOT OF VERTICAL ADJUSTMENT.

CLEAN–OUTS

1. CLEANOUTS SHALL BE DESIGNED TO BE GAS/WATERTIGHT.
2. BUILDING SEWERS SHALL BE PROVIDED WITH CLEANOUTS LOCATED NOT MORE THAN 100–FEET (75–FEET RECOMMENDED) APART MEASURED FROM THE UPSTREAM ENTRANCE OF THE CLEANOUT.
3. A CLEANOUT SHALL BE PROVIDED FOR EACH CHANGE OF DIRECTION EXCEEDING 45 (135) DEGREE.
4. THERE SHALL BE A CLEANOUT NEAR THE JUNCTION OF THE BUILDING DRAIN AND THE BUILDING SEWER. THE CLEANOUT SHALL BE EITHER INSIDE OR OUTSIDE THE BUILDING WALL AND SHALL BE BROUGHT UP TO THE FINISHED GROUND LEVEL OR TO THE FLOOR LEVEL. AN APPROVED TWO–WAY CLEANOUT IS ALLOWED TO BE USED AT THIS LOCATION TO SERVE BOTH THE BUILDING DRAIN AND BUILDING SEWER.
5. EVERY CLEANOUT SHALL BE INSTALLED TO OPEN TO ALLOW CLEANING IN THE DIRECTION OF THE FLOW OF THE DRAINAGE PIPE OR AT RIGHT ANGLES THERETO.
6. CLEANOUTS INSTALLED UNDER CONCRETE OR ASPHALT PAVING SHALL BE MADE ACCESSIBLE BY YARD BOXES OR BY EXTENDING FLUSH WITH PAVING WITH APPROVED MATERIALS AND SHALL BE ADEQUATELY PROTECTED.
7. CLEANOUTS SHALL BE THE SAME NOMINAL SIZE AS THE PIPE THEY SERVE UP TO 4 INCHES (102 MM). FOR PIPES LARGER THAN 4 INCHES (102 MM) NOMINAL SIZE, THE SIZE OF THE CLEANOUT SHALL BE NOT LESS THAN 4 INCHES (102 MM).
8. CLEANOUTS ON 6–INCH AND SMALLER PIPES SHALL HAVE A CLEARANCE OF MIN. 18–INCHES (457 MM) FOR RODDING. 8–INCH AND LARGER PIPES SHALL BE PROVIDED WITH A CLEARANCE OF MIN. 36–INCHES.

DOMESTIC WATER SYSTEM NOTES
(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

1. CONCRETE THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY TO PREVENT PIPE MOVEMENT.
2. ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12 INCHES OVER PIPE AND BACKFILLED WITH CEMENT STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE U.N.O.
3. WHERE A WATERLINE CROSSES ANOTHER UTILITY OTHER THAN A SANITARY SEWER, A MINIMUM OF 6–INCHES OF CLEARANCE MUST BE MAINTAINED.
4. ALL WATER LINE INSTALLED OVER 6' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS.
5. DO NOT PLACE WATERLINE APPURTENANCES UNDER PAVEMENT, POND OR LAKE, INSIDE RAMPS OR AT CURB.
6. DO NOT INSTALL STUB OUTS FOR FUTURE WATER SERVICES, UNLESS MENTIONED.
7. CONTRACTOR SHALL KEEP WATER PIPE CLEAN AND CAP (OR OTHERWISE EFFECTIVELY COVER) OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.
8. PIPE MATERIALS
   A. 3/4" THRU 2" WATER LINES SHALL BE CONTINUOUS TYPE K COPPER TUBING U.N.O.
   B. 2" THRU 4" WATER LINES SHALL BE P.V.C. SCHEDULE 40 U.N.O.
   C. 4" THRU 12" WATER LINES SHALL BE P.V.C. C–900 CLASS 150 DR–18, AWWA U.N.O.
   D. 4" THRU 54" D.I.P. WATER LINES SHALL BE AWWA C151 (ANSI A21.51) AND DOUBLE WRAPPED IN 8–MIL POLYETHYLENE U.N.O. PIPE SHALL BE LINED IN ACCORDANCE WITH THE AWWA C104 (ANSI A21.4).
   WATER SERVICE PIPE SHALL CONFORM TO NSF 61 AND SHALL CONFORM TO ONE OF THE STANDARDS LISTED IN TABLE 605.3 OF INTERNATIONAL PLUMBING CODE (IPC).
   WATER SERVICE PIPING MATERIALS NOT THIRD–PARTY CERTIFIED FOR WATER DISTRIBUTION SHALL TERMINATE AT OR BEFORE THE FULL OPEN VALVE LOCATED AT THE ENTRANCE TO THE STRUCTURE.

WATER METERS

1. LOCATE METERS IN AREAS WITH EASY ACCESS AND WITH PROTECTION FROM TRAFFIC AND ADJACENT TO RIGHTS–OF–WAY WHENEVER POSSIBLE.
2. DO NOT LOCATE METERS IN AREAS ENCLOSED BY FENCES.
3. PROVIDE CONCRETE METER BOXES FOR METERS LOCATED UNDER SIDEWALKS.

LEGEND

- PROPERTY LINE
- LOT LINE
- EASEMENT
- WATERLINE
- NPW — NON–POTABLE WATERLINE
- SANITARY SEWER LINE
- SS — SANITARY SEWER FORCE MAIN
- F — PROPOSED FIRE LINE
- GAS — GAS LINE
- COMM — UNDERGROUND COMMUNICATION UTILITY
- UG — UNDERGROUND OTHER UTILITIES
- P — OVERHEAD POWER LINE
- ABANDONED UTILITY
- CATCH BASIN / JUNCTION BOX
- EXIST.=FILLED PROP.=OPEN — MANHOLE
- CO — CLEAN–OUT
- GAS METER
- W — WATER METER
- EXIST.=FILLED PROP.=OPEN — VALVE
- EXIST.=FILLED PROP.=OPEN — FIRE HYDRANT

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Project No: 4002–006

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TBPE NO.: F–8029

STATE OF TEXAS — NIKEMDI I. OHALETE — 79428 — REGISTERED — CIVIL — 6/14/22

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:
Drawn:
Checked:
Scale:
ACAD File:

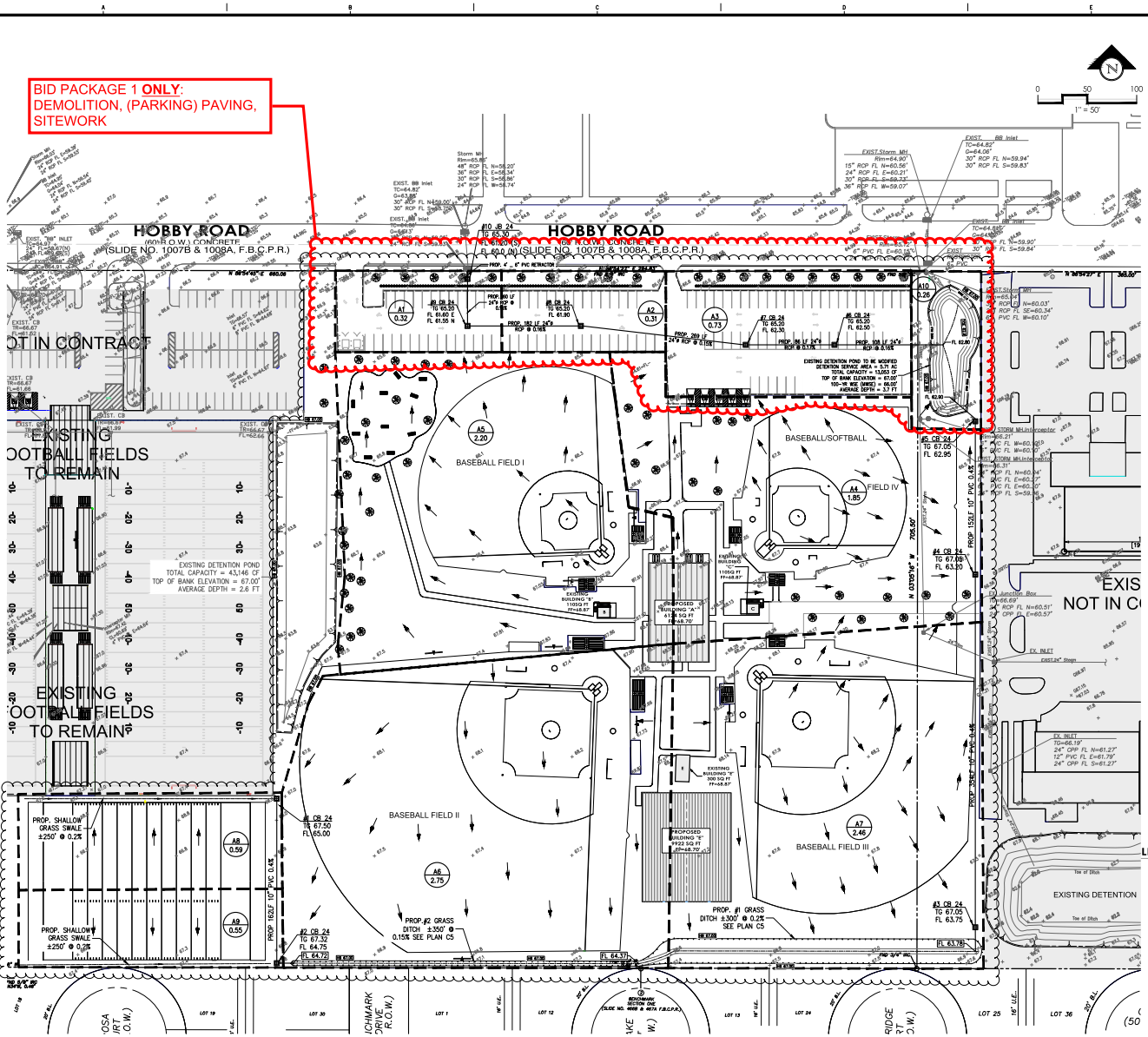
Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
CITY COMMENT	11/22/2021
100% CD	02/18/2022
ISSUE FOR BID	09/07/2022

UTILITY PLAN

C3-1

Tuesday, June 14, 2022 2:30 PM, Nedu, ARCH full bleed D (24.00 x 36.00 Inches), Z:\PROJECTS\2021\#E2120–FBC_HOBBY\CAD & BIM DRAWINGS\CIVIL 04–07–22\UTILITY PLAN.dwg



STORM SEWER SYSTEM NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

1. PIPE CULVERTS SHALL CONFORM TO ASTM SPECIFICATION C-76, CLASS III, FOR R.P.C.
2. STORM WATER DISCHARGING FROM A DITCH INTO A STORM SEWER SYSTEM MUST BE INTERCEPTED BY USE OF AN APPROPRIATE STRUCTURE (I.E., STUBS WITH RING GRATES OR TYPE "C" MANHOLES).
3. A MINIMUM DISTANCE OF TWO FEET (2') SHALL BE ESTABLISHED AND MAINTAINED BETWEEN THE RIGHT-OF-WAY LINE AND THE ADJACENT EDGE OF THE BANK OF A DITCH.
4. MATCH CROWNS OF PIPE AT ANY SIZE CHANGE UNLESS SEVERE DEPTH CONSTRAINTS PROHIBIT.
5. MINIMUM VERTICAL CLEARANCE BETWEEN ANY STORM PIPE OR BOX AND OTHER CROSSING PUBLIC OR PRIVATE UTILITIES SHALL BE AT LEAST 6-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY.
6. ALL STORM SEWERS UNDER OR WITHIN THREE (3) FT. OF PROPOSED OR FUTURE PAVEMENTS SHALL BE BACKFILLED WITH NO LESS THAN 1-1/2 SACKS OF CEMENT PER TON OF CEMENT STABILIZED SAND TO WITHIN ONE (1) FT. OF SUBGRADE.
7. ROOF DRAINS SHOULD PREFERABLY DISCHARGE TO STORM SEWER BY CLOSED PIPE OR EXTENDED AWAY FROM THE STRUCTURES BY 5 FEET OR AS FAR A POSSIBLE.

PIPE MATERIAL

A. STORM SEWER PIPE USED FOR CONNECTION TO STORM SEWER IN PUBLIC RIGHT-OF-WAY OR CONSTRUCTED WITHIN PUBLIC EASEMENT SHALL BE REINFORCED CONCRETE PIPE ASTM C-76, CLASS III, WITH O-RING JOINT PER ASTM C-443 AND SHALL EXTEND TO FIRST PRIVATE CATCH BASIN, INLET OR MANHOLE.

B. ALL OTHER PRIVATE STORM SEWER MAY BE SELECTED PER FOLLOWING CRITERIA:

a. CORRUGATED HIGH-DENSITY POLYETHYLENE (HDPE) (4 INCHES TO 48 INCHES IN DIAMETER): AASHTO M 294, DUAL WALL WITH WATER TIGHT (ASTM D3212) BELL-TO-BELL COUPLER, TRADE NAME N-12 BY ADS OR EQUAL.

b. POLYVINYL CHLORIDE (PVC) CORRUGATED PIPE WITH SMOOTH INTERIOR PER ASTM F 949 (4 INCHES TO 36 INCHES) WITH ELASTOMETRIC GASKET JOINTS. TRADE NAME A-2000 BY CONTECH OR EQUAL.

c. STEEL REINFORCED HIGH-DENSITY POLYETHYLENE (HDPE) (24 INCHES TO 48 INCHES IN DIAMETER): AASHTO M 294, HIGH PERFORMANCE JOINTS (ASTM D3212), TRADE NAME DUROMAXX OR EQUAL.

d. REINFORCED CONCRETE PIPE (RCP): ASTM C76, CLASS III WITH O-RING JOINTS PER ASTM C-443

– THE RESTRICTOR PIPE SHALL BE PVC OR OTHER MATERIAL ACCEPTABLE TO THE CITY / COUNTY.

MANHOLES / INLETS / CATCH BASINS

1. ALL MANHOLE FRAMES AND COVERS ARE TO BE FLUSH WITH PROPOSED FINISHED WALKS, PAVED AREAS, SWALES, etc. MANHOLE RIMS OUTSIDE OF PROPOSED PAVING TO BE SET 1" TO 4" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER GRADING OPERATIONS U.O.N.
2. ALL MANHOLES ARE TO BE CONSTRUCTED TO ALLOW FOR A MINIMUM OF 1 FOOT OF VERTICAL ADJUSTMENT.
3. CORED OR BLOCKED OUT PIPE OPENINGS MUST BE DESIGNED TO CLOSELY FIT THE OUTSIDE DIAMETER OF THE PROPOSED TIE IN AND SHALL BE SEALED USING APPROVED WATER STOP AND/OR GROUT.
4. ALL PRECAST MANHOLES AND INLETS BOXES MUST CONFORM TO ASTM C 913. PRECAST MANHOLES WITH THIN-WALL KNOCKOUTS TO ACCOMMODATE A RANGE OF PIPE SIZES WILL NOT BE ALLOWED IN THE RIGHT-OF-WAY.
5. FOR PRIVATE DEVELOPMENT WITH INTERNAL SITE DRAINAGE, ONLY ONE CONNECTION IS PERMITTED TO ANY ONE INLET, AND THAT CONNECTION (LEAD) SHALL BE MADE TO THE BACK OF THE INLET. CONNECTION SHALL NOT BE MADE TO THE FRONT FACE AND TO THE SHORT SIDES OF THE INLET UNLESS APPROVED BY THE ENGINEER/ CITY/ COUNTY.
6. FOR NEW CONNECTIONS TO CURBSIDE INLETS, EXISTING B INLETS SHALL BE ENLARGED TO 8B INLETS. B INLETS ARE NOT ALLOWED U.O.N.
7. DO NOT USE "RECHNIC" GRATE INLETS OR OTHER "SPECIALTY" INLETS.
8. DO NOT USE UNPROTECTED GRATE-TOP INLETS IN UNLINED ROADSIDE DITCH.

NOTE ON DETENTION FACILITIES:

1. STORMWATER DETENTION PONDS & SWALES SHOULD BE DESIGNED, ENGINEERED, CONSTRUCTED AND MAINTAINED FOR A MAXIMUM 48-HOUR DETENTION PERIOD AFTER THE DESIGN STORM AND REMAINS COMPLETELY DRY BETWEEN STORMS.
2. THE APPLICANT AND/OR OWNER, OR HEIRS AND ASSIGNS, SHALL BE RESPONSIBLE FOR THE PROPER OPERATION AND MAINTENANCE OF THE DETENTION BASIN AND STORMWATER MANAGEMENT FACILITIES FOR A PROPERTY.
3. SUBSURFACE DRAINAGE SYSTEM ARE REQUIRED TO BE DRAINED IN 48 HOURS.

FLOOD HAZARD WARNING SIGN:

CONTRACTOR TO PROVIDE THE PAVED PARKING AREAS WITH MULTIPLE SIGNAGE STATING THAT THE AREA IS SUBJECT TO FLOODING DURING SEVER RAINFALL EVENTS.
THE SIGNS SHALL HAVE A MINIMUM AREA OF 1.5 SQUARE FEET AND CONTAINING THE FOLLOWING MESSAGE:

WARNING

THIS AREA IS A DETENTION BASIN AND IS SUBJECT TO PERIODIC FLOODING TO A DEPTH OF 9 INCHES.

LEGEND

- PROPERTY LINE
- LOT LINE
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- DRAINAGE AREA LIMITS
- OFF-LINE DRAINAGE AREA LIMITS
- DRAINAGE SWALE
- DITCH TOP OF BANK
- CHANNEL TOP OF BANK
- CHANNEL TOE OF BANK
- CHANNEL CENTERLINE
- POND BOTTOM (TOE)
- BASIN GRADE SLOPE
- OFF-SITE RUNOFF DIRECTION
- PROPOSED CATCH BASIN / JUNCTION BOX
- MANHOLE
- CLEAN-OUT
- DRAINAGE AREA INFO (DRAINAGE AREA DESIGNATION A9 / 9.999)

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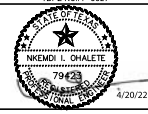

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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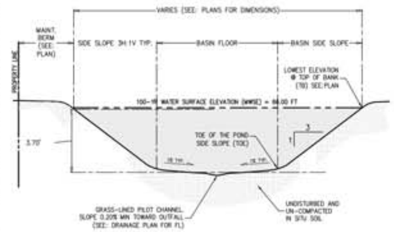
Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
CITY COMMENT	11/22/2021
100% CD	02/18/2022
CITY COMMENT	04/20/22
ISSUE FOR BID	09/07/2022

DRAINAGE PLAN

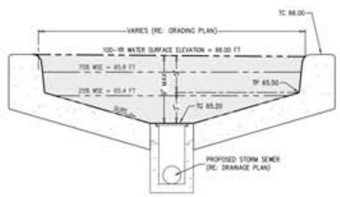
C4

Wednesday, April 20, 2022 3:42 PM, Nedu, ARCH full bleed D (24.00 x 36.00 Inches), I:\1PROJECTS\2021\ne2125--fbc_hobby\cad & bim drawings\plot 04-07-22\DRAINAGE PLAN.dwg

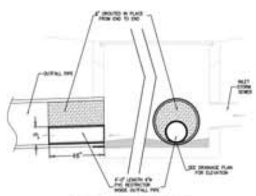


1. BASINS SHALL BE MAINTAINED TO PERFORM AS DESIGNED FOR THE LIFE OF THE PROJECT AND SHALL NOT BE CONVERTED TO A DIFFERENT USE WITHOUT AN APPROVAL.
2. THE DEPTH OF DETENTION POND SHALL BE INSPECTED ANNUALLY. DESIGN VOLUME SHALL BE RESTORED WHEN THE DEPTH OF SEDIMENT EXCEEDS 6" ANYWHERE ABOVE THE ELEVATIONS SHOWN ON PLANS HEREON.
4. INLET AND OUTLET LOCATIONS SHALL BE MAINTAINED FREE OF OBSTRUCTIONS. DEBRIS AND TRASH SHALL BE REMOVED FROM THE BASIN AT LEAST ANNUALLY.
5. THE DETENTION POND SHALL BE INSPECTED ANNUALLY AND AFTER STORM EVENTS TO ENSURE THAT POSITIVE DRAINAGE IS MAINTAINED FOR BASINS THAT DO NOT INCLUDE RETENTION VOLUME. SLOPES SHALL BE MAINTAINED TO THE ORIGINAL DESIGN CONFIGURATION.
5. 95% TURF GERMINATION SHALL BE ACHIEVED ON THE MAINTENANCE BERMS, SIDE SLOPES, AND BOTTOM TO PREVENT EROSION.

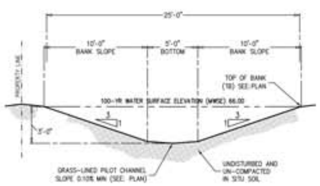
(1) TYPICAL DRY DETENTION BASIN CROSS-SECTION
N.T.S.



(1) TYPICAL PAVEMENT DETENTION CROSS-SECTION
N.T.S.

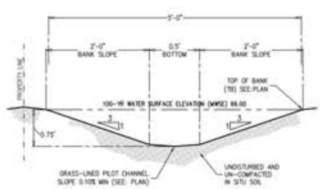


(2) TYPICAL RESTRICTOR PIPE DETAIL
N.T.S.



(A) DITCH "D1" CROSS-SECTION
N.T.S.

Width B (ft)		Length	Depth (ft)			Slope			A	P	R	Q	Q_T	V
Top	Bottom	L (ft)	Initial	End	H	Side (to 1)	Channel	n	(sf)	(ft)	(ft)	(cfs)	(cf)	(fps)
25.00	5.00	330.00	3.00	3.50	3.25	3.00	1.00%	0.013	48.75	25.55	1.91	857.1394	16,088	17.582



(A) DITCH "D2" CROSS-SECTION
N.T.S.

Width B (ft)		Length	Depth (ft)			Slope			A	P	R	Q	Q_T	V
Top	Bottom	L (ft)	Initial	End	H	Side (to 1)	Channel	n	(sf)	(ft)	(ft)	(cfs)	(cf)	(fps)
5.00	0.50	350.00	0.66	0.86	0.76	3.00	1.00%	0.013	2.09	5.31	0.39	12.8363	732	6.142

Peak Storm Runoff Calculations
(RATIONAL METHOD)

Watershed Area

- Total Area of Tract: 12.0167 Acres
- **Area affected in this phase of development (A):** **12.0167 Acres**

Time of concentration (Tc)

Tc = 10 x A^0.1761 + 15

Tc = 10 x (12.0167 ^ 0.1761) + 15 = 30.49 min, Initial Time = 10.00 min

Time of concentration (Tc) = 40.49 min

Rainfall Intensity (I)

I = b / (d + Tc)^e

	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
e	0.7244	0.69	0.6623	0.6294	0.6096	0.5797
b (in)	48.31	52.32	54.68	57.79	61	60.66
d(min)	9.27	7.88	7.88	5.89	5.46	4.44

$I_{2\text{-}YR}$ = 2.86 in/hr
$I_{10\text{-}YR}$ = 4.19 in/hr
$I_{100\text{-}YR}$ = 6.68 in/hr

Watershed Coefficient (C)

C = 0.6 Ir + 0.2 where: Ir = impervious area / total area

- **Pre - Development Condition A_E :**
  - Roof: 2,356 s.f.
  - Pavement: 40,647 s.f.
  - Sidewalk: 11,042 s.f.
  - Dry Grass Pond (15% Imp.): - s.f.
  - A_E = 62,045 s.f. or 1.4244 ac
  - Ir = 0.1185 ==> **C_{EXIST} = 0.6 x 0.1185 + 0.2 = 0.27**
- **Post - Development Condition A_{PR} :**
  - Roof: 14,089 s.f.
  - Pavement: 40,647 s.f.
  - Sidewalk: 13,200 s.f.
  - Dry Grass Pond (15% Imp.): 5,489 s.f.
  - A_{PR} = 81,425 s.f. or 1.8693 ac
  - Ir = 0.1556 ==> **C_{PROP} = 0.6 x 0.1556 + 0.2 = 0.29**

Peak Runoff (Q)

Q = I x (CA)

- **Pre - Development Condition (Q_{EXIST}) :**
  - $Q_{(2\text{-}YR)}$ = 2.86 x (0.27 x 12.0167) = **9.2793 cfs**
  - $Q_{(100\text{-}YR)}$ = 6.68 x (0.27 x 12.0167) = **21.6733 cfs**
- **Post - Development Condition (Q_{PROP}) :**
  - $Q_{(2\text{-}YR)}$ = 2.86 x (0.29 x 12.0167) = **9.9667 cfs**
  - $Q_{(100\text{-}YR)}$ = 6.68 x (0.29 x 12.0167) = **23.2788 cfs**

RESTRICTOR ORIFICE CALCULATIONS

- Detention Basis 100% (Full) Capacity = 61,439 c.f.
- Detention Basis 75% Capacity = 0.75 x 61439 = 46,079 c.f.
- Detention Basis 25% Capacity = 0.25 x 61439 = 15,360 c.f.
- Detention basin water depth for 100% of capacity = MWSE = 66.00 ft
- Detention basin water depth for 75% of capacity = $WSE_{75\%}$ = 65.23 ft
- Detention basin water depth for 25% of capacity = $WSE_{25\%}$ = 63.68 ft
- Primary Orifice Bottom Flow Line = FL = 60.00 ft

$Q = CA(2g)^{0.5}(h)^{0.5}$ and $D = Q^{0.5} / (2.25h^{0.25})$ Where:

Q = Outflow discharge (cfs)
C = Coefficient of Discharge
A = Orifice Area (sf)
h = Head, water surface differential (ft)
D = Orifice diameter (ft)
G = Gravitational Factor = 32.2 ft/s

Low level Restrictor (Primary Orifice) Calculations:

Total Drainage Area = 12.0167 Acres

- Q_{LL} = Outflow rate allowed for Low flow = 0.5 x 12.0167 = 6.0084 cfs
- H_{LL} = Water surface differential for low flow = 63.675-60-(6/24) = 3.43 ft
- C = Coefficient of Discharge = 0.80
- D_c = Calculated Orifice = (6.0084^0.5)/(2.25x3.43^0.25) = 0.80 ft or 9.60 in
- **D_{LL} = Provided Low Level (Primary) Restrictor Size : 6.00 Inches**
- a = Orifice Area = π (6/2)^2 = 0.1963 s.f.
- Q_{LL} = Flow Rate for low level restrictor = 0.8x0.1963x((2x32.2)^0.5)x((3.43*0.5)) = 2.3340 cfs

Development Information

☐ Single Family (SFR) ☐ Multi-Family Residential ☑ Commercial Development ☐ Other

Total Area of Tract: 12.0167 Acres
Total Development (Disturbed)Area (A): 12.0167 Acres

Area of Impervious Cover

	Existing					Final				
- Building:	2,356	s.f.	or	0.0541	a.c.	14,089	s.f.	or	0.3234	a.c.
- Pavement:	40,647	s.f.	or	1.1168	a.c.	40,647	s.f.	or	1.1168	a.c.
- Sidewalk/Patio/Stair:	11,042	s.f.	or	0.2535	a.c.	13,200	s.f.	or	0.3030	a.c.
- Detention Pond:	-	s.f.	or	-	a.c.	5,489	s.f.	or	0.1260	a.c.
- Pool:	-	s.f.	or	-	a.c.	-	s.f.	or	-	a.c.
Total Area	62,045	s.f.	or	1.4244	a.c.	81,425	s.f.	or	1.8693	a.c.

Percentage of Impervious Cover: Existing = 11.85% Final = 15.56%

Required Detention Volume (V_T)

Detention volume criteria utilized per COH IDM :
Ref: Detention Volume for Drainage Area Less Than 50 Acres
NO DETENTION REQUIRED

V_T = [43,560 x (Detention Rate x A_{IJ})] = 43,560 x 0.75 x 1.8693

V_T = Total Detention Volume for the proposed project (Cubic Feet)
A_{IJ} = Total Disturbed area that results in impervious surface (Acres)
A_{IJ} = 1.8693 Acres Detention Rate Required = 0.75 ac-ft/ac

- Total Detention Required V_T = 61,070 c.f. 1.4020 Acre-ft

Provided Detention Volume

100-YR Peak Water Surface Elevation (MWSE) = 66.00 ft

Pavement Detention

#	Area (s.f.)	TC (ft)	TP (ft)	TG (ft)	D1 (ft)	D2 (ft)	D (ft)	V (Volume)	
P1	40,647	66.00	65.50	65.20	0.45	0.30	0.55	26,756	c.f.

TP: Top of Pavement elevation; TG: Inlet Top of Grate elevation; D1= MWSE - TP; D2= TP - TG; D=(1/3*D2+D1); V = Area x D

Subtotal: 26,756 c.f. or 0.6142 Acre-Ft

Underground Detention System

- Circular / Elliptical Pipe:

Mult.	Rise (in)	Span (in)	L (ft)	A (sf)	Single Volume		Total Volume	
1	24	24	1,523.0	3.14	4,784.65	c.f.	4,784.65	c.f.
1	-	-	-	-	-	c.f.	-	c.f.
1	-	-	-	-	-	c.f.	-	c.f.

A = πR²

Subtotal: 4,785 c.f. or 0.1098 Acre-Ft

- CB / IB Volume:

#	Desc.	TG (ft)	FL (ft)	l	W (in)	W (ft)	D (ft)	Volume	
1	CB 24	67.50	65.00	7	22	1.83	1.92	6.44	c.f.
2	CB 24	67.32	64.75	7	22	1.83	1.99	6.68	c.f.
3	CB 24	67.05	63.75	7	22	1.83	2.72	9.13	c.f.
4	CB 24	67.05	63.20	7	22	1.83	3.27	10.98	c.f.
5	CB 24	67.05	62.95	7	22	1.83	3.52	11.82	c.f.
6	IB 24	65.20	62.50	7	22	1.83	2.12	7.11	c.f.
7	CB 24	65.20	62.30	7	22	1.83	2.32	7.79	c.f.
8	CB 24	65.20	61.90	7	22	1.83	2.72	9.13	c.f.
9	CB 24	65.20	61.55	7	22	1.83	3.07	10.31	c.f.
10	CB 24	65.30	60.00	7	22	1.83	4.72	15.85	c.f.

TG: Top of grate elevation; W: Inner width of Inlet structure; D: Depth of Inlet structure

Subtotal: 95 c.f. or 0.0022 Acre-Ft

Channel / Ditch / Swale Capacity:

Width B (ft)		Length	Depth (ft)			Slope		Volume (cf)
Top	Bottom	L (ft)	Initial	End	H	Side (to 1)	Channel	
25.00	5.00	330.00	3.00	3.50	3.25	3.00	1.00%	16,000
5.00	2.50	350.00	0.66	0.86	0.76	3.00	1.00%	750

Subtotal: 16,750 c.f. or 0.3845 Acre-Ft

Detention Pond:

Surface Area: 5,489.00 s.f.
Bottom Area: 1,001.00 s.f.
Finished Grade Highest Elevation: 67.00 ft
Outfall Flow Line: 62.00 ft
Average Depth: 3.70 ft

Subtotal: 13,853 c.f. or 0.2997 Acre-Ft

- Total Detention provided: 61,439 c.f. or 1.4104 Acre-Ft

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TBPE NO.: F-8029

STATE OF TEXAS
NKEMDI I. OHALETE
4/20/22

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MEP ENGINEER
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX
5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:
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Revisions:

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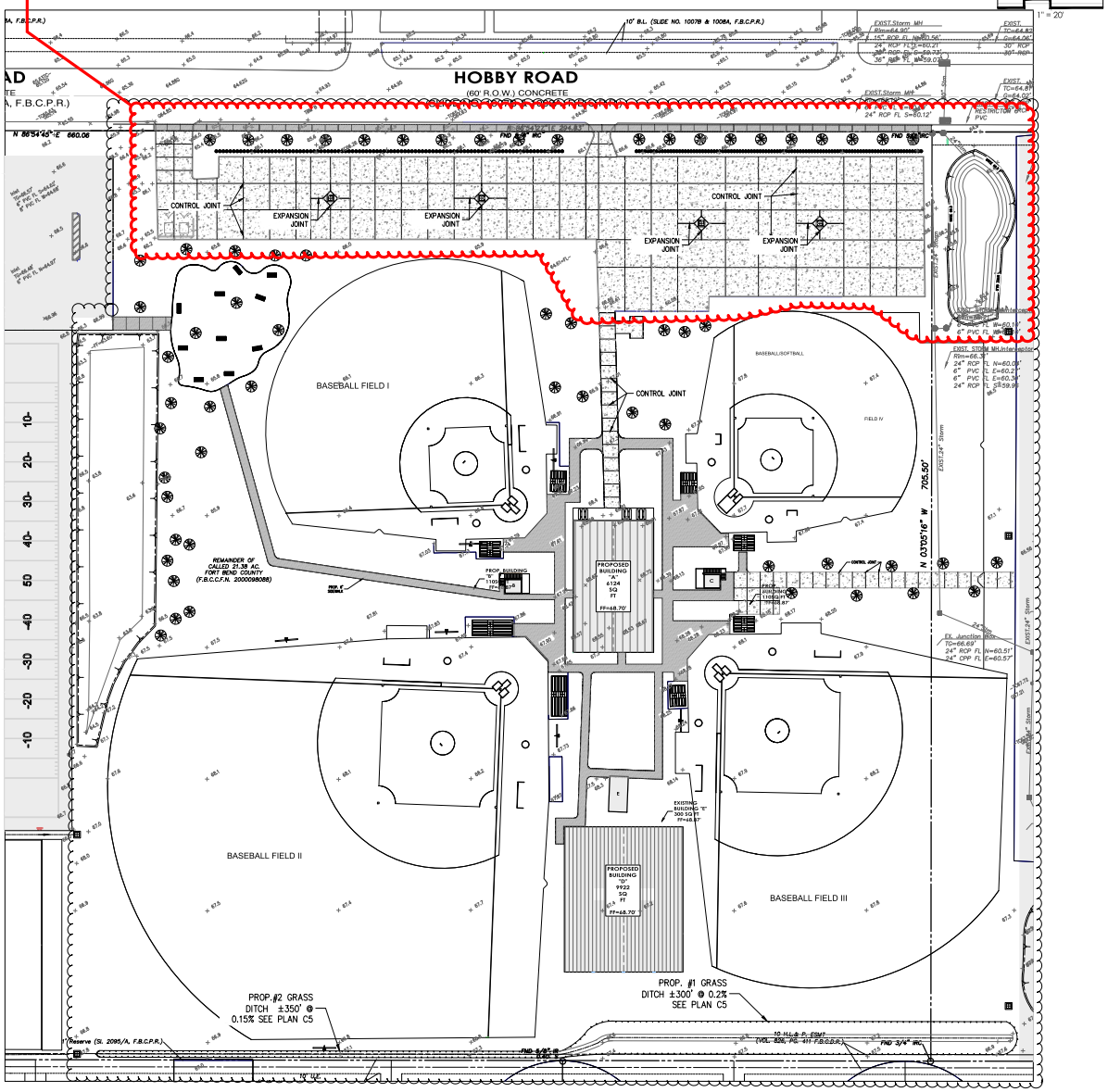
100% CD	02/18/2022
CITY COMMENT	04/20/22
ISSUE FOR BID	09/07/2022

DRAINAGE CALC.

C5



BID PACKAGE 1 **ONLY**: DEMOLITION AND PARKING PAVING, SITEWORK

GENERAL PAVING NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN GEOTECHNICAL REPORT, DETAILS AND/OR SPECIFICATIONS.)

1. PAVEMENT DESIGN AND SOIL PREPARATION RECOMMENDATIONS GIVEN IN THE GEOTECHNICAL REPORT PROVIDED BY THE OWNER SHALL BE ADHERED TO FOR BOTH MATERIALS AND PRACTICE OF INSTALLATION:
   TITLE: XXX
   PREPARED BY: XXX
   PROJECT NO: XXX
   DATE: XXX
2. CONTRACTOR SHALL FURNISH ALL PAVEMENT MARKINGS FOR FIRE LANES, ROADWAY LANES, PARKING STALLS, HANDICAPPED PARKING SYMBOLS, ACCESS AISLES, STOP BARS AND SIGNS, AND MISCELLANEOUS STRIPING WITHIN PARKING LOT AS SHOWN ON THE PLANS.
2. THE MATERIALS AND PROPERTIES OF CONCRETE SHALL MEET THE APPLICABLE REQUIREMENTS IN THE A.C.I. (AMERICAN CONCRETE INSTITUTE) MANUAL OF CONCRETE PRACTICE AS WELL AS LOCAL STANDARDS.
3. GOOD DRAINAGE SHOULD REDUCE THE POSSIBILITY OF THE SUBGRADE MATERIALS BECOMING SATURATED DURING THE NORMAL SERVICE PERIOD OF THE PAVEMENT.
4. ANY DAMAGED PAVING, CURBS AND/OR SIDEWALK WILL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE TO THE SATISFACTION OF THE ENGINEER AND OWNER.
5. BEFORE PLACING PAVEMENT, CONTRACTOR SHALL VERIFY THAT SUITABLE HANDICAPPED ROUTES (PER A.D.A. & T.A.S) EXIST TO AND FROM EVERY DOOR IN NO CASE SHALL:
   A. HANDICAP RAMP SLOPES EXCEED 1 VERTICAL TO 12 HORIZONTAL.
   B. SIDEWALK CROSS SLOPES EXCEED 2.0 PERCENT.
   C. LONGITUDINAL SIDEWALK SLOPES EXCEED 5.0 PERCENT.

   CONTRACTOR SHALL CONTACT ENGINEER PRIOR TO PAVEMENT CONSTRUCTION IF ANY SLOPES EXCEED THE ABOVE LIMITS.

PAVING

THE TRAFFIC LIKELY TO USE THE PAVEMENT WILL GENERALLY CONSIST OF LIGHT TRUCK TRAFFIC FOR MAIN DRIVES AND HEAVY DUTY (DRIVES) PAVEMENTS TO ACCOMMODATE OCCASIONAL HEAVIER LOADINGS DUE TO FIRE TRUCKS AND DELIVERY VEHICLES. THE RECOMMENDED PAVEMENT SECTIONS PROVIDED ABOVE ARE CONSIDERED THE MINIMUM NECESSARY TO PROVIDE SATISFACTION THEY PERFORMANCE BASED ON THE PROVIDED TRAFFIC LOADING. IN SOME CASES, JURISDICTIONAL MINIMUM STANDARDS FOR PAVEMENT SECTION CONSTRUCTION MAY EXCEED THOSE PROVIDED BELOW.

PAVEMENT SUBGRADE

EXISTING FILL SOILS WERE ENCOUNTERED TO A DEPTH OF ABOUT 2 FEET BELOW THE EXISTING SITE GRADES WITHIN PORTIONS OF THE PROJECT SITE. THE DEGREE OF COMPACTION MUST BE CAREFULLY EVALUATED DURING THE CONSTRUCTION. PROPOSED PAVED AREAS SHOULD BE PROOFROLLED WITH HEAVY COMPACTION EQUIPMENT WITH LOAD OF AT LEAST 25 TONS TO ATTEMPT TO LOCATE SOFT OR UNSUITABLE SOILS SO THEY CAN BE REMOVED AND REPLACED WITH PROPERLY PLACED AND COMPACTED SOILS. PUMPING OR RUTTING IDENTIFIED DURING PROOFROLL SHOULD BE CONDUCTED IN ACCORDANCE WITH TXDOT STANDARD SPECIFICATION ITEM 216. THE PROOFROLLING OPERATIONS SHOULD BE OBSERVED BY THE REPRESENTATIVE OF GEOTECHNICAL ENGINEER OF RECORD.

IF LIME IS USED, WE ESTIMATED APPROXIMATELY 6% HYDRATED LIME (BY DRY WEIGHT OF SOIL) BE USED TO MODIFY AND STABILIZE THE CLAY SUBGRADE SOILS. THE APPLICATION RATE CORRESPONDING TO THIS ADDITIVE AMOUNT WOULD BE APPROXIMATELY 27 POUNDS PER SQUARE YARD FOR EACH 6IN-INCH OF COMPACTED THICKNESS. THE HYDRATED LIME SHOULD MEET THE REQUIREMENTS OF ITEM 264 (TYPE A) IN THE TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES, AND SHOULD BE THOROUGHLY MIXED AND BLENDED WITH THE UPPER 6 INCHES OF THE CLAY SUBGRADE (TXDOT ITEM 260). THIS MIXTURE SHOULD BE UNIFORMLY COMPACTED TO A MINIMUM OF 95% OF ITS MAXIMUM STANDARD PROCTOR DRY DENSITY (ASTM D 698) AT A MOISTURE CONTENT WITHIN OPTIMUM AND +3% ABOVE OPTIMUM AS DETERMINED BY THAT TEST. LIME TREATMENT SHOULD EXTEND AT LEAST 1 FOOT BEYOND PAVEMENT EDGES TO REDUCE THE EFFECTS OF SHRINKAGE AND ASSOCIATED LOSS OF SUBGRADE SUPPORT. DENSITY TESTS SHOULD BE PERFORMED AT A FREQUENCY OF 1 TEST PER 5,000 SQUARE FEET OF PAVEMENT. THE ACTUAL AMOUNT OF LIME REQUIRED SHOULD BE CONFIRMED BY ADDITIONAL LABORATORY TESTS (LIME SERIES) DURING THE CONSTRUCTION PHASE.

CONCRETE PAVEMENT DESIGNATION

SPECIFIC TRAFFIC LOADING INFORMATION WAS NOT PROVIDED; HOWEVER, LIGHT DUTY (AUTOMOBILE PARKING) PAVEMENTS ARE EXPECTED TO RECEIVE PASSENGER VEHICLES. OUR PAVEMENT SECTION RECOMMENDATIONS FOR HEAVY DUTY (DRIVES) PAVEMENTS SHOULD ACCOMMODATE OCCASIONAL HEAVIER LOADINGS DUE TO FIRE TRUCKS, DELIVERY VEHICLES AND LIGHT TRUCK TRAFFIC AND MAY BE CONSIDERED FOR MAIN DRIVES. CONCRETE SHOULD BE DESIGNED WITH 3 TO 6 PERCENT ENTRAINED AIR.

LIGHT & MEDIUM DUTY		6" THICK CLASS "C" CONCRETE, 3500 PSI #3 REBAR @ 18" O.C. EACH WAY 6" LIME STABILIZED SUB-GRADE**
SIDEWALK		4" THICK CLASS "A" CONCRETE, 3000 PSI #3 REBAR @ 24" O.C. EACH WAY 6" COMPACTED SUB-GRADE

** IN LIEU OF LIME STABILIZED SUBGRADE, THE PCC PAVEMENT THICKNESS MAY BE INCREASED BY 1 INCH.

PAVEMENT JOINTS

1. SUGGESTED LONGITUDINAL AND TRANSVERSE JOINT SPACING FOR CONCRETE PAVING IS 15-FEET.
2. THE EXPANSION JOINT SPACING (IF USED) IS APPROXIMATELY 60-FEET.
3. ALL JOINTS SHALL BE SEALED PER CITY/COUNTY SPECIFICATIONS. ALL JOINTS SHALL EXTEND THROUGH THE CURB.
4. NO SAWCUT OR CONSTRUCTION JOINTS IN VALLEY OR WITHIN 3-FEET OF AN INLET FRAME.
5. PLACE TRANSVERSE CONSTRUCTION JOINT WHEREVER CONCRETE PLACEMENT MUST BE STOPPED FOR MORE THAN 30 MINUTES.
6. INTENTIONAL STOPPAGE OF THE PLACING OF CONCRETE SHALL BE AT EITHER AN EXPANSION JOINT OR AT A WEAKENED PLANE JOINT. CONSTRUCTION JOINTS SHALL BE TOOLED TO A SUFFICIENT WIDTH AND DEPTH IN ORDER TO RECEIVE JOINT SEALANT MATERIAL.
7. FOR PAVEMENT SLABS WIDER THAN 28-FEET PROVIDE A LONGITUDINAL SAWED JOINT U.N.O.
8. LAY OUT JOINTS TO FORM SQUARE PANELS. IF NOT PRACTICAL, RECTANGLE PANELS CAN BE USED AS LONG AS THE LONGER SIDE DIMENSION IS NO MORE THAN 1.5 TIMES THE SHORT SIDE.
10. DO NOT DISCHARGE CONCRETE FROM THE MIXER DIRECTLY ON TOP OF OR ON THE SIDES OF THE EXPANSION JOINT ASSEMBLIES.
11. WHEN JOINT SPACING ARE NOT DETERMINED, SPACING SHOULD NOT EXCEED 2 TO 2.5 TIMES THE SLAB OR PAVEMENT THICKNESS IN FEET.
    RECOMMENDED SPACING:
    THICKNESS 4" ==> SPACING 8'-10'
    THICKNESS 5" ==> SPACING 10'-12'
    THICKNESS 6" ==> SPACING 12'-15'
    THICKNESS 7" ==> SPACING 14'-15'
    THICKNESS 8"+ ==> SPACING 15'

LEGEND

- PROPERTY LINE
- EXPANSION/ISOLATION JOINT
- CONTROL (SAW CUT) JOINT
- CONSTRUCTION/LONGITUDINAL JOINT

Thursday, April 21, 2022 4:10 PM, Neda, ARCH full bleed D (24.00 x 36.00 Inches), Y:\PROJECTS\2021\ed2120-fbc_hobby\cad & bim drawings\civil 04-07-22\PAVING.dwg

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FAX: 832-448-2466

Project No: 4002-006

CONSULTANTS:

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STATE OF TEXAS — NKEMDI I. OHALETE — 79423 — REGISTERED PROFESSIONAL ENGINEER — 4/21/22

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MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:
Drawn:
Checked:
Scale:
ACAD File:

Revisions:

DESCRIPTION	
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DESIGN DEVELOPMENT	08/23/2021
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95% CD	09/27/2021
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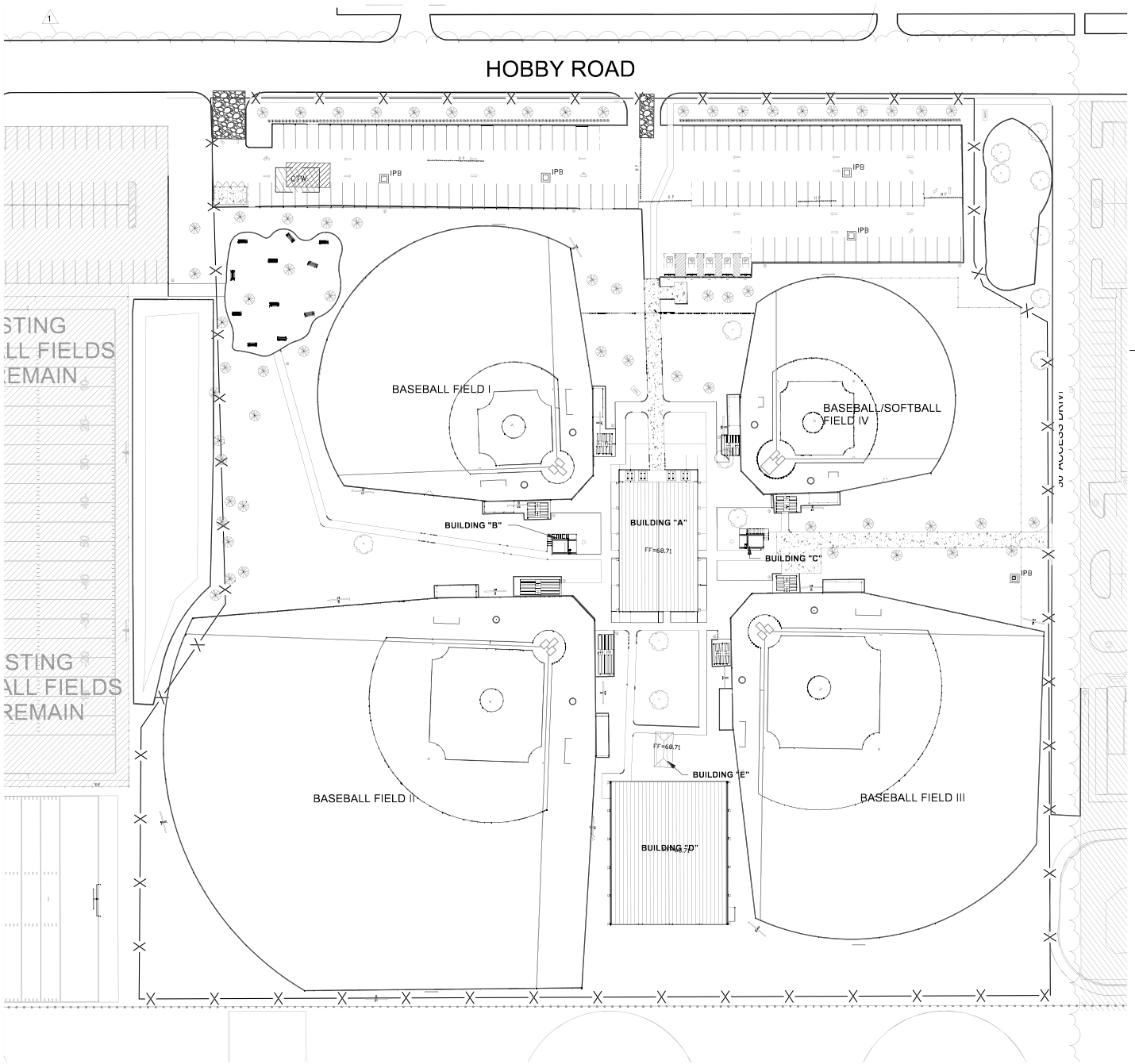
100% CD	02/18/2022
CITY COMMENT	04/20/22
ISSUE FOR BID	09/07/2022

PAVING PLAN

C6



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2/18/22

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	08/09/2021
Drawn:	MK
Checked:	NO
Scale:	1/32" = 1'-0"
ACAD File:	

Revisions:

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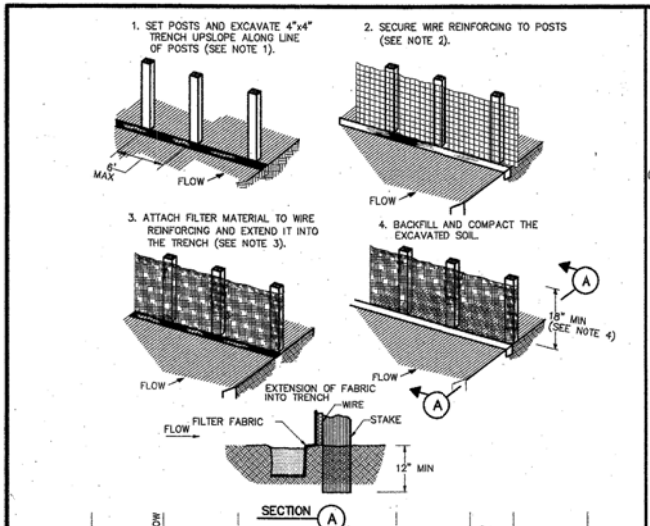
1	

SWPPP LAYOUT

C7

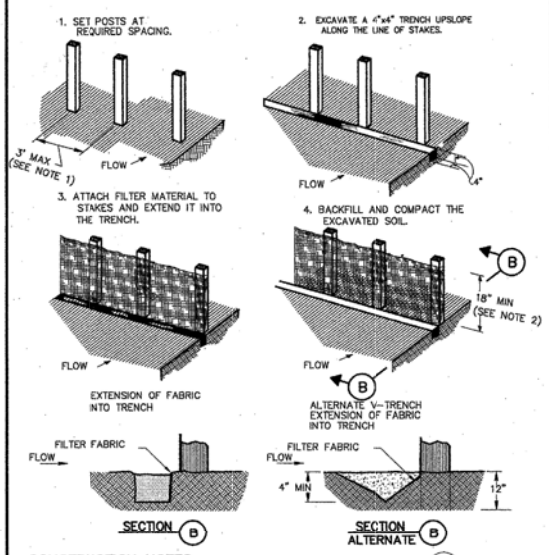


CONSTRUCTION NOTES:

1. SET 2 INCH BY 2 INCH WOODEN STAKES SPACED A MAX OF 6 FEET APART AND EMBEDDED A MIN OF 12 INCHES.
2. WOVEN WIRE REINFORCING TO BE FASTENED SECURELY TO BARRIER POSTS WITH STAPLES.
3. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE REINFORCING, WITH TIES SPACED EVERY 24 INCHES AT TOP AND MIDSECTION.
4. MINIMUM HEIGHT OF FILTER SHOULD BE 18 INCHES AND A MAXIMUM OF 36 INCHES ABOVE NATURAL GROUND.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
6. SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.

RFB SYMBOL

REINFORCED FILTER FABRIC BARRIER

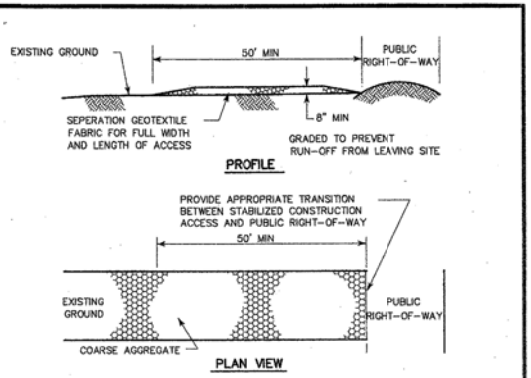


CONSTRUCTION NOTES:

1. 2 INCH THICK BY 2 INCH WOODEN STAKES TO BE SET AT MAX SPACING OF 3 FEET AND EMBEDDED A MIN OF 8 INCHES. IF PREASSEMBLED BARRIER WITH SUPPORT NETTING IS USED, SPACING OF POST MAY BE INCREASED TO 8 FEET MAX.
2. ATTACH FILTER FABRIC TO WOODEN STAKES. FILTER FABRIC BARRIER SHALL HAVE A MIN HEIGHT OF 18 INCHES AND MAX HEIGHT OF 36 INCHES ABOVE NATURAL GROUND.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHOULD BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
4. SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.

FF SYMBOL

FILTER FABRIC BARRIER

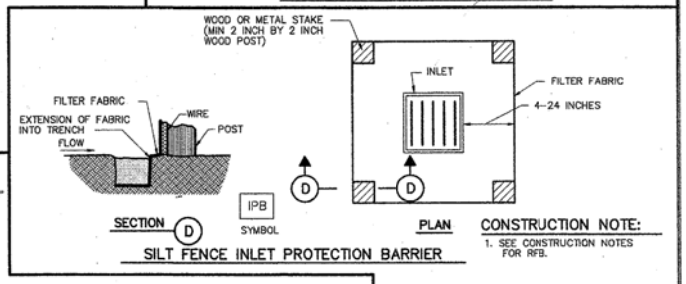


CONSTRUCTION NOTES:

1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
4. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION ACCESS, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
5. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMODATE A WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE WASHING AREA.
6. COH STANDARD SPECIFICATION FOR STABILIZED CONSTRUCTION ACCESS.
7. STABILIZED CONSTRUCTION ACCESS SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.

SC SYMBOL

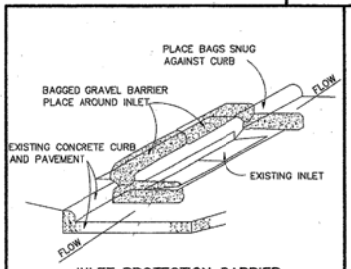
STABILIZED CONSTRUCTION ACCESS



CONSTRUCTION NOTE:

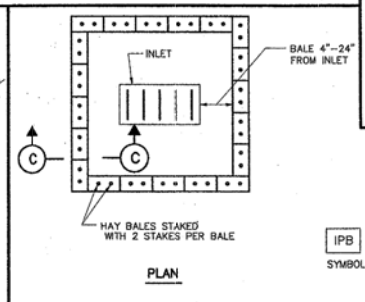
1. SEE CONSTRUCTION NOTES FOR RFB.

SILT FENCE INLET PROTECTION BARRIER



INLET PROTECTION BARRIER

(FOR STAGE II INLETS)
BAGGED GRAVEL BARRIER



HAY BALE INLET PROTECTION BARRIER

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STORM WATER POLLUTION PREVENTION PLAN DETAILS
(NOT TO SCALE)

APPROVED: CITY ENGINEER
APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2010
DWG NO: 01571-01

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FAX: 832-448-2466
Project No: 4002-006

CONSULTANTS:
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HOUSTON, TX 77036
PHONE:(713) 268 - 1666, FAX: (713) 268 - 1667
TBPE NO.: F-8029

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RDP ENGINEERS
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SUGAR LAND,TEXAS 77478

MEP ENGINEER
MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

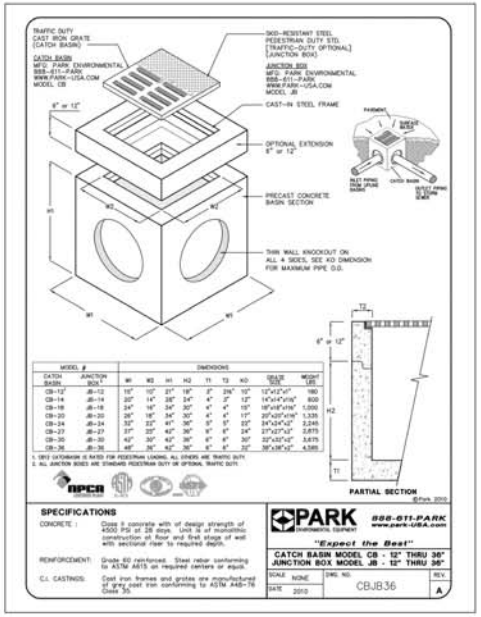
Drawing Date:	08/09/2021
Drawn:	MK
Checked:	NO
Scale:	1/32" = 1'-0"
ACAD File:	

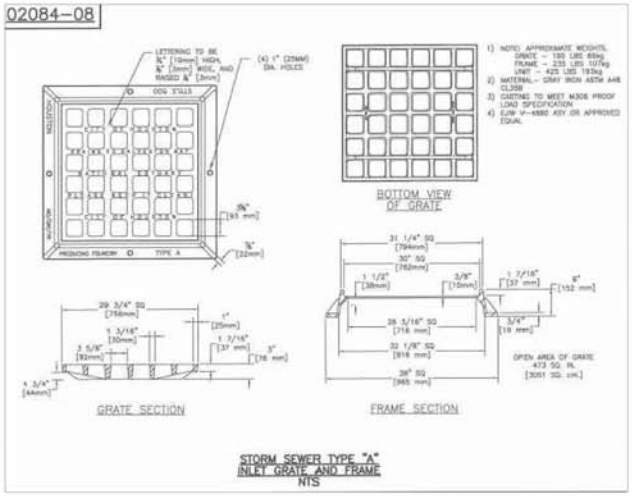
Revisions:

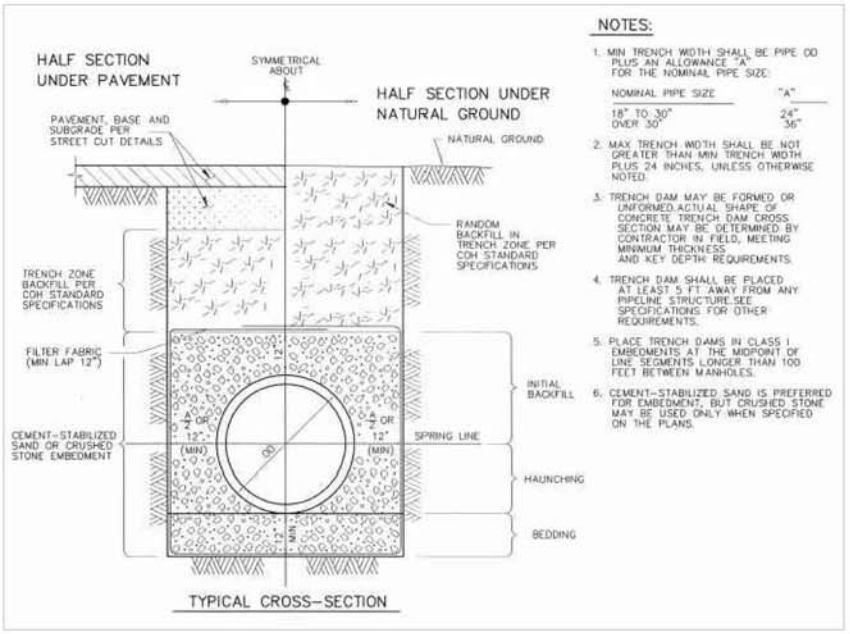
DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
CITY COMMENT	02/18/2022
ISSUE FOR BID	09/07/2022

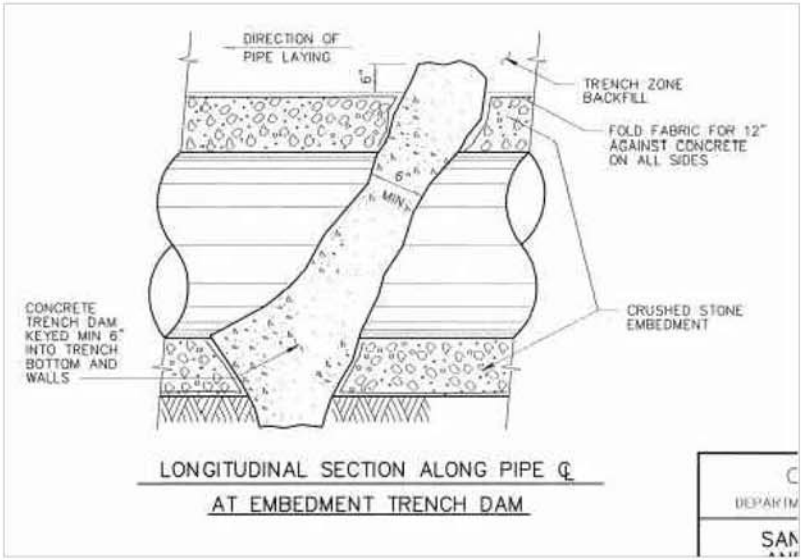
SWPPP DETAILS

C8









IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466
Project No: 4002-006

CONSULTANTS:
CIVIL ENGINEER
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TBPE NO.: F-8029

2/18/22

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MEP ENGINEER
MARSHALL ENGINEERING CORPORATION
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	08/09/2021
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Checked:	NO
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ACAD File:	

Revisions:

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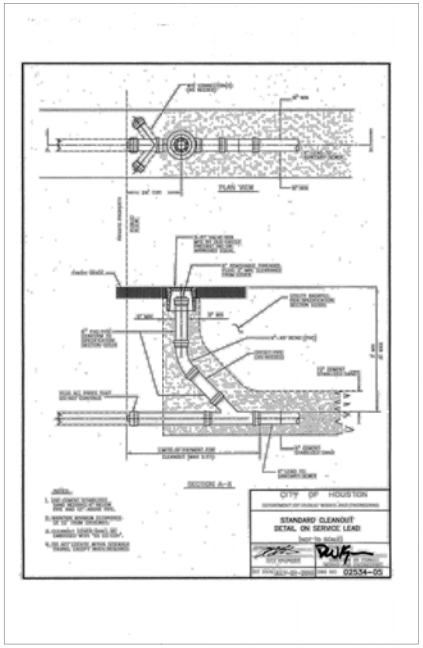
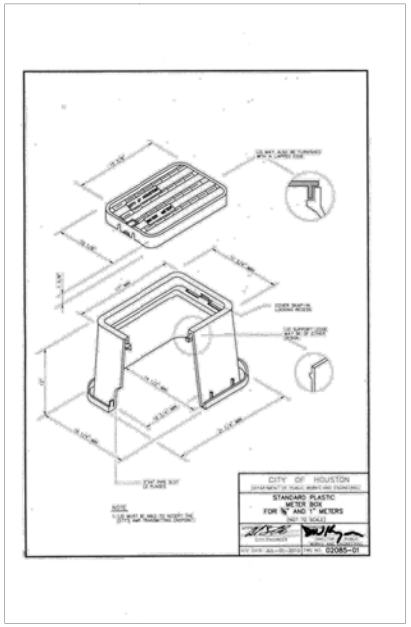
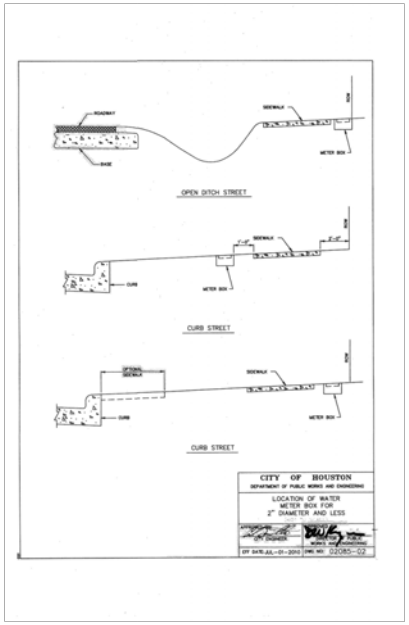
100% CD	11/22/2021
CITY COMMENT	02/18/2022
ISSUE FOR BID	09/07/2022

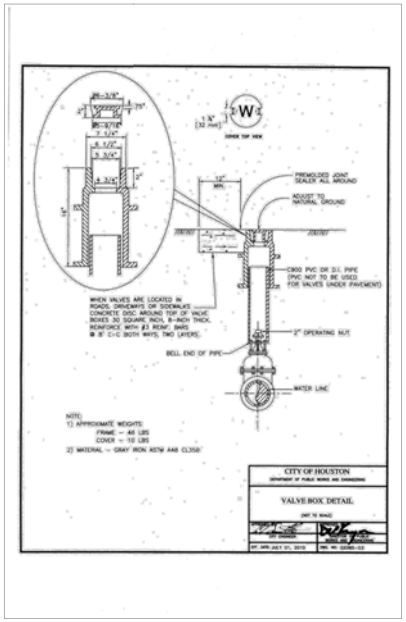
STORM DETAILS

C9









IDG+ ARCHITECTS
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FAX: 832-448-2466

Project No: 4002-006

CONSULTANTS:

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	08/09/2021
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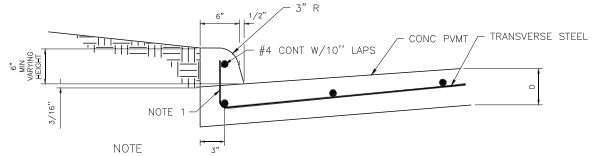
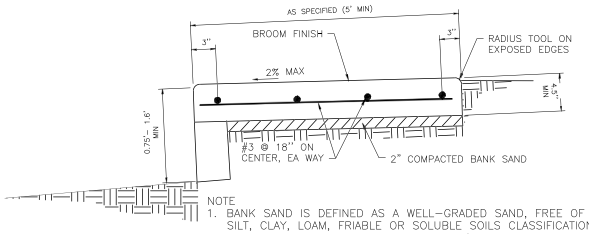
WATER & SANITARY DETAILS

C10



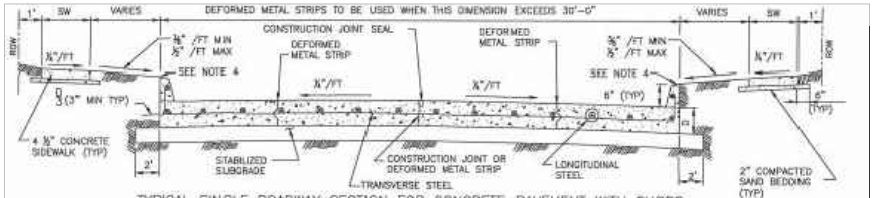
NOTE
1. WHEN CONCRETE CURB IS TO BE PLACED ON EXISTING CONCRETE BASE, #4 BARS @ 2'-0" CENTERS, 10" LONG, DOWELED AND SET IN SULPHUR OR QUICK SETTING CEMENT.
2. PLACE EXPANSION JOINTS @ 40' ON CENTERS & CONTRACTION JOINTS @ 10' ON CENTERS
3. FINISH TO BE ACCOMPLISHED BY FLOATING, STEEL TOWELING AND THEN BRUSHING, HAND FINISH NOT REQUIRED WHEN CURB AND GUTTER IS POURED BY A MACHINE, BUT CURB IS TO HAVE THE SAME OUTSIDE DIMENSIONS, AND HAVE A BRUSHED FINISH.

TYPICAL CONCRETE CURB DETAIL
NTS



NOTE
1. BANK SAND IS DEFINED AS A WELL-GRADED SAND, FREE OF SILT, CLAY, LOAM, FRIABLE OR SOLUBLE SOILS CLASSIFICATION SYSTEM GROUP SYMBOL SW CRITERIA W/A PLASTICITY INDEX OF LESS THAN 10. AND NO MORE THAN 12% OF MATERIAL CAN PASS THE No. 200 SIEVE.
2. DOWEL IN AND TIE TO ANY CONCRETE STRUCTURE ADJACENT TO SIDEWALK (DRIVEWAY, INLET BOX, CURB, JUNCTION BOX, ETC) WITH #3x12"LONG BARS @ 18" ON CENTERS. INCLUDE EXPANSION JOINT AT CONNECTION WITH BACK OF CURB.

TYPICAL SIDEWALK DETAIL @FENCE
NTS



TYPICAL SINGLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

TABLE 1
REINFORCING STEEL BAR SIZES AND SPACINGS FOR VARIOUS PAVEMENT THICKNESSES (D) WITH MAXIMUM TRANSVERSE CONTROL JOINT SPACING = 20'-0" MAXIMUM EXPANSION JOINT SPACING = 80'-0" f'c = 4,000 PSI/28 DAYS AND FY = 60,000 PSI

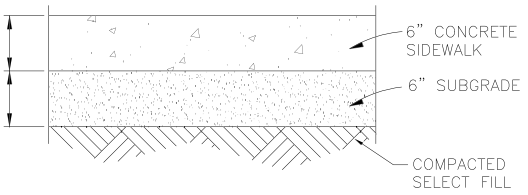
TABLE 1

PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
4 1/2	1/2	18	12
5	1/2	18	12
6	3/4	18	12
7	1	18	12

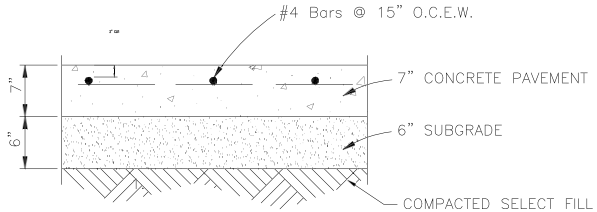
PAVEMENT THICKNESS D (IN)	PAVEMENT WIDTH (FT)	LONGITUDINAL STEEL # 4 BARS: NUMBER OF BARS	# 4 BARS: SPACING (IN)	# 4 BARS: END BAR SPACING (IN)	# 5 BARS: NUMBER OF BARS	# 5 BARS: SPACING (IN)	# 5 BARS: END BAR SPACING (IN)	# 6 BARS: NUMBER OF BARS	# 6 BARS: SPACING (IN)	# 6 BARS: END BAR SPACING (IN)	TRANSVERSE STEEL # 4 BARS: SPACING (IN)	# 5 BARS: SPACING (IN)	# 6 BARS: SPACING (IN)
6	28	17	20.50	4	–	–	–	–	–	–	36	–	–
7	25	17	18.25	4	–	–	–	–	–	–	36	–	–
7	35	24	18.00	3	–	–	–	–	–	–	36	–	–
7	36	25	17.75	3	–	–	–	–	–	–	36	–	–
7	37	25	18.25	3	–	–	–	–	–	–	36	–	–
7	41	28	18.00	3	–	–	–	–	–	–	36	–	–
7	45	31	17.75	3.75	–	–	–	–	–	–	36	–	–
8	25	20	15.50	2.75	13	24.50	3	–	–	–	36	36	–
8	34	27	15.50	2.50	17	25.00	4	–	–	–	36	36	–
8	35	27	16.00	2	18	24.25	4	–	–	–	36	36	–
8	36	28	15.75	3.25	18	25.00	3	–	–	–	30	36	–
8	44	24	15.75	4	22	24.75	4	–	–	–	30	36	–
8	45	35	15.75	2.25	23	24.25	3	–	–	–	30	36	–
9	25	22	14.00	3	14	22.50	4	–	–	–	36	36	–
9	34	31	13.50	2	19	22.25	3.50	–	–	–	30	36	–
9	35	31	13.75	3.75	20	21.75	3.50	–	–	–	30	36	–
9	36	32	13.75	3	21	21.25	3.50	–	–	–	30	36	–
9	44	39	13.75	2.75	25	21.75	3	–	–	–	24	36	–
9	45	39	14.00	4	26	21.25	4.50	–	–	–	24	36	–
10	25	24	12.75	3.5	17	18.25	4	–	–	–	36	36	36
10	34	33	12.50	4	21	20.00	4	–	–	–	30	36	36
10	35	34	12.50	3.75	23	18.75	4	–	–	–	30	36	36
10	36	35	12.50	3.5	24	18.50	3	–	–	–	30	36	36
10	44	44	12.00	4	29	18.50	4.50	–	–	–	24	36	36
10	45	44	12.50	3	29	19.00	3	–	–	–	24	36	36
11	25	27	11.25	3	17	18.25	4	12	26.75	3	36	36	36
11	34	38	11.50	2.75	24	17.50	2.5	17	25.00	4	24	36	36
11	35	37	11.50	3	24	18.00	3	17	25.75	4	24	36	36
11	36	40	11.00	2	25	17.75	3	17	26.50	4	24	36	36
11	44	48	11.125	2.5	30	18.00	3	21	26.00	4	24	36	36
11	45	49	11.125	3	31	17.75	4	22	25.50	3	24	36	36
12	25	–	–	–	19	18.25	4	13	24.50	3	36	36	36
12	34	–	–	–	26	18.00	4	18	23.50	4	24	36	36
12	35	–	–	–	26	18.50	4	19	23.00	3	24	36	36
12	36	–	–	–	27	18.25	4.5	20	22.25	4.5	24	36	36
12	44	–	–	–	33	18.25	4	24	22.50	5	24	30	36
12	45	–	–	–	35	18.75	3	25	22.25	3	24	30	36

MINIMUM LAP LENGTH (L):
A. # 4 BARS ; L = 22 INCHES
B. # 5 BARS ; L = 27 INCHES
C. # 6 BARS ; L = 32 INCHES

CONCRETE PAVEMENT DETAILS
NTS



6" CONCRETE SIDEWALK



7" CONCRETE PAVEMENT

SUBGRADE TO BE STABILIZED WITH 7% LIME IN ACCORDANCE WITH TxDOT SPECIFICATION ITEM 260. COMPACT LIME TREATED SUBGRADE TO 95% STANDARD PROCTOR DENSITY PER ASTM D-698. EXTEND LIME TREATED SUBGRADE 5' PAST PAVING LIMITS.

IDG ARCHITECTS
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PH: 832-448-2462
FAX: 832-448-2466
Project No: 4002-006

CONSULTANTS:
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TBPE NO. F-8029

2/18/22

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

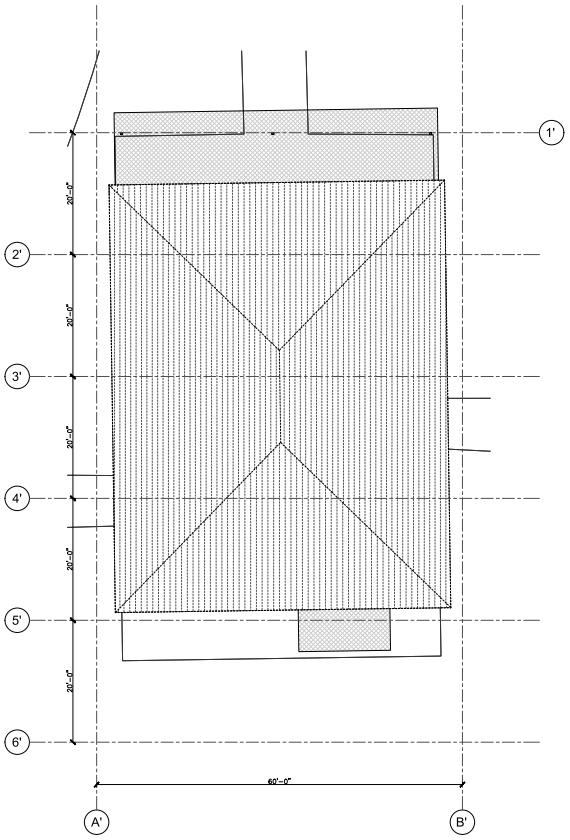
Drawing Date:	08/09/2021
Drawn:	MK
Checked:	NO
Scale:	1/32" = 1'-0"
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
CITY COMMENT	02/18/2022
ISSUE FOR BID	09/07/2022

PAVING DETAILS

C11



A DEMOLITION PLAN - EXISTING CONCESSION BUILDING
SCALE: 1/8"=1'-0"

NOTES:

1. DISCONNECT ALL UTILITIES.
2. REMOVE ALL NON STRUCTURAL MEMBER PRIOR TO REMOVING ANY STRUCTURAL MEMBERS. REMOVE MEMBERS MEMBERS INDICATED BELOW IN ORDER INDICATED.
3. REMOVE BUILDING FACADE PANELS.
4. REMOVE BUILDING ROOF PANELS.
5. REMOVE WALL GIRTS/STUD FRAMING
6. REMOVE ROOF PURLINS/JOISTS
7. REMOVE ROOF BEAMS AND GIRDERS
8. REMOVE COLUMNS.

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
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FAX: 832-448-2466
Project No: 6001-002

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R.D.PATEL 85011 LICENSED PROFESSIONAL ENGINEER

RDP ENGINEERS, INC.
TBPE FIRM REGISTRATION
NO F-573

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5535 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	JL
Checked:	RDP
Scale:	AS NOTED
ACAD File:	

Revisions:

DESCRIPTION	
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ISSUED FOR PERMIT	12/22/2021
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DEMOLITION PLAN CONCESSION BUILDING

SD 200A

1. DEMOLISH THE EXISTING CONCESSION BUILDING IN ITS ENTIRETY. RE: ARCHITECTURAL, STRUCTURAL & MEP DRAWINGS
2. DEMOLISH EXISTING PARKING LOT IN ITS ENTIRETY. RE: CIVIL DRAWINGS
3. EXISTING BASEBALL/SOFTBALL FIELDS FENCES POST AND POST FOUNDATION TO REMAIN. DISASSEMBLE THE CHAIN LINK FENCE FROM EACH POST (SAFELY STORE THE DISASSEMBLED FENCE FOR LATER REASSEMBLY) TO PERFORM THE REMOVAL AND REGRADING OF EXISTING GRASS PER CIVIL DRAWINGS
4. EARTHWORK/REGRADING TO BE PERFORMED IN BASEBALL/SOFTBALL FIELDS TO RECEIVE NEW TURF. RE CIVIL DRAWINGS
5. DEMOLISH EXISTING WOODEN/STEEL BOLLARDS INCLUDING FOOTINGS IN THEIR ENTIRETY.
6. EXISTING SMALL TREES RIGHT NEXT TO THE WOODEN BOLLARDS TO BE DEMOLISHED IN THEIR ENTIRETY INCLUDING THEIR ROOTS. BACKFILL TO FINISH GRADE.
7. EXISTING ASPHALT PAVEMENT WALKWAY TO BE DEMOLISHED IN ITS ENTIRETY. RE: CIVIL DRAWINGS AND SPECIFICATIONS
8. DEMOLISH ONLY THE CORRUGATED METAL PANEL OF THE EACH FIELD DUGOUTS. EXISTING DUGOUT STRUCTURES/BLEACHER AS WELL AS THEIR CONCRETE PAD TO REMAIN AND PROTECTED DURING THE COURSES OF THE WORK.
9. EXISTING SOLAR LIGHT POLE TO REMAIN.
10. EXISTING TREE TO BE DEMOLISHED
11. EXISTING FIELD ENTRANCE GATE (ONLY) TO BE DEMOLISHED IN THEIR ENTIRETY
12. EXISTING 30 GALLON TRASH CONTAINER (PLASTIC BARREL ON WOODEN POSTS) TO BE DEMOLISHED IN ITS ENTIRETY.
13. EXISTING CONCESSION BUILDING SEPTIC TANK TO BE DEMOLISHED AND REMOVED IN ITS ENTIRETY INCLUDING THE CONNECTION LINES FROM THE BUILDING TO THE TANK. BACKFILL TO FINISH GRADE RE: MEP FOR ADDITIONAL INSTRUCTION.
14. EXISTING HANDICAP PARKING SIGN TO BE DEMOLISHED IN ITS ENTIRETY INCLUDING THE FOOTING. BACKFILL TO FINISH GRADE.
15. EXISTING HEADSTONE TO BE CAREFULLY REMOVED AND RELOCATED TO A NEW PLACE. COORDINATE WITH OWNER FOR THE NEW RELOCATION PLACE.
16. EXISTING SIGN TO BE DEMOLISHED IN ITS ENTIRETY.
17. EXISTING FOOTBALL FIELDS SIDEWALK.
18. EXISTING STORAGE BUILDING TO REMAIN.
19. EXISTING SAFETY NET WITH POSTS TO REMAIN DURING CONSTRUCTION
20. EXISTING CHAIN LINK FENCE WITH SLATS WITH POSTS/FOOTING AND GATE TO BE DEMOLISHED IN THEIR ENTIRETY. RE: MEP DRAWINGS FOR ELECTRICAL SCOPE

NOT IN THIS CURRENT BID PACKAGE

NOT IN THIS CURRENT BID PACKAGE

NOT IN THIS CURRENT BID PACKAGE

NOT IN THIS CURRENT BID PACKAGE

KEYNOTES

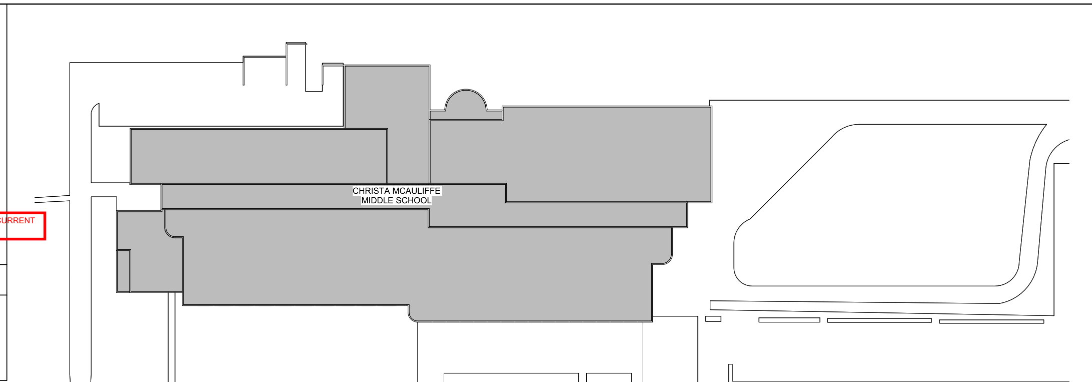
EXISTING FOOTBALL FIELDS TO REMAIN

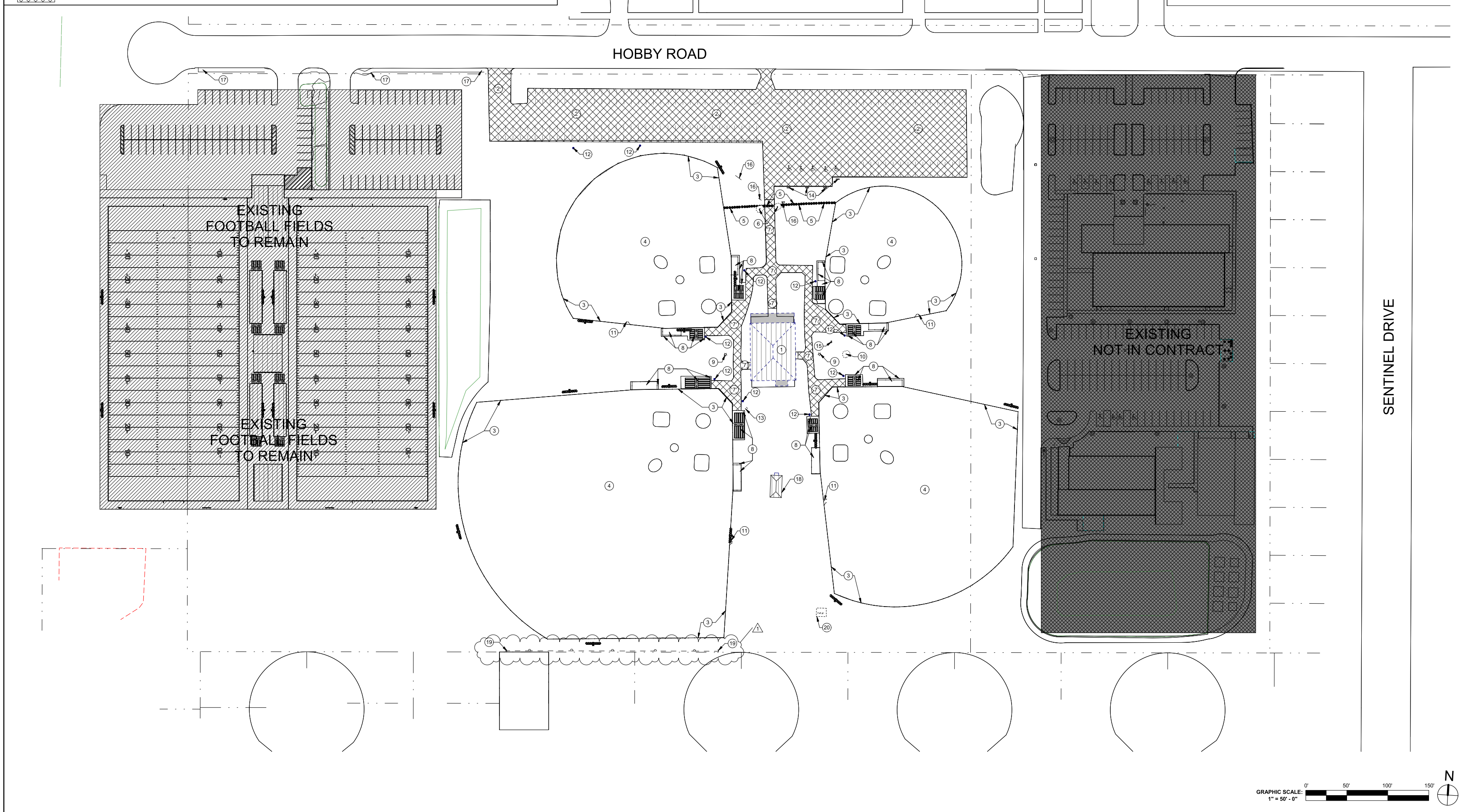
NOT IN CONTRACT

ASPHALT PAVEMENT PARKING/WALKWAY

NOTES:

REFERENCE: CIVIL DRAWINGS FOR SIDEWALK DEMO
REFERENCE: CIVIL DRAWINGS FOR DEMO BASEBALL FIELDS
REFERENCE: CIVIL DRAWINGS FOR NEW PARKING





EXISTING SITE PLAN 1
1" = 50'-0"

IDG+ ARCHITECTS

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PH: 832-448-2462
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Project No: 6001-02

CONSULTANTS:

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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1 CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

DEMOLITION SITE PLAN

AD100

A

B

C

D

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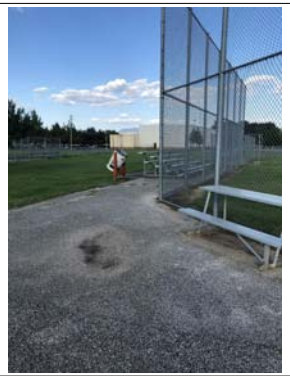
O



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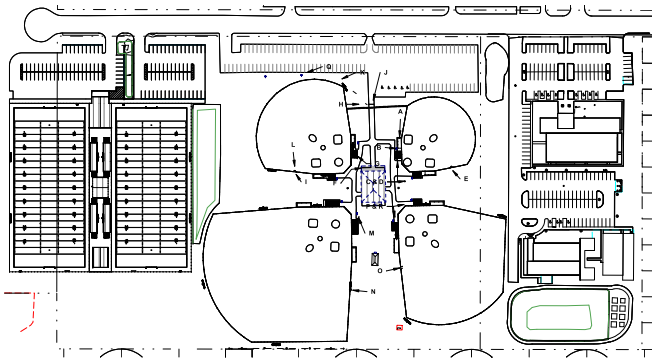

PHOTO LEGEND
N.T.S

1

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	IK
Checked:	BM, CD, PN
Scale:	1" = 50'-0"
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

EXISTING PHOTOS

REFERENCE ONLY

AD102

A

B

C

D

E

F

G

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J

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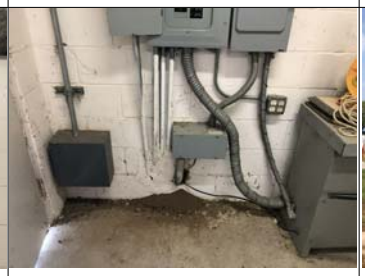
L



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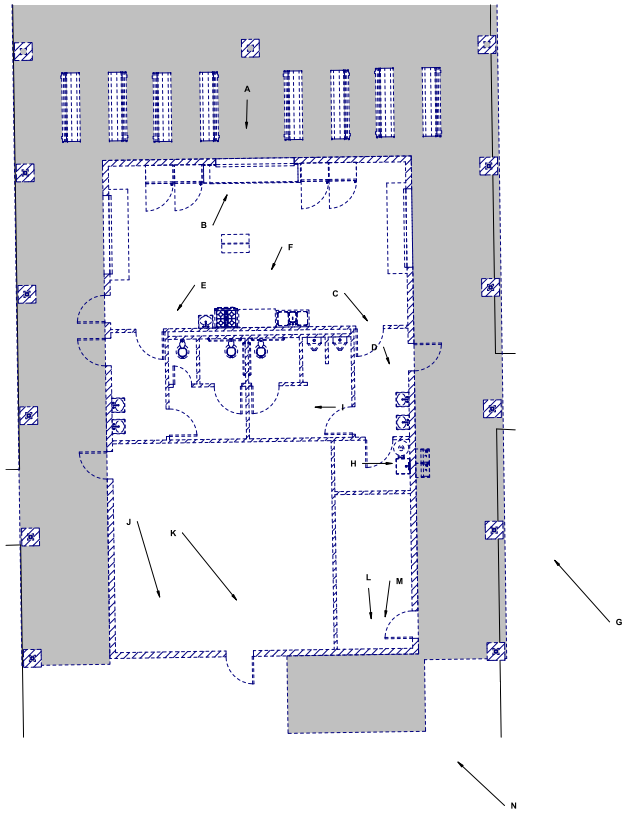

CONCESSION BUILDING EXISTING PHOTOS 1

3/16" = 1'-0"

IDG+ ARCHITECTS

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EXISTING PHOTOS

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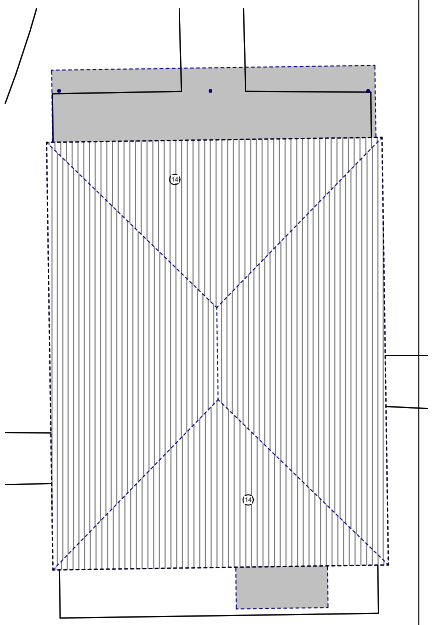
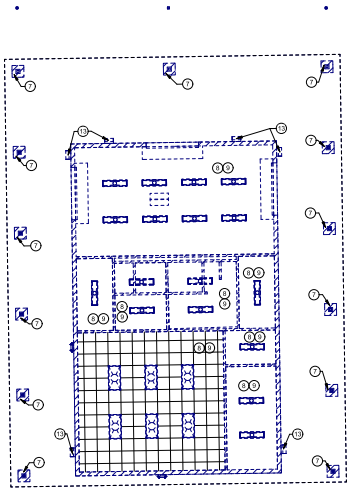
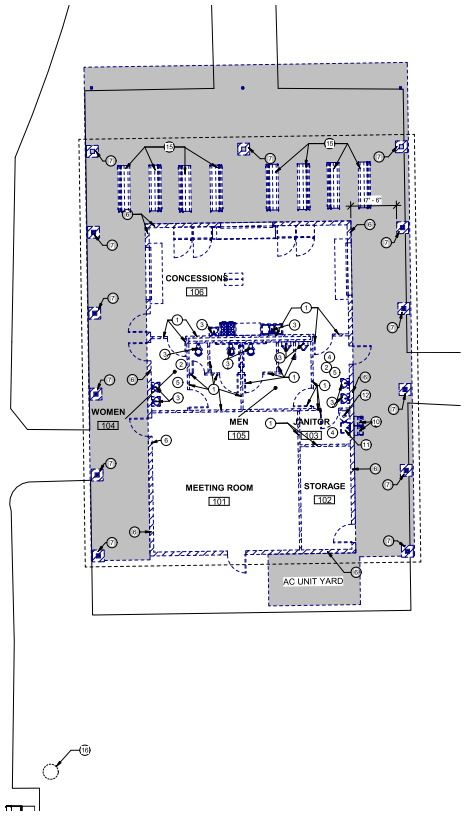


EXISTING ROOF DEMO PLAN
1/8" = 1'-0"
4



EXISTING CONCESSION RCP DEMO
1/8" = 1'-0"
2



EXISTING CONCESSION DEMO PLAN
1/8" = 1'-0"
1

1. DEMOLISH EXISTING CMU BLOCK WALL IN ITS ENTIRETY.DEMOLISH EXISTING CONCESSION BUILDING FOUNDATION IN ITS ENTIRETY DEMOLISH DOOR, DOOR FRAME, TOILET, RESTROOMS CMU PARTITION IN THEIR ENTIRETY. REMOVE DOOR STOPS. RE: MEP & STRUCTURAL DRAWINGS & SPECIFICATIONS.
2. DEMOLISH EXISTING TOILET ACCESSORIES, GRAB BARS, PAPER TOWEL DISPENSERS, SOAP DISPENSERS, TOILET PAPER DISPENSERS IN ALL THEIR ENTIRETY
3. DEMOLISH EXISTING PLUMBING FIXTURES REF: MEP DRAWINGS FOR SELECT DEMOLITION
4. DEMOLISH EXISTING CONCESSION BUILDING FLOOR IN ITS ENTIRETY.
5. REMOVE ALL EXISTING MIRRORS
6. EXTERIOR CMU BLOCK WALL TO BE DEMOLISHED ALL THE WAY TO THEIR FOUNDATION
7. EXISTING CMU BLOCK FURR AROUND INCLUDING THE STRUCTURAL FRAMING TO BE DEMOLISHED ALL IN THEIR ENTIRETY
8. EXISTING LIGHT FIXTURES TO BE DEMOLISHED REF: MEP DRAWINGS
9. EXISTING REFLECTIVE CEILING TO BE DEMOLISHED IN ITS ENTIRETY.
10. EXISTING DRINK WATER FOUNTAIN TO BE DEMOLISHED IN ITS ENTIRETY.
11. EXISTING MOP SINK TO BE DEMOLISHED IN ITS ENTIRETY REF: MEP DRAWINGS AND SPECIFICATIONS
12. EXISTING WATER HEATER TO BE DEMOLISHE. REF. MEP DRAWINGS
13. EXISTING WALL LIGHT TO BE DEMOLISHED.
14. EXISTING CONCESSION BUILDING BUILDING ROOF SYSTEM AS WELL AS THE ROOF STRUCTURAL FRAMING TO BE DEMOLISHED IN THEIR ENTIRETY.
15. EXISTING BENCH TO BE REMOVED, STORED, PROTECT DURING CONSTRUCTION, AND REUSE FOR THE NEW CONCESSION BUILDING
16. EXISTING CONCESSION BUILDING SEPTIC TANK TO BE DEMOLISHED AND REMOVED IN ITS ENTIRETY INCLUDING THE CONNECTION LINES FROM THE BUILDING TO THE TANK. BACKFILL TO FINISH GRADE RE: MEP FOR ADDITIONAL INSTRUCTION.

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12. PROVIDE KICKERS AT 48" O.C.
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14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

NOT IN CONTRACT

LEGEND

KEY PLAN

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

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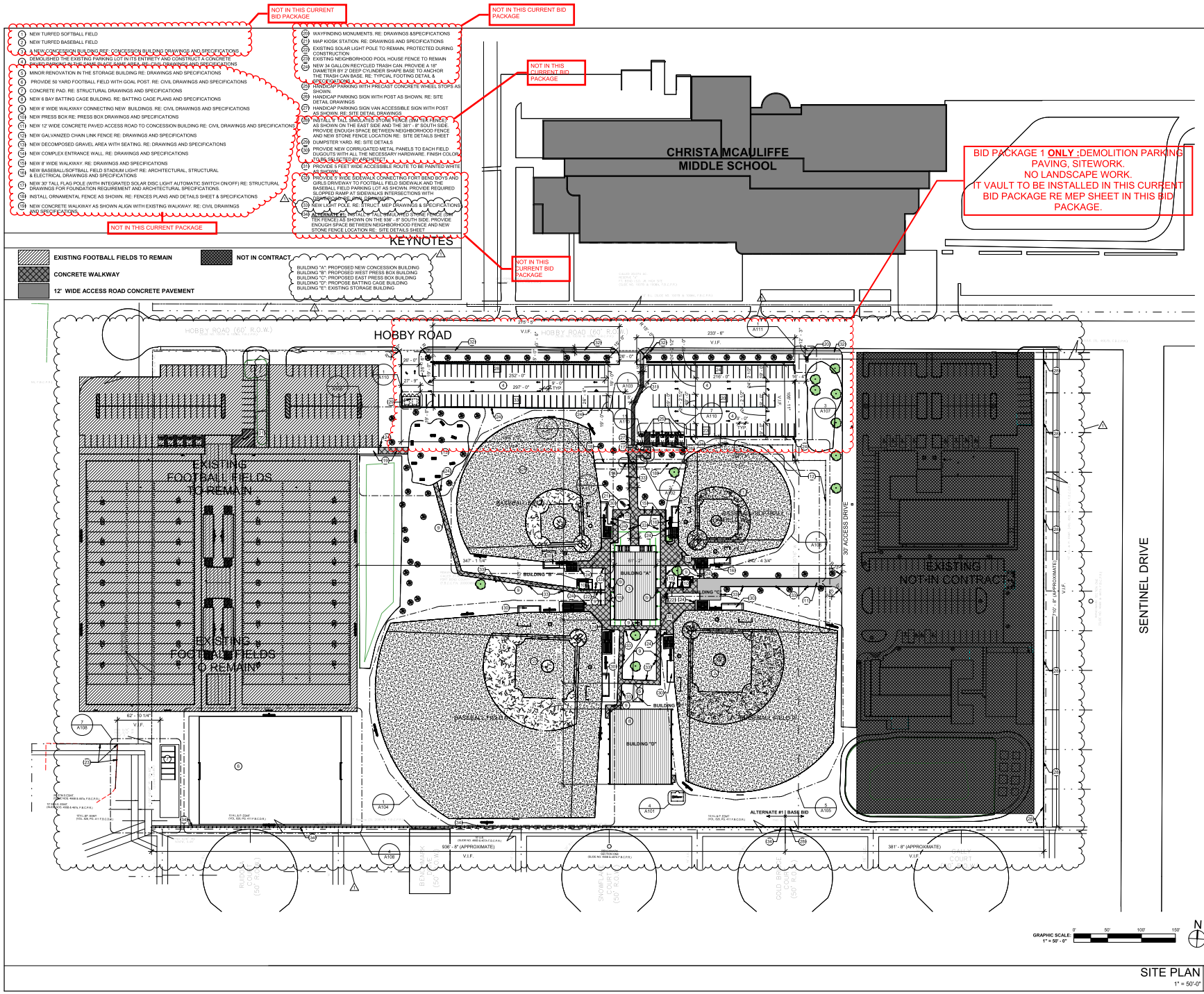
CONCESSION BUILDING DEMOLITION PLANS

AD200A



SITE PLAN
1" = 50'-0" | 1

A100

IDG+ ARCHITECTS

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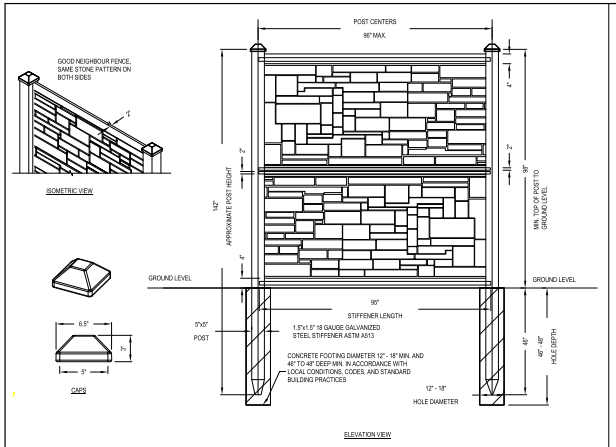
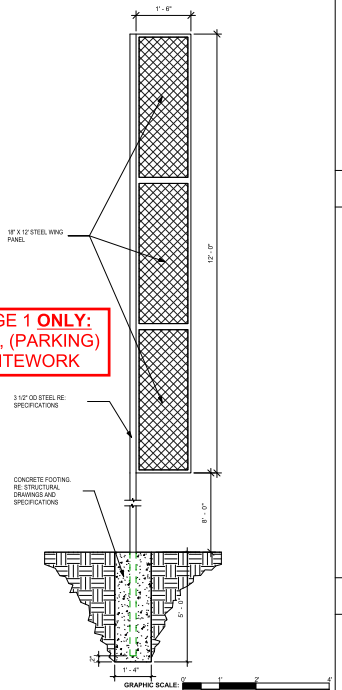
SITE PLAN

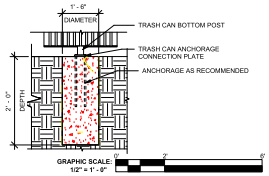


SIMULATED STONE FENCE ELEV. TYPICAL N.T.S | 10

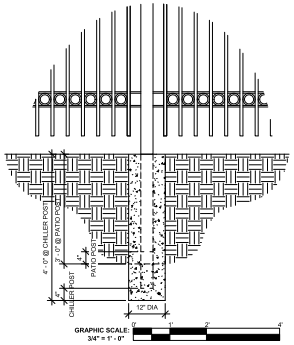
BID PACKAGE 1 **ONLY:**
DEMOLITION, (PARKING) PAVING, SITEWORK



FOUL POLE FOUNDATION DETAIL 3/4" = 1'-0" | 7



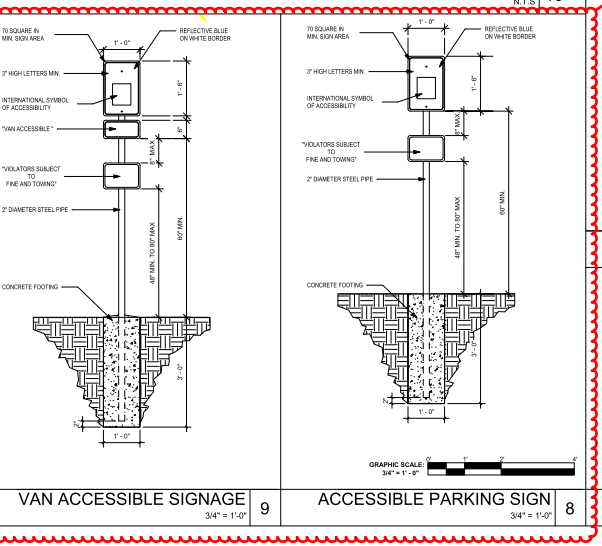
TYPICAL TRASH CAN BASE 1/2" = 1'-0" | 4



FENCE FOOTING DETAIL 3/4" = 1'-0" | 3

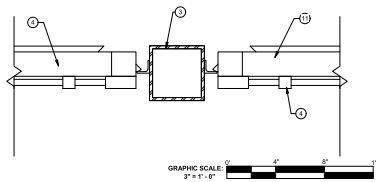
1. ENTRANCE WALL RE: COMPLEX ENTRANCE WALL PLANS & SPECIFICATIONS
2. SIDEWALK
3. 4"X4" GATE/FENCE POST TYP.
4. PICKETS TYP. RE: SPECIFICATIONS
5. CIRCULAR RING TYP. RE: SPECIFICATIONS
6. INTERMEDIATE RAILS TYP. RE: SPECIFICATIONS
7. EXISTING BASEBALL FIELD CHAIN LINK FENCE TO REMAIN AND PROTECTED DURING CONSTRUCTION
8. NEW ORNAMENTAL FENCE, FINISH COLOR TO SELECTED BY ARCHITECT RE: DETAILS AND SPECIFICATIONS
9. NEW CHAIN LINK FENCE RE: DETAILS AND SPECIFICATIONS
10. 12' WIDE ACCESS CONCRETE PAVED
11. ORNAMENTAL/CHAIN LINK FENCE GATE WITH MANUFACTURER RECOMMENDED HARDWARE RE: SPECIFICATIONS

KEY NOTES

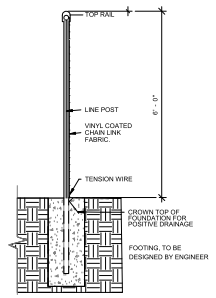


VAN ACCESSIBLE SIGNAGE 3/4" = 1'-0" | 9

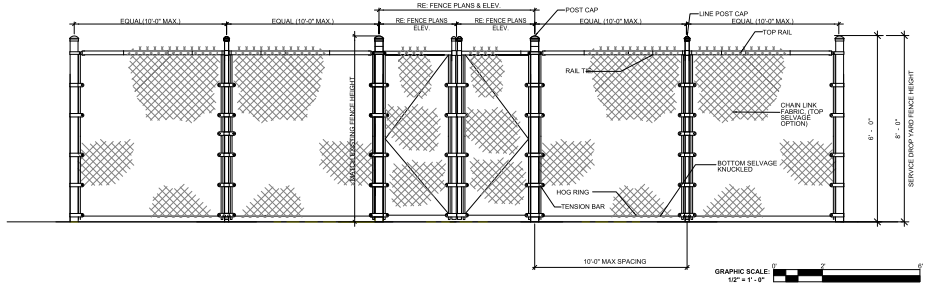
ACCESSIBLE PARKING SIGN 3/4" = 1'-0" | 8



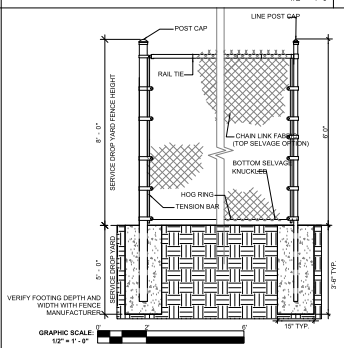
ORNAMENTAL FENCE GATE PLAN 3" = 1'-0" | 6



FENCE SECTION DETAIL 1/2" = 1'-0" | 2



CHAIN LINK GATE TYPICAL ELEV. 1/2" = 1'-0" | 5



FENCE FOOTING TYPICAL 1/2" = 1'-0" | 1

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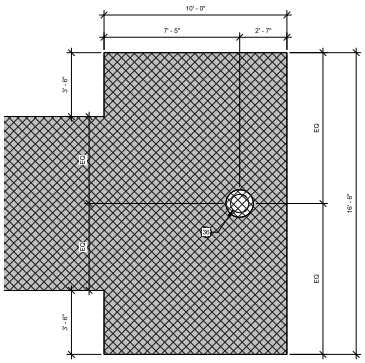
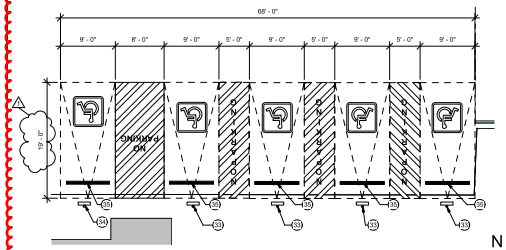
SITE DETAILS ⚠

A109

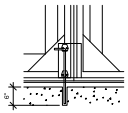
BID PACKAGE 1 **ONLY**:
DEMOLITION, (PARKING)
PAVING, SITEWORK



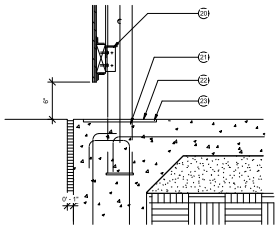
FLAG POLE 3/8" = 1'-0" | 11



HANDICAP PARKING 1/8" = 1'-0" | 7

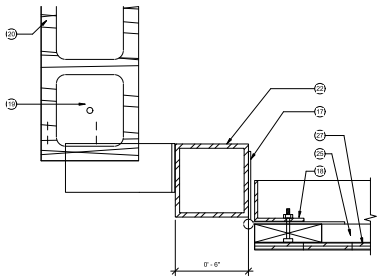


GATE DETAIL 3/4" = 1'-0" | 4

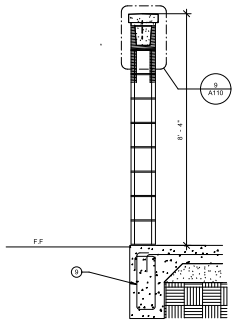


SCREEN WALL SECTION 2 1 1/2" = 1'-0" | 3

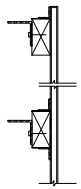
1. FACE BRICK
2. 6" DIA CONCRETE FILLED STL. BOLLARD - REF. DTL. 02 AT 4'-0" O.C. (TYP.)
3. CMU BOND BEAM - REF: STRUCTURAL
4. 8" REINF. CMU - REF: STRUCTURAL
5. MASONRY VENEER ANCHORS
6. MASTIC DAMPROOFING
7. PROVIDE 5-1/4" X 8" DRAIN OPENINGS IN BASE COURSE
8. WEEPS @ 16" O.C. W/ METAL THRU WALL FLASHING
9. STEEL REINFORCING REF: STRUCTURAL
10. 12" LONG X 1/2" DIA CANE BOLT W/ MOUNTING BRACKET
11. STEEL BACKUP PLATE - EXTEND PLATE ACROSS OPP. LEAF TO ACT AS STOP
12. CONCRETE SLAB
13. CAST STONE
14. GRAFFITI SHIELD
15. 6"X6"X3/8" STL. TUBE COLUMN
16. HEAVY DUTY HINGE; STANLEY MODEL BB855-TYP
17. 2"X2"X1/4" STL. ANGLE FRAME
18. WALL REINF. - REF: STRUCTURAL
19. 2"X2"X4" LG. ALUM. ANGLE @ 1'-0" O.C. - DRILL & TAP TO TUBE COL. PROVIDE ASPHALTIC MASTIC BETWEEN TUBE & ANGLE
20. CONC. DUMPSTER PAD W/ VAPOR BARRIER
21. WELD TO IMBED PLATE - REF: STRUCTURAL
22. IMBED PLATE - REF: STRUCTURAL
23. 1"X1" ALUMMUN ANGLE
24. 2X3 WOOD CEDAR RUNNERS
25. 2" X 2" STEEL ANGLE
26. 1 X 4 DOG-EARRED CEDAR FENCE PANELS
27. S.S. FLASHING - 2" OVERLAP
28. S.S. THRU FLASHING
29. 3/8" STL. ROD AT 3'-0" O.C.
30. CONT. STRIP RUBBERIZED ASPHALT FLASHING MEMBRANE
31. HEAVY DUTY LOCKING SLIDING BOLT GATE LATCH
32. HANDICAP PARKING SIGN WITH POST AS SHOWN. RE: SITE DETAIL DRAWINGS
33. HANDICAP PARKING SIGN VAN ACCESSIBLE SIGN WITH POST AS SHOWN. RE: SITE DETAIL DRAWINGS
34. PRECAST WHEEL STOP.
35. NEW 30' TALL FLAG POLE (WITH INTEGRATED SOLAR DISC LIGHT AUTOMATIC SWITCH ON/OFF) RE: STRUCTURAL DRAWINGS FOR FOUNDATION REQUIREMENT AND ARCHITECTURAL SPECIFICATIONS.



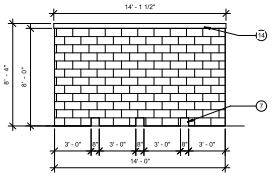
GATE JAMB DETAIL 3" = 1'-0" | 10



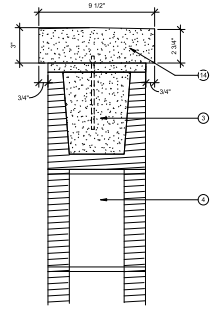
SCREEN WALL SECTION 1 3/4" = 1'-0" | 8



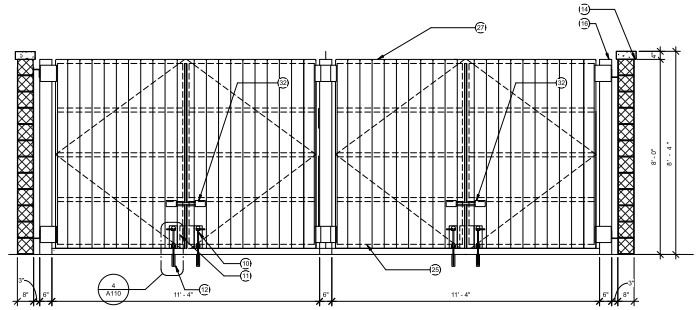
WOOD PANEL DETAIL 3" = 1'-0" | 6



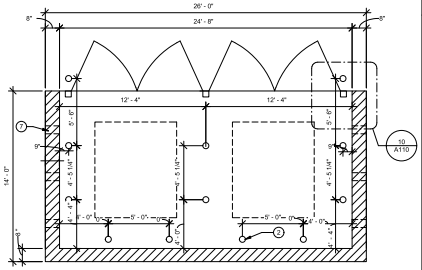
SIDE SCREEN WALL ELEVATION 1/4" = 1'-0" | 2



SCREEN WALL DETAIL 1 3" = 1'-0" | 9



FRONT SCREEN WALL ELEVATION 1/2" = 1'-0" | 5



DUMPSTER ENCLOSURE FLOOR PLAN 1/4" = 1'-0" | 1

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES AND APPLICATIONS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL DIMENSIONS AND OR EXISTING FIELD CONDITIONS PRIOR TO START.
5. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO THE ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.
6. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES WITH ARCHITECT PRIOR TO BIDDING.
7. THE GENERAL CONTRACTOR SHALL PROTECT ANY CONSTRUCTION OR FINISHES THAT IS TO REMAIN.
8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

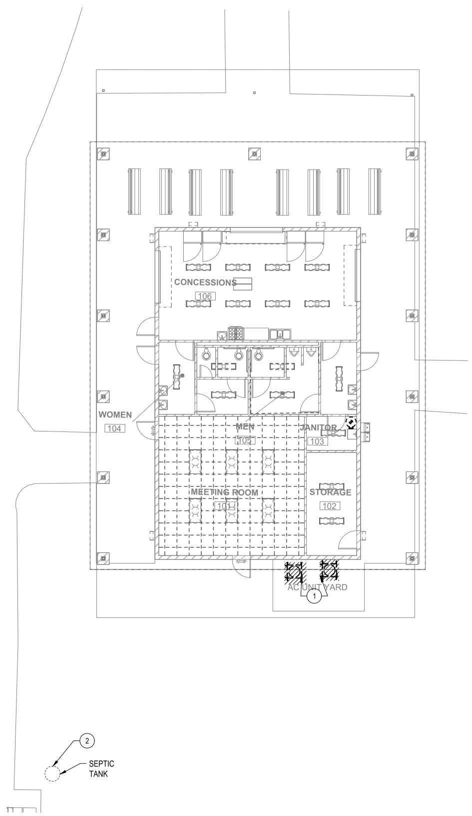
Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

SITE DETAILS

A110



1 DEMOLITION FLOOR PLAN
1/8"=1'-0"

KEY NOTES:

1. RECOVER REFRIGERANT FROM ALL AIR CONDITIONING AND REFRIGERATION EQUIPMENT ACCORDING TO LOCAL, STATE, AND FEDERAL REQUIREMENTS.
2. REMOVE ALL PIPING CONNECTING SEPTIC TANK TO BUILDING. REMOVE ALL PIPING COMPLETELY TO RETURN EARTH TO NATURAL CONDITION.

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND ELECTRICAL GENERAL NOTES, SEE SHEET E001.

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

MARSHALL ENGINEERING CORPORATION
T.B.P.E. FIRM REG. # F-5988
715 N. HOUSTON AVENUE
HUMBLE TEXAS 77338
PHONE: 281-852-4131
FAX: 281-852-4631
marshallengineeringco.com

STATE OF TEXAS
CLIFFORD TONY MARSHALL
127321
REGISTERED
PROFESSIONAL ENGINEER

DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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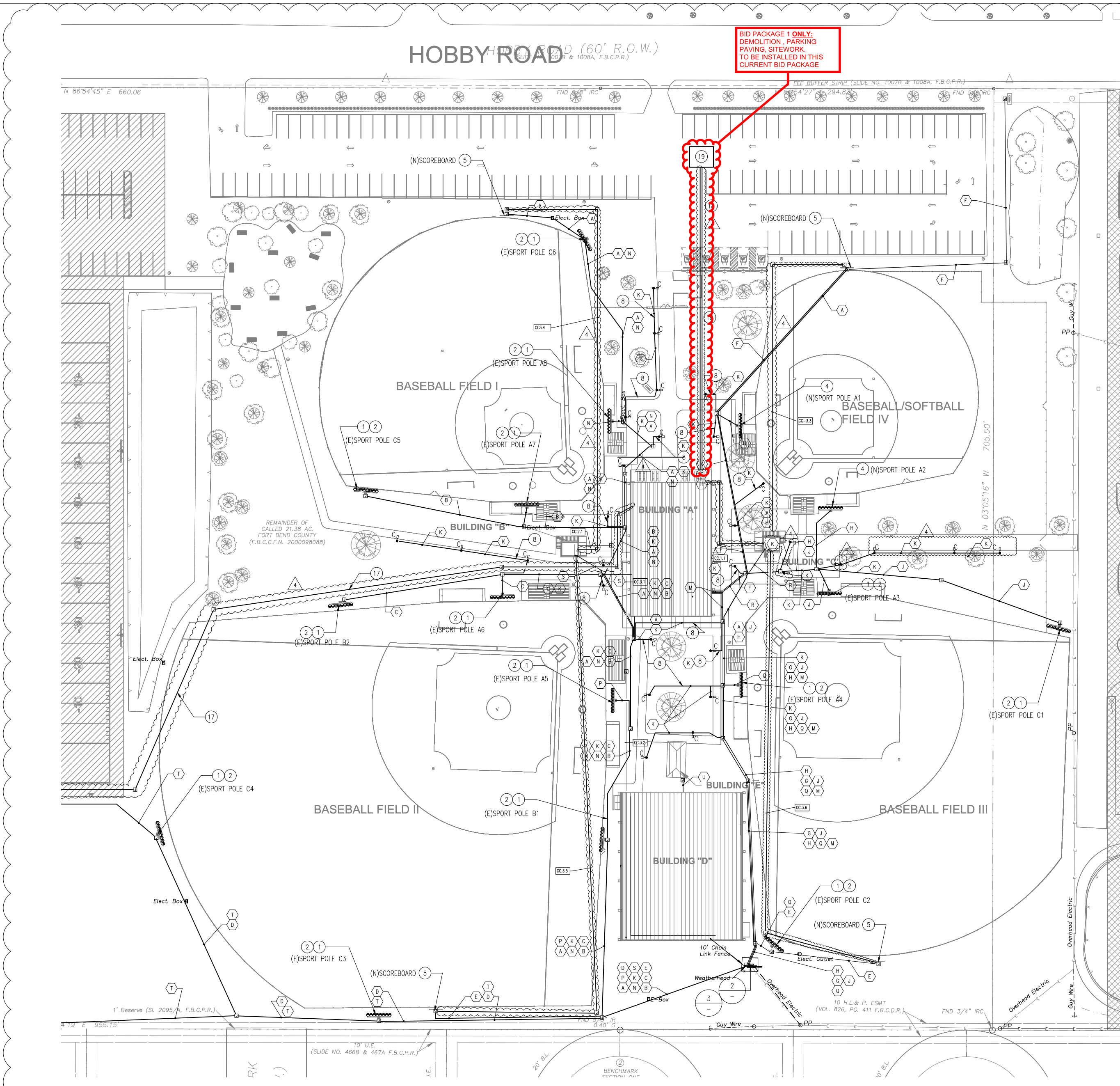
1 CITY OF HOUSTON COMMENTS	02/24/2022
2 CITY OF HOUSTON COMMENTS	03/22/2022
3 CITY OF HOUSTON COMMENTS	05/19/2022
BID PACKAGE	09/07/2022

DEMOLITION FLOOR PLAN
MECHANICAL/PLUMBIING

DM-100

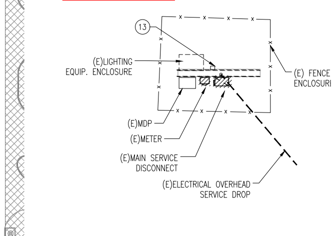


1 MEP SITE PLAN
SCALE: 1"=30'

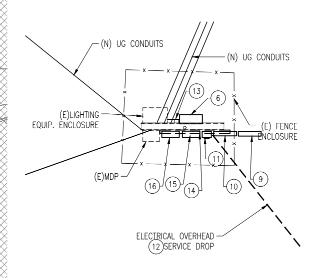
BID PACKAGE 1 ONLY: DEMOLITION, PARKING PAVING, SITEWORK. IT VAULT AND CONDUIT FROM THE PARKING AS SHOWN TO THE IT RACK IN STORAGE #101. COORDINATE WITH OWNER IT DEPARTMENT

KEY NOTES:

1. EXISTING SPORTS LIGHTING FIXTURES TO BE REMOVED.
2. NEW SPORTS LIGHT FIXTURES ON EXISTING SPORT LIGHTING POLE.
3. NEW UNDERGROUND 2-2" COMMUNICATION CONDUIT AND PULL BOX PER PLAN.
4. NEW SPORTS LIGHTING POLE AND FIXTURES.
5. PROVIDE NEMA 3R DISCONNECT AND 277V/1ø PRIMARY, 120V, SECONDARY TRANSFORMER FOR SCORE BOARD POWER.
6. NEW SPORT LIGHTING CONTROLLER IN NEMA 3R ENCLOSURE AND NODE TRANSPONDER SYSTEM. LOCATE ECOLINK WIRELESS BASE STATION IN IT ROOM BUILDING A, ROOM 101.
7. NEW COMMUNICATION PULL-BOX AT ELECTRONIC SCOREBOARD.
8. 1" ELECTRICAL CONDUIT TO WALKWAY POLE FIXTURES.
9. NEW NEMA 3R, 600 AMP SERVICE DISCONNECT WITH 3 600 AMP FUSES INSTALL PER CENTER POINT ENERGY (CPE) STANDARDS.
10. NEW 30X42 METER C.T. CABINET PER CPE STANDARDS. CABINET FURNISHED BY CPE AND INSTALLED BY CONTRACTOR.
11. NEW METER. METER BASE BY PROVIDED BY CONTRACTOR. METER PROVIDED BY CPE.
12. NEW UNDERGROUND ELECTRICAL SERVICE. 2 SETS 4/0 THWN, 2" PVC.
13. EXISTING CONTROL TRANFORMER. 277V PRMARY/120V SECONDARY.
14. 12X12 AUXILLARY WIREWAY PER NEC.
15. 400 AMP NEMA 3R FUSED DISCONNECT WITH 3-250 AMP FUSES. ROUTE FEEDERS FROM DISCONNECT TO BUILDING A.
16. 200 AMP NEMA 3R FUSED DISCONNECT WITH 3-120 AMP FUSES. ROUTE FEEDERS FROM DISCONNECT TO BUILDING D.
17. 4"C WITH MAXCELL INTERDUCT. FIELD VERIFY EXACT LOCATION AND INSTALLATION DEPTH WITH OTHER DISCIPLINES TO AVOID OBSTRUCTIONS.
18. 2-4"C WITH MAXCELL INTERDUCT. FIELD VERIFY EXACT LOCATION WITH INSTALLATION DEPTH WITH DISCIPLINES TO AVOID OBSTRUCTIONS.
19. IT VAULT FOR IT COMMUNICATIONS CONDUIT STUB-UPS. FIELD VERIFY EXACT LOCATION.



2 SERVICE DEMOLITION PLAN
SCLAE: 3/16" = 1'-0"



3 NEW SERVICE ENTRANCE PLAN
SCLAE: 3/16" = 1'-0"

SCALE: 3/16" = 1'-0"
SCALE: 1" = 30'

IDG+ ARCHITECTS
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HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:
MARSHALL ENGINEERING CORPORATION
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PHONE: 281-852-4131
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marshallengineeringco.com

STATE OF TEXAS — CLIFFORD TONY MARSHALL — 127321 — PROFESSIONAL ENGINEER
09/07/22
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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BID PACKAGE	09/07/2022

ELECTRICAL SITE PLAN

MEP100

FORT BEND COUNTY

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Bid Package 2: Buildings A, B, C, D. Building E Renovation, Partial Sitework, Partial Paving, Partial Utility.

09/07/2022

TDLR #: TABS 2022005864
ILMS# 21076845

FORT BEND COUNTY COMMISSIONERS

KP GEORGE, County Judge

VINCENT MORALES, JR., Precinct 1

GRADY PRESTAGE, Precinct 2

ANDY MEYERS, Precinct 3

KEN DEMERCHANT, Precinct 4

PROJECT TEAM

IDG+ ARCHITECTS

440 Benmar Dr., Suite 3335
Houston, Texas
PH: 832-448-2462
Project No: 6001-02

ARCHITECT	IDG+ ARCHITECTS, INC
STRUCTURAL ENGINEERS	RDP ENGINEERS
MEP ENGINEERS	MARSHALL ENGINEERING CORPORATION
CIVIL ENGINEERS	NEDU ENGINEERING SERVICES, INC.

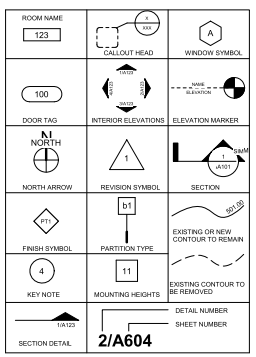
ABBREVIATIONS

ACC	ACCESSIBLE
A/C	AIR CONDITIONING,AIR CONDITIONED
ACOUS	ACOUSTIC, ACOUSTICAL
AD	AREA DRAIN
ADH	ADHESIVE
ADJ	ADJACENT OR ADJUSTABLE
ADMIN	ADMINISTRATIVE, ADMINISTRATION
AFF	ABOVE FINISH FLOOR
ALUM	ALUMINUM
ALT	ALTERNATE
ANOD	ANODIZED
AP	ACCESS PANEL
APPROX	APPROXIMATE
ARCH	ARCHITECT, ARCHITECTURAL
ASPH	ASPHALT
AUTO	AUTOMATIC
AUX	AUXILIARY
AVG	AVERAGE
BD	BOARD
BLDG	BUILDING
BRK	BRICK
BLK(G)	BLOCK(ING)
BM	BEAM
BOL	BOLLARD
BOT	BOTTOM
BRKT	BRACKET
BSMT	BASEMENT
BUR	BUILT-UP ROOF
BVL	BEVELED, BEVEL
CAB	CABINET
CC	CENTER TO CENTER
CEM	CEMENT, CEMENTITIOUS
CER	CERAMIC
CG	CORNER GUARD
C.I.	CAST IRON
CIP	CAST IN PLACE
CJ	CONTROL JOINT
CJT	CONSTRUCTION JOINT
CL	CENTER LINE
CLG	CEILING
CLO	CLOSET
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS, CONTINUATION
CONTR	CONTRACTOR
COOL	COOLER
CORR	CORRIDOR
CPT	CARPET
CT	CERAMIC TILE
CTR	COUNTER
CWG	CLEAR WIRE GLASS
CUST	CUSTODIAL
DBL	DOUBLE
DEPT	DEPARTMENT
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIV	DIVISION
DN	DOWN
DS	DOWNSPOUT
DW	DISHWASHER
DWG	DRAWING
DWR	DRAWER
DF	DRINKING FOUNTAIN
EHD	ELECTRIC HAND/ HAIR DRYER
E	EAST
EA	EACH
EJC	EXPANSION JOINT COVER
EJ	EXPANSION JOINT
EL	ELEVATION
ELEV	ELEVATOR
ELEC	ELECTRIC, ELECTRICAL
EMER	EMERGENCY
ENCL	ENCLOSURE
ENGR	ENGINEER
ENTR	ENTRANCE
E.D.F	ELECTRIC DRINKING FOUNTAIN
EQ	EQUAL
EQUIP	EQUIPMENT
EST	ESTIMATE
EW	EACH WAY
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPOSED, EXPANSION, OR EXPANDED
EXT	EXTERIOR
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
F TO F	FACE TO FACE
FF	FINISH FLOOR
FHC	FIRE HOSE CABINET
FIN	FINISH OR FINISHED
FIXT	FIXTURE
FLR	FLOOR
FLRG	FLOORING
FLUOR	FLUORESCENT
FP	FIREPROOF
FT	FOOT, FEET
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GEN	GENERATOR
GL	GLASS OR GLAZING
GYP	GYPSUM
H	HIGH
HB	HOSE BIBB
HDW	HARDWARE
HEX	HEXAGON, HEXAGONAL
HGR	HANGER
HGT	HEIGHT
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HP	HIGH POINT
HR	HOUR
HW	HOT WATER
HVAC	HEATING, VENTILATION & AIR CONDITIONING
ID	INSIDE DIAMETER
IDF	INTERMEDIATE DATA FRAME
INCAN	INCANDESCENT
INCL	INCLUSIVE, INCLUDE
INFO	INFORMATION
INSUL	INSULATION
INT	INTERIOR
JUNC	JUNCTION
JST	JOIST
JT	JOINT
KS	KNEESPACE
LAB	LABORATORY
LAM	LAMINATE, LAMINATED
LAV	LAVATORY
LB(S)	POUND(S)
LDG	LANDING
L	LONG, LENGTH
LF	LINEAR FEET
LH	LEFT HAND
LOC	LOCATION
LP	LOW POINT
LT	LIGHT
LTG	LIGHTING
LVR	LOUVER
MACH	MACHINE
MAINT	MAINTENANCE
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MED	MEDIUM
MEMB	MEMBRANE
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MET	METAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MO	MASONRY OPENING, MOTOR OPERATED
MOD	MODIFY, MODIFIED
MTD	MOUNTED
MTG	MOUNTING
MW	MICROWAVE
MTL	METAL
N	NORTH
NA	NOT APPLICABLE
NAT	NATURAL
NFPA	NATIONAL FIRE PROTECTION ASSOC.
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NR	NOT RATED
NTS	NOT TO SCALE
OA	OVERALL
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OFF	OFFICE
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OTS	OPEN TO STRUCTURE
PART	PARTITION
PB	PARTICLE BOARD
PERF	PERFORATE, PERFORATED
PL	PLATE
PLAS	PLASTER
PLAM	PLASTIC LAMINATE
PLYWD	PLYWOOD
PLBG	PLUMBING
PNL	PANEL
PR	PAIR
PREP	PREPARATION
PT	PAINT
PTD	PAINTED
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
R	RADIUS
RA	RETURN AIR
RCP	REFLECTED CEILING PLAN
RCPT	RECEPTACLE
RCVG	RECEIVING
RD	ROOF DRAIN
RE	REFER, REFERENCE
REC	RECEPTION
REF OR REFRIG	REFRIGERATOR
REINF	REINFORCE, REINFORCING
REQD	REQUIRED
RET	RETURN
REV	REVISION
RH	RIGHT HAND
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
RR	RESTROOM
RB	RESILIENT BASE
S	SOUTH
SA	SUPPLY AIR
SC	SEALED CONCRETE
SCHED	SCHEDULE
SECT	SECTION
SECY	SECRETARY
SERV	SERVICE, SERVING
SF	SQUARE FEET
SHLVG	SHELVING
SHT	SHEET
SHWR	SHOWER
SIM	SIMILAR
SLDNG	SLIDING
SND	SANITARY NAPKIN DISPENSER
SNDU	SANITARY NAPKIN DISPOSAL UNIT
SQ	SQUARE
SPEC	SPECIFICATIONS
SPKR	SPEAKER
ST	STREET
SS	STAINLESS STEEL
STA	STATION
STC	SOUND TRANSMISSION CLASS
STD	STANDARD
STL	STEEL
STOR OR STO	STORAGE
STRUC	STRUCTURAL
SUSP	SUSPENDED
SW	SWITCH
SYM	SYMMETRICAL
SYN	SYNTHETIC
SURF	SURFACE
TAS	TEXAS ACCESSIBILITY STANDARDS
TB	TACKBOARD
TC	TOP OF CURB
TEL	TELEPHONE
TEMP	TEMPERATURE
TERR	TERRAZZO
THK	THICK(NESS)
TLT	TOILET
TRANS	TRANSPORTATION
TRD	TREAD
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL, TOP OF SLAB
TPD	TOILET PAPER DISPENSER
TYP	TYPICAL
UL	UNDERWRITERS LABORATORY
UNFN	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UTIL	UTILITY
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST	VESTIBULE
V.I.F.	VERFY IN FIELD
VWC	VINYL WALL COVERING
VP	VISION PANEL
W	WIDTH, WEST
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WD	WOOD
WGL	WIRE GLASS
WP	WATERPROOF
WT	WEIGHT
WTW	WALL TO WALL
WWF	WELDED WIRE FABRIC

SHEET REFERENCES

MATERIALS & SYMBOLS

COMMON BRICK
STRUCTURAL CLAY TILE
CONCRETE MASONRY UNITS
CAST OR CUT STONE
MARBLE
CONCRETE
EARTH
GRAVEL
SAND
WOOD(ROUGH)
WOOD(BLOCKING)
PLYWOOD
TERRAZZO EXPOSED AGGREGATE
CEMENT TOPPING
RIGID INSULATION
EXTRUDED SHAPES
BREAK METAL SHAPES
BATT OR BLANKET INSULATION
CORK OR COMPOSITE
RUBBER OR NEOPRENE
STEEL IN SECTION
BRASS OR BRONZE
STAINLESS STEEL OR ALUMINUM
SHEET METAL (ALL METALS SMALL SCALE)
METAL ELEVATION
CAST IRON
CERAMIC TILE
QUARRY TILE
RESILIENT TILE
CARPET & PAD
PLASTER ON METAL LATH
GYPSUM BOARD
PLASTER OR DRYWALL PARTITION
SOLID PLASTER PARTITION
INSULATED PARTITION SOUND OR THERMAL
WOOD FRAME PARTITION
RIGID INSULATION
STEEL SHAPES



ARCHITECTURAL

G000	COVER SHEET
G001	DRAWING INDEX
G002	ACCESSIBILITY STANDARDS
G003	CODE ANALYSIS
G004	LIFE SAFETY PLAN

GENERAL

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	PLAT (SHEET 1 OF 2)
	PLAT (SHEET 2 OF 2)
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C3	GRADING PLAN
C3-1	UTILITY PLAN
C4	DRAINAGE PLAN
C5	DETENTION AND DRAINAGE CALCULATIONS
C6	PAVING LAYOUT
C9	STORM DETAILS
C11	PAVING DETAILS

CIVIL

S 000	GENERAL NOTES
S 001	TYPICAL DETAILS
S 100	SITE PLAN
S 101	ENTRANCE WALL PLAN, ELEVATION AND DETAILS
S 102	LIGHT POLE & FLAG POLE FOUNDATIONS
S 200A	CONCESSION FOUNDATION & GR. FL. FRAMING PLAN
S 200B	BATTING CAGE FOUNDATION & GR. FL FRAMING PLAN
S 200C	PRESS BOX FDN., GR. FL. PLAN & DETAILS
S 300A	CONCESSION ROOF FRAMING PLAN
S 300B	BATTING CAGE ROOF FRAMING PLAN
S 400	DETAILS

LANDSCAPE

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A101	EXISTING STORAGE BUILDING & ELECTRICAL SERVICE DROP YARD
A102	COMPLEX ENTRANCE WALL PLANS
A103	BASEBALL FIELD I
A104	BASEBALL FIELD II
A105	BASEBALL FIELD III
A106	BASEBALL/SOFTBALL FIELD IV
A107	FENCE PLANS AND ELEVATIONS
A108	ENLARGED SITE PLANS
A109	SITE DETAILS
A110	SITE DETAILS
A111	WAYFINDING SIGNAGE
A112	MAP STATION PLAN
A113	SECURITY CAMERAS LOCATION ON SITE
A200A-1	CONCESSION SCHEDULE
A200A-2	CONCESSION FLOOR PLAN
A200A-3	CONCESSION DIMENSION CONTROL PLAN
A200B-1	BATTING CAGE SCHEDULE
A200B-2	BATTING CAGE FLOOR PLAN
A200B-3	BATTING CAGE DIMENSION CONTROL PLAN
A200B-4	BATTING CAGE FLOOR PATTERN PLAN
A200C	PRESS BOXES PLANS (TYPICAL)
A300A	CONCESSION REFLECTIVE CEILING PLAN
A300B	BATTING CAGE REFLECTIVE CEILING PLAN
A305A	CONCESSION ROOF PLAN
A305B	BATTING CAGE ROOF PLAN
A306A	CONCESSION ROOF DETAILS
A306B	BATTING CAGE ROOF DETAIL
A400A	CONCESSION EXTERIOR ELEVATIONS
A400B	BATTING CAGE EXTERIOR ELEVATIONS
A500A	CONCESSION BUILDING SECTIONS
A500B	BATTING CAGE BUILDING SECTIONS
A501A	CONCESSION WALL SECTIONS
A501B	BATTING CAGE WALL SECTIONS
A502A	CONCESSION WALL SECTIONS
A502B	BATTING CAGE WALL SECTIONS
A503A	CONCESSION WALL SECTIONS
A503B	BATTING CAGE EXTERIOR WALL DETAILS
A504A	CONCESSION EXTERIOR WALL DETAILS
A505A	MISC. DETAILS
A600	RESTROOMS ENLARGED PLANS
A601	CONCESSION KITCHEN ENLARGED PLAN
A700	RESTROOM ELEVATIONS
A701	INTERIOR ELEVATIONS
A702	MILLWORK ELEVATIONS & MILLWORK TYPES (CONCESSION)
A703	MILLWORK ELEVATION & MILLWORK TYPE (BATTING CAGE)
A704	PLAQUE SCHEDULE
A800A	CONCESSION BUILDING PLAN DETAILS
A800B	BATTING CAGE PLAN DETAILS
A801B	BATTING CAGE PLAN DETAILS
A900	PARTITION TYPES
A901A	CONCESSION WINDOW & DOOR FRAME DETAILS
A901B	BATTING CAGE WINDOW & DOOR FRAME DETAILS

TECHNOLOGY

MECHANICAL

MEP100	ELECTRICAL SITE PLAN
MEP101	PHOTO DEPICTIONS OF WORK & PRACTICE FIELD LIGHTING
MEP102	SPORT LIGHTING PHOTOMETRIC PLAN
MEP103	SPORT LIGHTING PHOTOMETRIC PLAN
MEP104	WALKWAY PHOTOMETRICS
M001	MECHANICAL LEGEND, NOTES AND SCHEDULES
M002	MECHANICAL DETAILS
M003	MECHANICAL SCHEDULES
M-100	CONCESSION FLOOR PLAN MECHANICAL
M-101	CONCESSION ROOF PLAN MECHANICAL
M-200	BATTING CAGE FLOOR PLAN MECHANICAL
M-300	PRESS BOX FLOOR PLAN MECHANICAL
M400	CONCESSION HOOD DETAILS SHEET 1
M401	CONCESSION HOOD DETAILS SHEET 2
M402	CONCESSION HOOD DETAILS SHEET 3
M403	CONCESSION HOOD DETAILS SHEET 4

PLUMBING

P001	PLUMBING LEGEND, NOTES AND SCHEDULES
P002	PLUMBING DETAILS
P003	PLUMBING RISER DIAGRAMS
P004	GREASE TRAP DETAILS
P-100A	CONCESSION SUB-FLOOR PLAN PLUMBING
P-100B	CONCESSION FLOOR PLAN PLUMBING
P-200A	BATTING CAGE FLOOR PLAN PLUMBING UNDERGROUND
P-200B	FLOOR PLAN PLUMBING ABOVE-GRADE

ELECTRICAL

E001	ELECTRICAL SYMBOLS, SCHEDULES AND NOTES
E002	ELECTRICAL ONE-LINE AND PANEL SCHEDULES
E003	ELECTRICAL PANEL SCHEDULES
E004	ELECTRICAL CONDUIT SCHEDULES
EP-100	FLOOR PLAN ELECTRICAL POWER
EP-101	ROOF PLAN ELECTRICAL POWER
EP-200	BATTING CAGE FLOOR PLAN ELECTRICAL POWER
EP-300	FLOOR PLAN ELECTRICAL POWER
EL-100	FLOOR PLAN ELECTRICAL LIGHTING
EL-200	FLOOR PLAN ELECTRICAL LIGHTING
EL-300	FLOOR PLAN ELECTRICAL LIGHTING
EL-400	FLOOR PLAN LIGHTING

ALTERNATES

PACKAGE 2: BUILDINGS A, B, C, D ; RENOVATION OF BUILDING E, PARTIAL SITEWORK, PARTIAL PAVING, PARTIAL UTILITY, ENTRANCE WALL, NEW FENCES.
THE ENTIRE COMPLEX WILL RECEIVE IMPROVEMENTS SUCH AS FOLLOW BUT NOT LIMITED TO:

- A NEW SIX (6) BAY PRE-ENGINEERED BUILDING (INCORPORATED WITH SELF-RETRACTABLE NETTING SYSTEMS) WITH RESTROOMS.
- TWO (2) NEW PRESS BOXES (PRE-ENGINEERED BUILDINGS)
- AN ENTRANCE WALL DESIGN (LOCATED NORTH SIDE OF THE COMPLEX).
- AN ORNAMENTAL FENCE AT THE NORTH SIDE OF THE COMPLEX AND A CHAIN LINK FENCE ON EAST SIDE PERIMETER OF THE COMPLEX
- NEW SIDEWALKS AS SHOWN IN THE DRAWINGS CONNECTING THE NEW BUILDINGS THROUGHOUT THE COMPLEX AS WELL AS THE NORTH SIDE OF THE REMODELED PARKING LOT.
- OUTSIDE SEATING AREA WITH PARK BENCHES BETWEEN THE BASEBALL FIELD AND FOOTBALL FIELD
- ONE (1) NEW FLAG POLE AT THE ENTRANCE OF THE COMPLEX & NEW TWO (2) NEW STADIUM LIGHTS FOR THE SOFTBALL FIELD
- MINOR RENOVATION OF THE SMALL STORAGE ROOM LOCATED ON THE NORTH SIDE OF THE BATTING CAGE BUILDING
- REMOTE ACCESS CONTROLLED CAMERAS AS SHOWN IN THE DRAWINGS
- PROVIDE THE CONCRETE PAD AS SHOWN ON THE PLANS FOR THE SHIPPING CONTAINERS
- INSTALL NEW STADIUM LIGHT POLES WITH LED LIGHT FIXTURE ON THE 50 YARD FOOTBALL PRACTICE FIELD. RE: ENLARGED SITE PLANS & MEP DRAWINGS

SCOPE OF WORK

PROJECT LOCATION

NORTH

VICINITY MAP

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE: HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

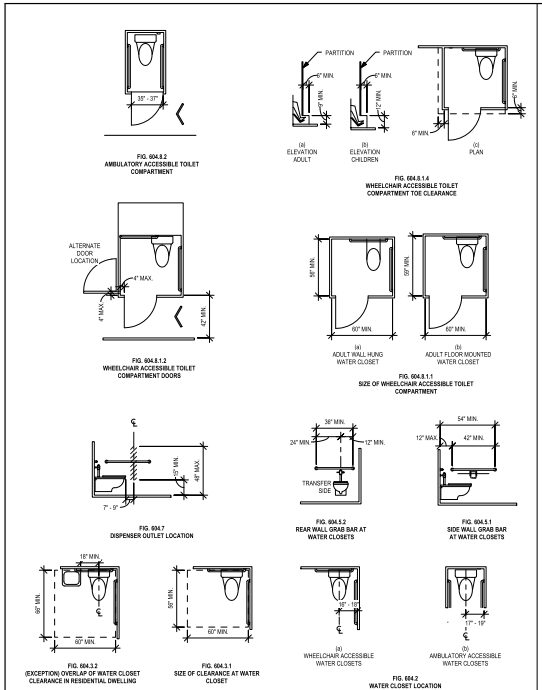
Drawing Date:	07/26/2021
Drawn:	IK
Checked:	BM, CD
Scale:	12" = 1'-0"
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

DRAWING INDEX

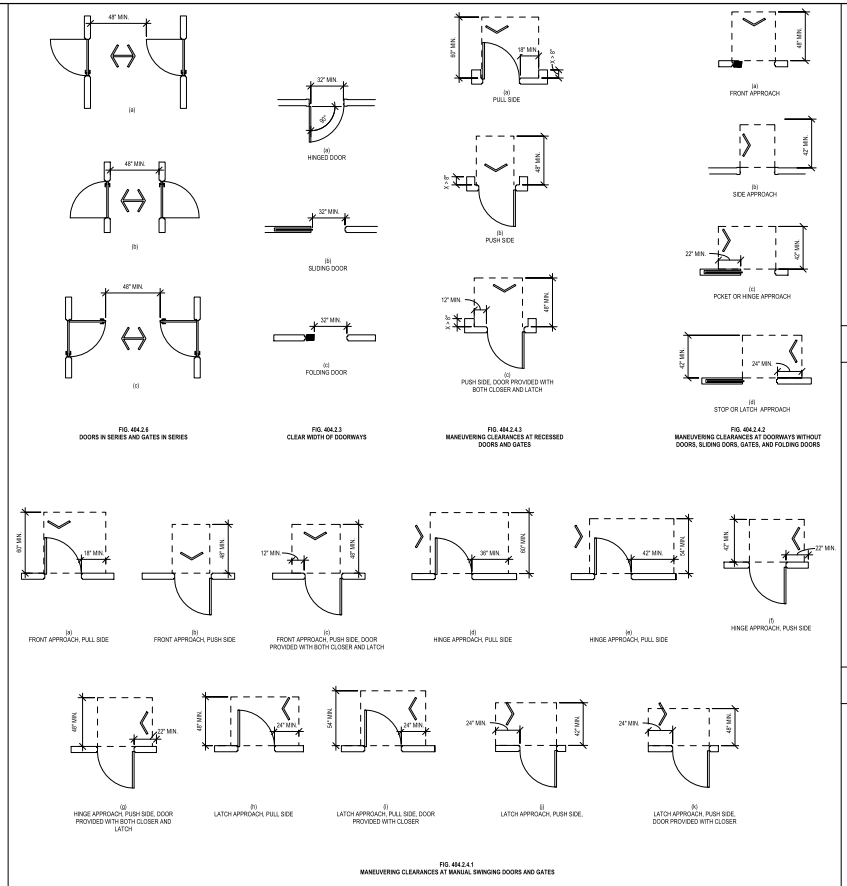
G001



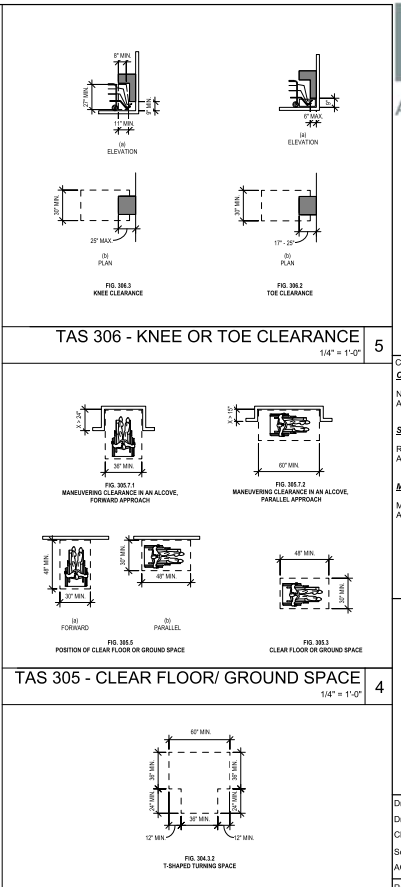
	AGES 3 & 4	AGES 5 THROUGH 8	AGES 9 THROUGH 12
WATER CLOSET CENTERLINE	12 IN. (305 MM.)	12 TO 15 IN. (305 TO 380 MM.)	15 TO 18 IN. (380 TO 455 MM.)
TOILET SEAT HEIGHT	11 TO 12 IN. (280 TO 305 MM)	12 TO 15 IN. (305 TO 380 MM.)	15 TO 17 IN. (380 TO 430 MM.)
GRAB BAR HEIGHT	18 TO 20 IN. (280 TO 305 MM.)	20 TO 25 IN. (510 TO 635 MM.)	25 TO 27 IN. (635 TO 685 MM.)
DISPENSER HEIGHT	14 IN. (355 MM.)	14 TO 17 IN. (355 TO 430 MM.)	17 TO 19 IN. (430 TO 485 MM.)

ADVISORY SPECIFICATIONS FOR WATER CLOSETS SERVING CHILDREN AGES 3 THROUGH 12

TAS 604 - WATER CLOSETS AND TOILET COMPARTMENTS 1/4" = 1'-0" 11



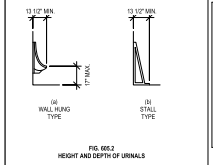
TAS 404 - DOORS DOORWAYS, AND GATES 1/4" = 1'-0" 7



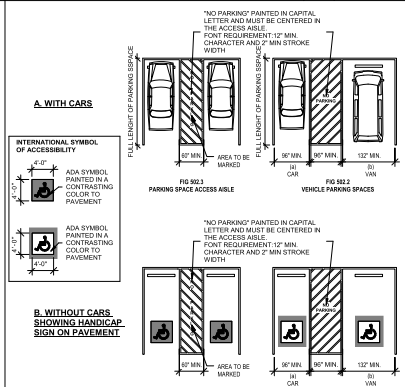
TAS 306 - KNEE OR TOE CLEARANCE 1/4" = 1'-0" 5

TAS 305 - CLEAR FLOOR/ GROUND SPACE 1/4" = 1'-0" 4

TAS 304 - TURNING SPACE 1/4" = 1'-0" 3

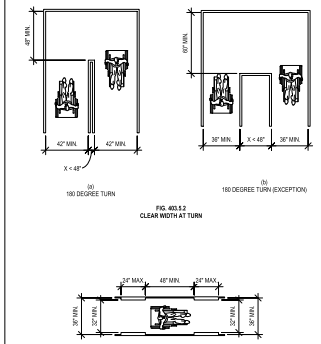


TAS 605 - URINALS 1/4" = 1'-0" 10

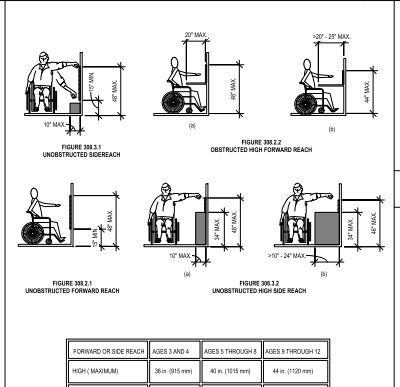


TAS 502 - NEW ACCESSIBLE PARKING REQUIREMENTS EFFECTIVE AUGUST 1ST, 2020

TAS 502 - PARKING SPACES 1/4" = 1'-0" 9



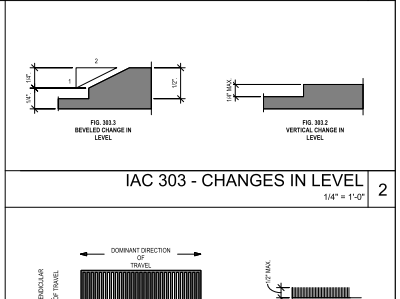
TAS 403 - WALKING SURFACES 1/4" = 1'-0" 8



FORWARD OR SIDE REACH	AGES 3 AND 4	AGES 5 THROUGH 8	AGES 9 THROUGH 12
HIGH (MAXIMUM)	36 in. (915 mm)	40 in. (1015 mm)	44 in. (1120 mm)
LOW (MINIMUM)	20 in. (510 mm)	18 in. (455 mm)	16 in. (405 mm)

CHILDREN'S REACH RANGES

TAS 308 - REACH RANGES 1/4" = 1'-0" 6



IAC 303 - CHANGES IN LEVEL 1/4" = 1'-0" 2

TAS 302 - FLOOR OR GROUND SURFACES 1/4" = 1'-0" 1

IDG+ ARCHITECTS
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

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ISSUE FOR BID	09/07/2022

ACCESSIBILITY STANDARDS

G002

CODE ANALYSIS

1. PROJECT DESCRIPTION:
Project Name: Baseball Fields Upgrade Phase II: South Post Oak Sportsplex
Location: 5535 Hobby Road
Houston, TX 77053
Project No: 6000-02
Analysis By: Peggy Nordmann
Date(s): 08/04/2021

2. GOVERNING AGENCY(s):

Fort Bend County
City of Houston

3. GOVERNING CODE(s):

2012 International Building Code w/ Local Amendments
2012 Uniform Mechanical Code w/ Local Amendments
2012 Uniform Plumbing Code w/ Local Amendments
2012 International Fire Code w/ Local Amendments
2015 International Energy Conservation Code w/ 2001 Supplement
2020 National Electric Code w/ State Mandates
2015 International Existing Building Code w/ Local Amendments
2015 International Fire Code w/ Local Amendments
2012 Texas Accessibility Standards
Fort Bend County Fire Marshall
2013 ANSI/ASHRAE/IES Standard 90.1

4. ZONING DISTRICT:

Not Applicable

5. FIRE DISTRICT:

City of Houston Fire Marshall

6. BUILDING DESIGN CATEGORY:

Category II-B, Table 1604.5

7. WIND LOAD:

150 mph (3 Second Wind Gust), Figure 1609.3(1)

8. SNOW LOAD:

0 , Figure 1608.2

9. SEISMIC USE GROUP:

Risk Category Group III, Section 1604.5

10. OCCUPANCY CLASSIFICATION: Primary: ASSEMBLY - (A-5) Section 305.1

11. SPECIAL OCCUPANCY PROVISIONS:

Not Applicable

12. CONSTRUCTION TYPE:
Table 601

Assembly (A-5): Type IIB (NON-SPRINKLED)

All wood blocking to be fire-retardant

13. PROPERTY RESTICTIONS AND REQUIREMENTS:

Plan North: 10'-0" Building Line - City of Houston
Plan East: No Restrictions
South: No Restrictions
West: No Restrictions

14. ALLOWABLE FLOOR AREA and HEIGHT:
See Table 503

UL - Unlimited

CONSTRUCTION TYPE -	HEIGHT ABOVE GRADE PLANE
TYPE II-B	-

15. ALLOWABLE FLOOR AREA MODIFICATIONS:

A-5 Occupancy:
Allowable floor area for non-sprinkled Type II - B = UL sf per floor
Actual floor area = 13,327 SF

A = Allowable Area per Story
S = Stories above grade
UL = Unlimited
NP = Not permitted
1 = Allowable building height and story increase due to automatic sprinkler system installation. Section 504.2
2 = Allowable building area increase due to street frontage. Section 506.2
3 = Allowable building area increase due to automatic sprinkler system installation. Section 506.3
4 = Unlimited area buildings. Section 507
W = Width of public way or open space (feet) in accord. w/ Section 506.2.1

Equation 5.1: Aa = [At + (At x If) + (At x Is)]
Equation 5.2: If = [F/P - .25]W/30

* Section 506.2, ** Section 506.1,

16. BUILDINGS AT BASEBALL FIELDS

Building "A" Concession Stand
4,422 SF, One Story
Construction Type II B (non-sprinklered)
Fire Separation Distance (Table 602):
North: 204'
East: 20'
South: 93'
West: 23'

Building "B" West Press Box
112 SF, Second Story only (No First Floor)
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance:
North: Exceeds 30'
East: 23'
South: Exceeds 30'
West: Exceeds 30'

Building "C" East Press Box
112 SF , Second Story only (No First Floor)
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance:
North: Exceeds 30'
East: Exceeds 30'
South: Exceeds 30'
West: Exceeds 20'

Building "D" Batting Cage Building
10,156 SF, One Story
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance
North: 10' - 7" (No exterior wall openings)
East: Exceeds 30'
South: Exceeds 30'
West: Exceeds 30'

Building "E" Existing Storage Building
297 SF, One Story
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance
North: Exceeds 30'
East: Exceeds 30'
South: 10' - 7" (No exterior wall openings)
West: Exceeds 30'

17. FIRE RESISTANCE RATING REQ. FOR EXT. WALLS BASED ON FIRE SEPARATION DISTANCE:
See Table 602

Wall Protection	Fire Rating (Hour(s))
< 5'	1
≥ 5' to < 10' 1 (0 for IIB)	1
≥ 10' to < 30'1 (0 for IIB)	0
≥ 30'	0

18. MAXIMUM AREA OF EXTERIOR WALL OPENINGS:

Wall Opening	% of Unprotected Wall	% of Protected Wall
< 3'	Not Permitted	Not Permitted
3' to < 5'	Not Permitted	15
5' to < 10'	10	25
10' to < 15'	15	45
15' to < 20'	25	75
20' to < 25'	45	No Limit
25' to < 30'	70	No Limit
30' or more	No Limit	No Limit

Roof Covering Classification: Table 1505.1

Type C (for IIB)

19. OCCUPANCY SEPARATION REQUIREMENTS:

No Separation Required

Nota A - Occupancy separation not required between storage and business

20. BUILDING FIRE RESISTIVE REQUIREMENTS:
See Table 601

All 0 if using IIB - including roof assembly (Note e)

21. PROTECTION OF INTERIOR WALLS
See Table 803.11

Finish Requirements - Class C

22. SPECIAL FIRE RESISTANCE PROVISIONS:

Not Applicable

23. DESIGN LOADS (UNIFORM AND CONCENTRATED):
See Table 1607.1,

Category	Uniform Load(psf)	Concentrated Load(lbs)
Corridors	100	-
Fire Escapes	100	-
Lobby	100	-
Classrooms	40	1,000
Offices	50	2,000
Corridors above 1st floor	80	2,000
Sidewalks	250	8,000
Stairs	100	Note f
Walkways / Elevated Platforms	60	-

24. OCCUPANT LOAD:

See Table 1004.1.2 (Maximum Floor Area Allowances per Occupant)

Space Use
Assembly (A-5)

Occupant Load Factor (sf)

Building "A" Concession
Concession Stand
1. Concession - 762 SF/200 GSF = 4
2. Storage - 62 SF/300 GSF = 1
Meeting Rooms
3. Meeting Room I - 441 SF/15 NSF = 30
4. Meeting Room II - 441 SF/15 NSF = 30
5. Janitor/HVAC/Storage 333/300 GSF = 2
Occupant Load Total : 67 Persons

Building "B" Press Box
1. Press Box - 112 SF/100 GSF = 2
Building "B" Occupant Load Total: 2 persons

Building "C" Press Box
1. Press Box - 112 SF/100 GSF = 2
Building "C" Occupant Load Total: 2 persons

Building "D" Batting Cage
1. Batting Cages - 9,405 SF/50 GSF = 188
Building "D" Occupant Load Total: 188 Persons

Building "E" Existing Storage building
1. Storage - 62 SF/300 GSF = 1
Building "E" Occupant Load Total: 1 Person

SPORT COMPLEX BUILDINGS (A, B, C, D, E)

Total Occupant Load: 260 persons

25. EXIT WIDTH CALCULATION :

Building "A"
Concession Stand
Exit Width (1005.3.2)
(Occup.) 5 X 0.2"= 1" Required
36"x1 = 36" Provided
Meeting Rooms I & II (441 SF Each)
(Occup.) 30 X 0.2"= 6" Required
36"x1 = 36" Provided

Building "B" & "C" (Each) Press Box
(Occup.) 2 X 0.2"= .40" Required
36"x1 = 36" Provided

Building "D" Batting Cages
(Occup.) 188 X 0.2"= 37.6" Required
36"x2 = 72" Provided

Building "E" Existing Storage Building
(Occup.) 1 X 0.2"= .2" Required
72"x1 = 72" Provided

.....

Exit Travel Distance (1015)
A-3 Non-Sprinklered: 200' (Table 1016.2)
S-2 Non-sprinklered: 300'

Common Path of Egress Travel (Table 1021.2 (2))
Occ. A to not Exceed 75'
Occ S to not Exceed 75'

26. CORRIDOR EGRESS
Minimum Corridor Egress Ceiling Height:. Section 1003.2
All Occupancies 7'-6" (COH Amendment).
Calculated Egress Exit Required Width: Table 1005.3.2
Actual Egress Exit Width: See Plans
yy exits doors of 36" = yy" total egress
Minimum Egress Door Width and Height: Section 1005
Occ. A: 32" Clear & 80" Height (48" max. width for swinging door leaf)
Minimum Building Occupant Load Required Exits: Section 1014
Condition 1: Two exits required when occupancy exceeds Table 1015.1
1015.1.1: Three or more exits provided from a floor or space with occup. load of 501-1,000
Section 1012.1 - Minimum Number of Exits (see below)
Occupant load 1-500 persons per story 2 min. number of exits per story
Maximum Space Occupant Load for (1) Egress: Table 1015.1
Occ. A - 49 max. occupant load for space with one means of egress (COH Amendments)
Egress Exit Access: Section 1016.2
Non-Sprinklered: Where two exits or exit access doorways are required, from any portion of the exit access, the exit doors or exit access doorways shall be placed a distance apart equal to not less than one-third of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit door or exit access doorways.

Minimum Corridor Egress Width: Section 1018.1

Maximum Egress Length: Table 1017.2

Maximum Dead End Corridor: Section 1018.4

27.INTERIOR ENVIRONMENT
Minimum Habitable Room Width: Section 1208.1
7'-0" in any dimension
Minimum Habitable Spaces Ceiling Height: Section 1208.2
All Occupancies 7'-6"
Minimum Support Spaces Ceiling Height: Section 1208.2,
All Occupancies 7'-0"

28. PLUMBING **FIXTURE REQUIREMENTS:**
Fixture Count Requirements: See Table 2902.1, page 579

Occ. A-5
Water Closets
MALE 1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500
FEMALE 1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520
DRINKING FOUNTAIN 1 per 1000
MALE LAVATORIES 1 per 200
FEMALE LAVATORIES 1 per 150
2902.1.1: The occupant load shall be composed of 50% of each sex, unless statistical data approved by the building official indicate a different distribution of the sexes.

2014 Illinois Plumbing Code: Appendix A, Table B

ACTUAL OCCUPANCY = 400	MEN 200					WOMEN 200					UNISEX				TOTAL BUILDING	
	REQUIRED	EXISTING	DEMO	NEW	TOTAL	REQUIRED	EXISTING	DEMO	NEW	TOTAL	EXISTING	DEMO	NEW	TOTAL	REQUIRED	PROVIDED
WATER CLOSET	1	1	1	2	2	6	2	2	6	6	0	-	1	1	7	9
URINAL	-	2	2	2	2	-									-	9
TOTAL WC'S & URINALS	1	3	3	4	4	6	2	2	6	6	0	-	1	1	7	11
LAVATORY	1	2	2	3	3	1	2	2	3	3	0	-	1	1	2	7
DRINKING FOUNTAIN															1	2
MOP SINK															1	1

29. PARKING REQUIREMENTS:

See City of Houston Amendments
2012 Texas Accessibility Standard section 208 Table 208.2

Classification Parking Requirements:

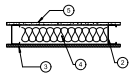
Class 6 (Recreational and Entertainement) L. Sport Complex
1 Space for every 40 SF of Seating
VAN Accessible Spaces 1 for every 8 accessible spaces must be "VAN" Accessible

Actual Building Parking Spaces:

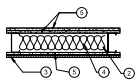
Classification Actual Spaces Space 1 for every 40 SF of seating
Total Parking Required: 18
Total Parking Provided with accessibe spaces: 123 + 5 accessible = 128 Parking Spaces

DESIGN NO. U404

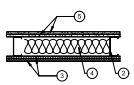
Bearing Wall Rating - 1 and 2 Hr (See items 2, 3 and 5)
Nonbearing Wall Rating - 1 and 2 Hr (See items 2, 3 and 5)



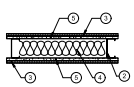
1 Hr. Configuration



2 Hr. Configuration



2 Hr. Configuration B



2 Hr. Configuration C

1. Steel Floor and Ceiling Runners- - (Not Shown) - Channel shaped, 3-1/58 in. wide by 1-1/4 in. deep, fabricated from min 20 MSG (0.0329 in., min bare metal thickness) galvanized steel spaced max 16 in. OC. For bearing walls, studs shall be designed in accordance with the current edition of the Specification for the Design of Cold-Formed Steel Structural Members by the American Iron and Steel Institute. All design details enhancing the structural integrity of the bearing wall assembly, including the axial design load of the studs, shall be as specified by the steel stud designer and/or producer and shall meet the requirements of all applicable local code agencies. Steel studs attached to floor and ceiling runners with 3/8 in. long Type S-12 steel screws on both sides of the studs or by welded or bolted connections' designed in accordance with the AISI specifications. For nonbearing walls, studs to be cut 3/8 to 3/4 in. less than assembly height and friction-fitted into floor and ceiling runners.

2. Steel Studs- - 3-5/8 in. wide, fabricated from min 20 MSG (0.0329 in., min bare metal thickness) galvanized steel spaced max 16 in. OC. For bearing walls, studs shall be designed in accordance with the current edition of the Specification for the Design of Cold-Formed Steel Structural Members by the American Iron and Steel Institute. All design details enhancing the structural integrity of the bearing wall assembly, including the axial design load of the studs, shall be as specified by the steel stud designer and/or producer and shall meet the requirements of all applicable local code agencies. Steel studs attached to floor and ceiling runners with 3/8 in. long Type S-12 steel screws on both sides of the studs or by welded or bolted connections' designed in accordance with the AISI specifications. For nonbearing walls, studs to be cut 3/8 to 3/4 in. less than assembly height and friction-fitted into floor and ceiling runners.

3. Cementitious Backer Units* - - 1/2 in. or 5/8 in. thick, applied vertically or horizontally with vertical joints centered over studs. Fastened to studs and runners with corrosion resistant, chamfered, ribbed wafer head screws with a minimum head diameter of .400 inch. For nonbearing systems, fastened to studs and bottom runners; with the uppermost screws placed 1/2 in. to 2 in. below the bottom edge of the leg of the top runner. Horizontal joints need not be backed by framing. 1 Hr System - Screws shall be min 1-1/4 in. Long and spaced a max of 8 in. OC. All vertical joints staggered one stud cavity from gypsum board vertical joints on the opposite side of studs. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. 2-Hr System - For the base layer in Configuration B, the screws shall be min 1-1/4 in. long and spaced a max of 12 in. OC. For the face layers, screws shall be 1-5/8 in. long and spaced a max of 8 in. OC. All face layer joints offset min 12 in. from underlying base layer joints. Joints in either layer need not be staggered from joints on the opposite side of the wall.
UNITED STATES GYPSUM CO - DUROCK Exterior Cement Board, or DUROCK Brand Cement Board.

4. Batts and Blankets* - Min 3 in. thick mineral wool insulation batts, friction-fitted between studs .
THERMAFIBER INC -Type SAFB.

5. **Gypsum Board*** - 5/8 in. thick, with square or tapered edges, applied vertically or horizontally with vertical joints centered over studs. Horizontal joints need not be backed by framing. Fastened with Type S-12 screws. *1-Hr System* - For vertical application, fastened to studs and runners with 1 in. long screws spaced max 8 in. OC at vertical edges and spaced max 12 in. OC in the field. For horizontal application, fastened to studs and runners with 1 in. long screws spaced max 8 in. OC. Vertical joints staggered one stud cavity from cement board vertical joints on opposite side of studs. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. *2-Hr System* - Base layer with an overlying gypsum board face layer fastened with 1 in. long screws spaced max 16 in. OC to studs and runners. Base layer with an overlying cement board face layer, fastened with 1 in. long screws spaced max 12 in. OC to studs and runners. Face layers fastened with 1 - 5/8 in. long screws spaced max 16 in. OC to studs and runners with screws offset 8 in. from face layer screws. Faco layer joints offset min 12 in. from base layer joints. Joints in either layer need not be staggered from joints on the opposite side of the wall.
CANADIAN GYPSUM COMPANY -Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC or WRX.
UNITED STATES GYPSUM CO -Type AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC or WRX.

U.L. RATINGS
1" = 1'-0" | 1

IDG Architects — Ft. Bend Co.-South Post Oak Sportsplex — Baseball Fields Upgrades – Phase II
Proj. No. 6001-02

61496 OPTI2323528 Version 2
HARDWARE GROUP NO. 001

PROVIDE EACH RU DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA.	SFIC EVEREST CORE	80-037 CKC EVQ9 R	626	SCH
1	EA.	SFIC MORTISE CYL.	80-132 X CAMCOLLAR AS REQ'D	626	SCH
1	EA.	NOTE	REMAINDER OF HARDWARE BY DOOR MFR.		

-Coordinate hardware with door MFR.

HARDWARE GROUP NO. 205

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA.	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVQ9 R	626	SCH
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	RAIN DRIP	142A DW x 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 209

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA.	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVQ9 R	626	SCH
1	EA.	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ (MOUNT ON INT.)	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	39A	A	ZER
1	EA.	THRESHOLD	655A	A	ZER

IDG Architects — Ft. Bend Co. - South Post Oak Sportsplex — Baseball Fields Updates – Phase II
Proj. No. 6001-02

HARDWARE GROUP NO. 214

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA.	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
2	EA.	MANUAL FLUSH BOLT	FB458	626	IVE
1	EA.	DUST PROOF STRIKE	DP2	626	IVE
1	EA.	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVQ9 R	626	SCH
1	EA.	OH STOP	9033 SERIES X SIZE & MOUNTING AS REQ	630	GLY
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ (Active Leaf)	689	LCN
2	EA.	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA.	RAIN DRIP	142A DW x 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	MEETING STILE	8193AA (2 PCS - 1 SET) HEIGHT AS REQ	AA	ZER
2	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 301

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA.	PRIVACY W/COIN TURN	L9044 17A LS83-363	626	SCH
1	EA.	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA.	GASKETING	4885 PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

HARDWARE GROUP NO. 501C

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA.	CLASSROOM LOCK	L9070HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVQ9 R	626	SCH
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	GASKETING	4885 PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

IDG Architects — Ft. Bend Co.-South Post Oak Sportsplex — Baseball Fields Upgrades – Phase II
Proj. No. 6001-02

HARDWARE GROUP NO. 715

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA.	PANIC HARDWARE	99-NL LENGTH AS REQ	626	VON
1	EA.	SFIC EVEREST CORE	80-037 CKC EVQ9 R	626	SCH
1	EA.	SFIC RIM CYLINDER	80-159 7	626	SCH
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	RAIN DRIP	142A DW x 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 805L

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA.	CLASSROOM DEADBOLT	B562HD	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVQ9 R	626	SCH
1	EA.	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA.	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA.	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA.	RAIN DRIP	142A DW x 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. J902

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA.	PADLOCK LCYL-SFIC	KS41F1200	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVQ9 R	626	SCH
1			BALANCE OF HARDWARE BY GATE SUPPLIER		

- CANE BOLT BY GATE SUPPLIER.

END OF SECTION 08 71 00

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466
Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

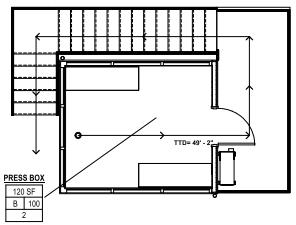
Drawing Date:	07/26/2021
Drawn:	PN, IK,
Checked:	BM, CD
Scale:	1" = 1'-0"
ACAD File:	

Revisions:

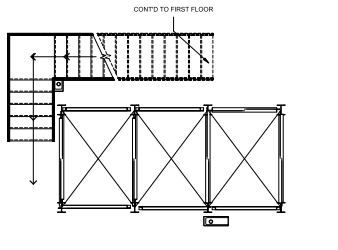
DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

CODE ANALYSIS

G003



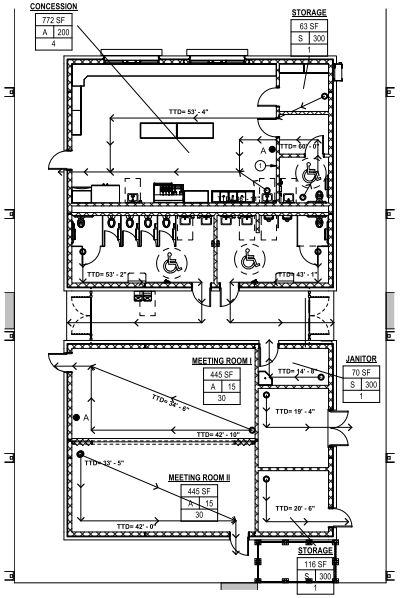
PRESS BOX - 2ND FLOOR LIFE SAFETY 3
1/4" = 1'-0"



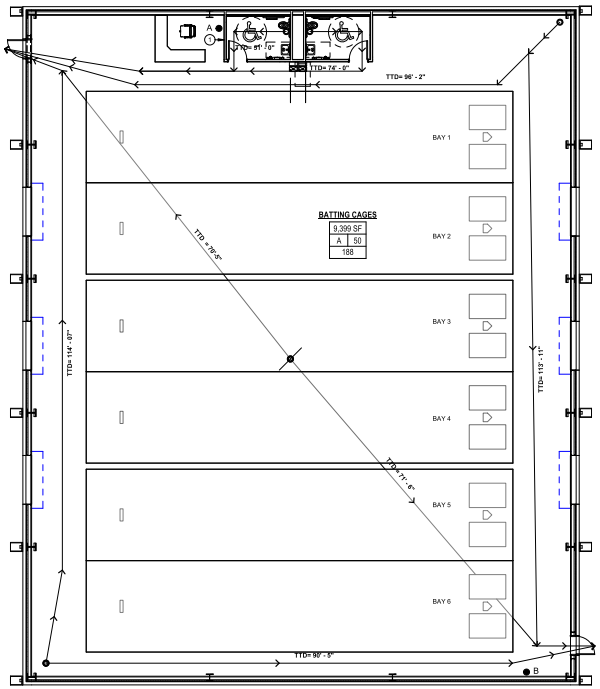
PRESS BOX - 1ST FLOOR LIFE SAFETY 2
1/4" = 1'-0"

① PROVIDE AN AUTOMATED EXTERNAL DEFIBRILLATOR AS SHOWN WITH STORAGE CABINET & WALL RECESSED MOUNTED TYPE PROVIDE A SIGN ABOVE SHOWING THE LOCATION. RE: SPECIFICATIONS

KEY NOTES



CONCESSION BUILDING LIFE SAFETY PLAN 4
1/8" = 1'-0"



BATTING CAGE BUILDING LIFE SAFETY PLAN 1
1/8" = 1'-0"

Fire Extinguisher
A - GENERAL (Semi-Recess)
B - GENERAL (Surface Mounted)
C - KITCHEN (Surface Mounted)

WALL MOUNTED FIRE EXTINGUISHER (FE) TYPE ABC, 10LB UNITS TO MEET CURRENT ANSI/UL STANDARDS 711 REQUIREMENTS, REFERENCE SPECIFICATIONS FOR MANUFACTURE

ONE HOUR (1) RATED FIRE PARTITION UL DESIGN NO. U419.

INDICATES EMERGENCY EXIT ROUTE

TTD 115'

TRAVEL DISTANCE TO AN EXIT NOT TO EXCEED 193 FEET

INDICATES POINT OF STARTING LOCATION

EXIT

INDICATES DIRECTION OF EXIT TRAVEL

Room name
2000 SF
OCCUPANCY TYPE E 20
100
AREA OF ROOM
AREA PER OCCUPANT
OCCUPANT LOAD

CODE ANALYSIS LEGEND

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC. AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES AND APPLICATIONS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL DIMENSIONS AND OR EXISTING FIELD CONDITIONS PRIOR TO START.
5. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO THE ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.
6. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES WITH ARCHITECT PRIOR TO BIDDING.
7. THE GENERAL CONTRACTOR SHALL PROTECT ANY CONSTRUCTION OR FINISHES THAT IS TO REMAIN.
8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	IK
Checked:	BM, CD
Scale:	As indicated
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Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
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ISSUE FOR PERMIT	12/22/2021
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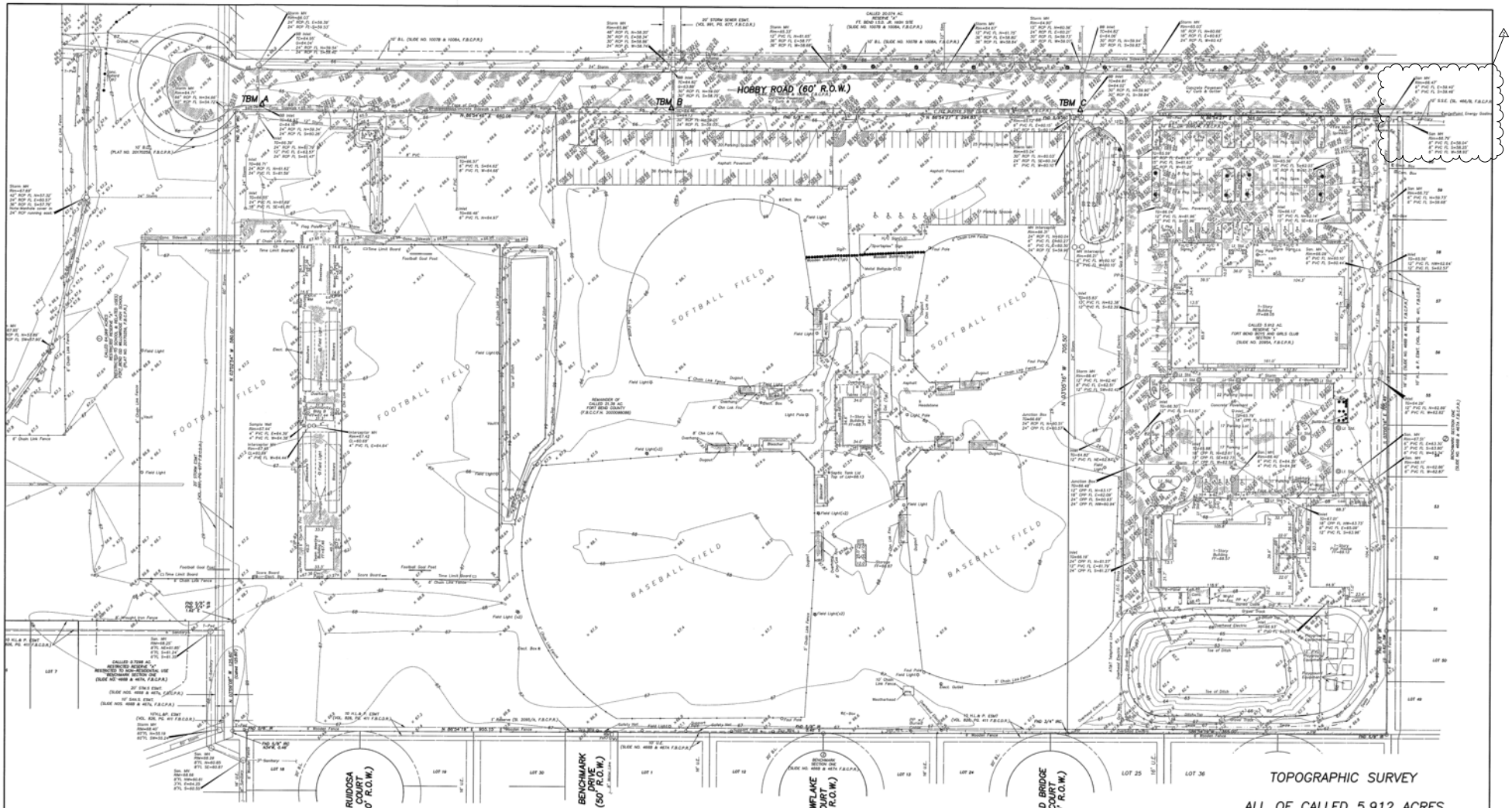
LIFE SAFETY PLAN

G004



LEGEND

	PROPERTY CORNER		WOOD FENCE
⊙ FND	FOUND MONUMENTATION		BARBED WIRE FENCE
○ SET	SET MONUMENTATION W/CAP		CHAIN LINK FENCE
GM	GAS METER		WROUGHT IRON FENCE
PP	POWER POLE		OVERHEAD ELECTRIC
Guy	GUY WIRE		SANITARY SEWER LINE
MH	MANHOLE		STORM SEWER LINE
CO	CLEANOUT		WATERLINE
WV	WATER VALVE		GAS LINE
FH	FIRE HYDRANT		TELEPHONE LINE
WM	WATER METER		EASEMENT
Tel Box	PHONE EQUIPMENT		AERIAL EASEMENT
TV	CABLE EQUIPMENT		BUILDING LINE
LS	LIGHT STANDARD		PARKING SETBACK
LE	LIGHT		CENTER OF SWALE
	TRAFFIC SIGN		TOP OF BANK
	TREE		
	PIPE BOLLARD		
	PIPELINE MARKER	452.6	EXIST. NATURAL GROUND ELEVATION
	CURB LINE		
	EDGE ASPHALT	452.67	EXIST. ASPHALT OR CONCRETE ELEVATION
	CURB INLET		
	AREA INLET		
	EDGE OF BUILDING	452.67 / 452.17	TOP OF CURB ELEVATION / GUTTER ELEVATION

CEDER
OAK
ASHBERRY
HACKBERRY

50 25 0 50 100 150

NOTES:

1. THE BEARINGS SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD '83
2. THIS PROPERTY LIES IN UNSHADED ZONE "X" AS PER THE FLOOD INSURANCE RATE MAPS, COMMUNITY PANEL NO. 480296 1005 M, EFFECTIVE DATE MAY 2, 2019.
3. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT. THE SURVEYOR HAS NOT ATTEMPTED TO ABSTRACT THE PROPERTY. EASEMENTS, SETBACK LINES, AND AGREEMENTS MAY EXIST WHICH ARE NOT SHOWN HEREON.
4. BENCHMARK: HARRIS COUNTY FLOODPLAIN RM NO. 010225, BRASS DISK STAMPED RM 010225, LOCTAED 4.5 MILES WEST ON FM 2234 FROM THE INTERSECTION OF SH 288 & FM 2234 TO A BRIDGE BETWEEN HIRAM–CLARK AND PARK MANOR ST. MONUMENT IS ON THE EAST END OF A HEADWALL ON THE NORTH R.O.W. OF FM 2234. ELEV.=64.42' (NAVD'88, 2001 ADJ.)
5. TBM A: BOX CUT ON CURB OF A "BB" INLET LOCATED ON THE SOUTH RIGHT–OF–WAY OF HOBBY ROAD, APPROXIMATELY 58 FEET WEST OF THE HOBBY ROAD CUL–DE–SAC. ELEV.=64.97' (NAVD'88, 2001 ADJ.)
6. TBM B: BOX CUT ON CURB OF A "BB" INLET LOCATED ON THE SOUTH R.O.W. OF HOBBY ROAD APPROXIMATELY 550 FEET WEST OF THE HOBBY ROAD CUL–DE–SAC. ELEV.=64.86' (NAVD'88, 2001 ADJ.)
7. TBM C: BOX CUT ON TOP OF CURB AT CENTERLINE OF CURB INLET, APPROXIMATELY 500' WEST OF CENTERLINE OF SENTINEL ROAD. ELEV.=64.81' (NAVD'88, 2001 ADJ.)
8. TBM D: BOX CUT ON THE NORTHWEST CORNER OF A CURB INLET ON THE NORTH CURB LINE OF HOBBY STREET, APPROXIMATELY 250 FEET EAST OF CHIMNEY ROCK ROAD. ELEV.=66.63' (NAVD'88, 2001 ADJ.)
9. THE LOCATION OF UNDERGROUND SANITARY AND STORM LINES IS BASED ON VISIBLE AND APPARENT EVIDENCE. THE LOCATION AND SIZE OF UNDERGROUND WATER LINES IS BASED ON COMPILED DRAWINGS. UNDERGROUND GAS, COMMUNICATIONS, AND ELECTRICAL LINES CANNOT ALWAYS BE LOCATED AND MAY NOT ALL BE SHOWN ON THIS SURVEY. LOCATIONS SHOWN ARE BASED ON UTILITY MARKINGS AT THE TIME OF THIS SURVEY AND ANY COMPILED MAPS PROVIDED.

I hereby certify that this plat correctly represents the results of a topographic survey made on the ground under my supervision on the 27th day of April, 2021

Randy S. McClendon
Registered Professional Land Surveyor
Texas Registration No. 4079

NOTE: Without an original signature, this product is strictly preliminary, and shall not be recorded for any purpose and shall not be used or viewed or relied upon as a final survey document.

TOPOGRAPHIC SURVEY

ALL OF CALLED 5.912 ACRES
RESERVE "A"
FORT BEND BOYS AND GIRLS CLUB, SEC.1
(SLIDE NO. 2095A, F.B.C.P.R.) &
REMAINDER OF CALLED 21.38 AC.
(F.B.C.C.F.N. 2000098088)
J. POINTEVENT SURVEY NO. 3, A–305
FORT BEND COUNTY, TEXAS

TEJAS SURVEYING, INC.
FIRM NO. 10031300
1810 FIRST OAKS STREET, SUITE 220
RICHMOND, TEXAS 77406
Website: mrsurveyor.com

SCALE: 1"=50'	FIELD BOOK: 21–02	DATE: 05–19–2021
GF NO. XXXXXXXXX	ADDRESS: HOBBY ROAD, HOUSTON, TX 77053	REV: 10–20–2021
PHONE: (281) 240–9099	CAD FILE: TP\61\61–2105T	JOB NO. 61–2105–EAST

STATE OF TEXAS
COUNTY OF FORT BEND

We, Diane Duncum, President and Linda Worthy, Secretary of Board of Trustees, being officers of the Fort Bend Independent School District, owners of the 26.789 Acre Tract described in the above and foregoing map of FORT BEND I.S.D. JR. HIGH SITE, do hereby make and establish said subdivision and development plat of said property according to all lines, dedications, restrictions and notations on said maps or plat and hereby dedicate to the use of the public forever, all streets (except those streets designated as private streets), alleys, parks, water courses, drains, easements and public places shown thereon for the purposes and considerations therein expressed; and do hereby bind myself (or ourselves), my (or our) heirs and assigns to warrant and forever defend the title to the land so dedicated.

FURTHER, We, do hereby dedicate for public utility purposes an unobstructed aerial easement five (5) feet in width from a plane twenty (20) feet above the ground level upward, located adjacent to all public utility easements shown hereon.

FURTHER, We, do hereby covenant and agree that all of the property within the boundaries of this plat shall be restricted to provide that drainage structures under driveways shall have a net drainage opening area of sufficient size to permit the free flow of water without backwater and in no instance have a drainage opening of less than one and three quarters (1 3/4) square feet (18" diameter).

FURTHER, We, do hereby dedicate to the public a strip of land twenty (20) feet wide on each side of the center line of any and all bayous, creeks, gullies, ravines, draws, and drainage ditches located in said subdivision, as easements for drainage purposes. Fort Bend County or any other governmental agency shall have the right to enter upon said easement at any and all times for the purposes of construction and maintenance of drainage facilities and structures.

FURTHER, We, do hereby covenant and agree that all of the property within the boundaries of this subdivision and adjacent to any drainage easement, ditch, gully, creek or natural drainage way shall hereby be restricted to keep such drainageways and easements clear of fences, buildings, excessive vegetation and other obstructions to the operations and maintenance of the drainage facility and that such abutting property shall not be permitted to drain directly into this easement except by means of an approved drainage structure.

FURTHER, We, do hereby certify that We are the owners of all property immediately adjacent to the boundaries of the above and foregoing subdivision of FORT BEND I.S.D. JR. HIGH SITE where building setback lines or public utility easements are to be established outside the boundaries of the above and foregoing subdivision and do hereby make and establish all building setback lines and dedicate to the use of the public. all public utility easements shown in said adjacent acreage.

IN TESTIMONY WHEREOF, The Fort Bend Independent School District has caused these presents to be signed by Diane Duncum, its President, thereunto authorized, attested by its Secretary, Linda Worthy, and its common seal hereunto affixed this 9th day of December, 1986.

Fort Bend Independent School District

By: [signature]
President: Diane Duncum

Attest: [signature]
Secretary: Linda Worthy

STATE OF TEXAS

COUNTY OF FORT BEND

BEFORE ME, the undersigned authority, on this day personally appeared Diane Duncum and Linda Worthy known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledge to me that they executed the same for the purposes and considerations therein expressed and in the capacity therein and herein set out, and as the act and deed of said corporation.

GIVEN UNDER MY HAND AND SEAL OF OFFICE. THIS 16 day of December, 1986.

[signature]
Notary Public in and for
Fort Bend County, Texas
Rose Scamion

My Commission Expires 3-31-89

I, Franklin R. Schodek, am authorized under the laws of the State of Texas to practice the profession of surveying and hereby certify that the above subdivision is true and correct, was prepared form an actual survey of the property made under my supervision on the ground and that all boundary corners, angle points, points of curvature and other points of reference have been marked with iron (or other suitable permanent ferrous metal) pipes or rods having an outside diameter of not less than five eighths (5/8) inch and a length of not less than three (3) feet.

November 10, 1986

[signature]
Franklin R. Schodek

Texas Registration No.1535

GENERAL NOTES:

1. One-foot reserve dedicated to the public in fee as a buffer separation between the side or end of streets where such streets abut adjacent acreage tracts. the condition of such dedication being that when the adjacent property is subdivided in a recorded plat, the one-foot reserve shall thereupon become vested in the public for street right-of-way purposes and the fee title thereto shall revert to and revest in the dedicator, his heirs, assigns, or successors.
2. "BL" indicates Building Line.
3. "HL&P" indicates Houston Lighting & Power Company.
4. The top of all floor slabs shall be a minimum of [illegible] feet above sea level. In addition to this minimum, no floor slab shall be less than 1.5 feet above natural ground.
5. No improvements, including structures, fences, vegetation, etc., shall be constructed or placed within the drainage easement. The drainage district shall not be held responsible for any damage or vegetation placed upon the drainage easement. The drainage district shall have the right to remove any structure or vegetation which it deems to be interferring with drainage and the purpose of these drainage easements.
6. The shall be a **10.0** foot side building line on this tract.
7. There are no pipelimes crossing this tract.

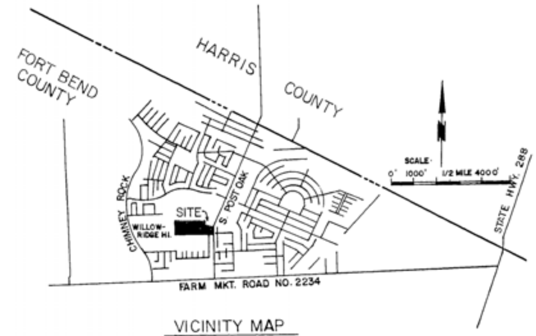
FORT BEND I.S.D. JR. HIGH SITE

BEING THE FORT BEND INDEPENDENT SCHOOL DISTRICT 26.789 ACRE TRACT IN THE J. POINTEVENT SURVEY, ABSTRACT 305, FORT BEND COUNTY, TEXAS

OWNER: FORT BEND INDEPENDENT SCHOOL DISTRICT
P.O. BOX 1004
SUGARLAND, TEXAS 77478
713-980-1300

ENGINEER: HENRY STEINKAMP, JR. INC.
909 FIFTH STREET
ROSENBERG, TEXAS 77471
713-342-2241

OCTOBER, 1986



VICINITY MAP

I, James H. Suchma, a Professional Engineer registered in the State of Texas do hereby certify that construction was completed on November 26, 1986.

This project was under continous inspection during construction and was constructed in accordance with and includes all items in the plans and specifications as approved by Fort Bend County and complies with all Fort Bend County requirements.

[signature]
James H. Suchma, P.E.

I, James H. Suchma, a Professional Engineer registered in the State of Texas do hereby certify that this plat meets all requirements of Fort Bend County.

[signature]
James H. Suchma, P.E.

I, Ron D. Drachenberg, FORT BEND COUNTY ENGINEER, DO HEREBY CERTIFY THAT THE PLAT OF THIS SUBDIVISION COMPLIES WITH ALL OF THE EXISTING RULES AND REGULATIONS OF THIS OFFICE AS ADOPTED BY THE FORT BEND COUNTY COMMISSIONERS COURT. HOWEVER, NO CERTIFICATION IS HEREBY GIVEN AS TO THE EFFECT OF DRAINAGE FROM THIS SUBDIVISION ON THE INTERCEPTING DRAINAGE ARTERY OR PARENT STREAM OR ON ANY OTHER AREA OR SUBDIVISION WITHIN THE WATERSHED.

[signature]
FORT BEND COUNTY ENGINEER
Ron D. Drachenberg

APPROVED BY THE COMMISSIONERS COURT OF FORT BEND COUNTY, TEXAS, THIS 2 DAY OF October, 1989.

[signature]
PRECINCT 1, COUNTY COMMISSIONER
Robert L. O'Shieles

[signature]
PRECINCT 2, COUNTY COMMISSIONER
Ben Dopham

[signature]
PRECINCT 3, COUNTY COMMISSIONER
Alton Pressley

[signature]
PRECINCT 4, COUNTY COMMISSIONER
Bob Lutts

[signature]
COUNTY JUDGE
Jodie Stavinoha

This is to certify that the City Planning Commission of the City of Houston, Texas as approved this plat and subdivision of FORT BEND I.S.D. JR. HIGH SITE in conformance with the laws and the State of Texas and the ordinances of the City of Houston as shown hereon and authorized the recording of this plat this 17th day of April 1989.

BY: [signature]
Chairman:
Burdette Keeland

BY: [signature]
Michael S. Marcotte, P.E.
Acting Secretary

I, DIANE WILSON, COUNTY CLERK IN AND FOR FORT BEND COUNTY, HEREBY CERTIFY THAT THE FOREGOING INSTRUMENT WITH ITS CERTIFICATE OF AUTHENTICATION WAS FILED FOR RECORDATION IN MY OFFICE ON October 2, 1989, AT 11:01 O'CLOCK A.M. IN SLIDE NUMBER (S) 1007B, 1008A OF THE PLAT RECORDS OF SAID COUNTY.

WITNESS MY HAND AND SEAL OF OFFICE, AT RICHMOND, TEXAS. THE DAY AND DATE LAST ABOVE WRITTEN.

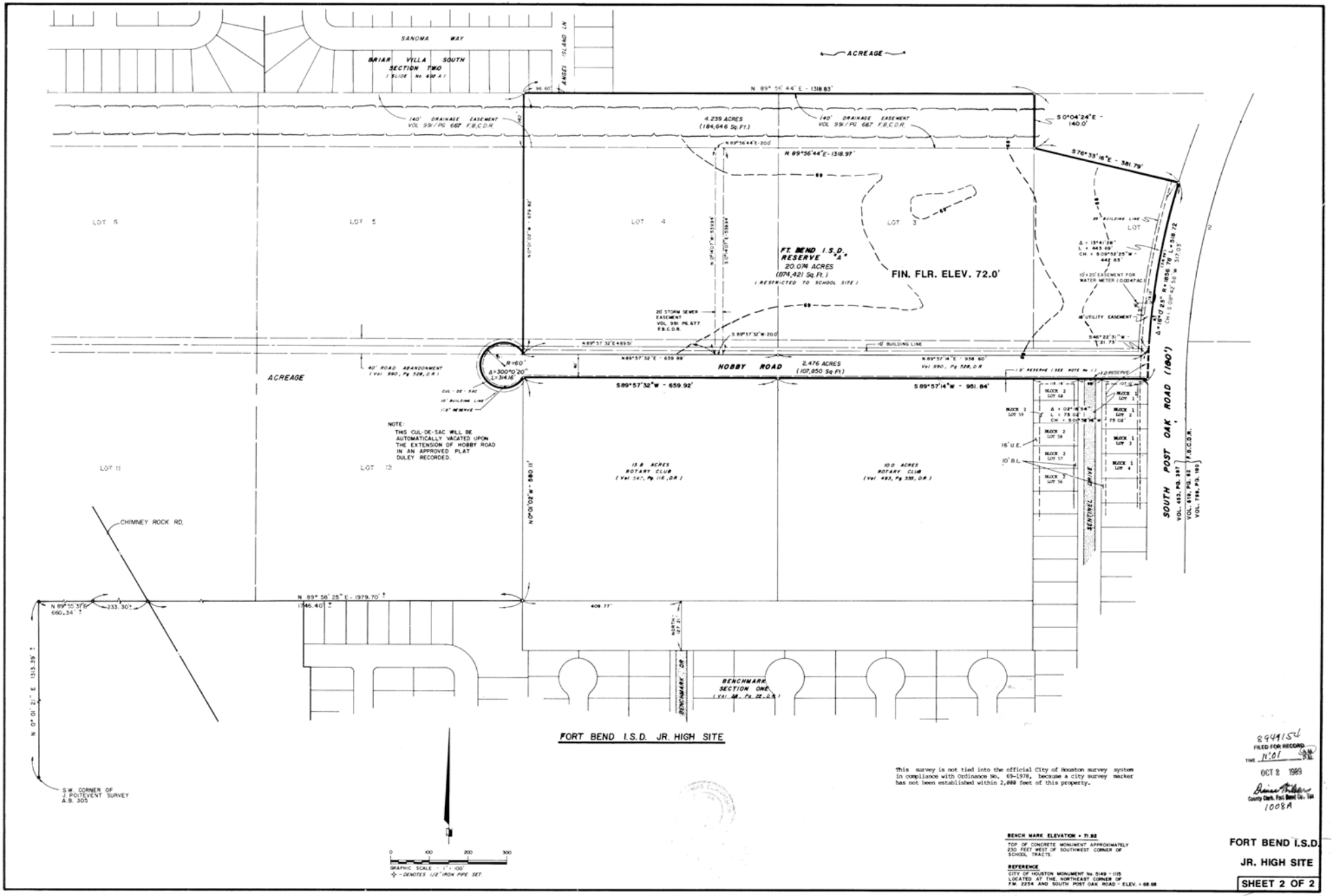
[signature]
COUNTY CLERK

FORT BEND COUNTY, TEXAS
BY: [signature]
DEPUTY

8949154
FILED FOR RECORD
11:01 A.M.
OCT 2 1989
1007B

SHEET 1 OF 2

1007B



FORT BEND I.S.D. JR. HIGH SITE

This survey is not tied into the official City of Houston survey system in compliance with Ordinance No. 69-1978, because a city survey marker has not been established within 2,000 feet of this property.

BENCH MARK ELEVATION = 71.92

TOP OF CONCRETE MONUMENT APPROXIMATELY 230 FEET WEST OF SOUTHWEST CORNER OF SCHOOL TRACTS.

REFERENCE

CITY OF HOUSTON MONUMENT No. 5149 - 1115
LOCATED AT THE NORTHEAST CORNER OF F.M. 2254 AND SOUTH POST OAK ROAD - ELEV. = 68.68

8 9 4 9 1 5

FILED FOR RECORD
TIME 11:01 A.M.
OCT 2 1989
County Clerk, Fort Bend Co., Tex.
1008A

FORT BEND I.S.D.
JR. HIGH SITE

SHEET 2 OF 2

FORT BEND I.S.D.
JR. HIGH SITE

GENERAL NOTES– INSIDE CITY LIMITS

1. CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING, AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS. WATER LINES, STORM DRAINAGE, AND STREET PAVING PUBLISHED BY HOUSTON PUBLIC WORKS.
2. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713–223–4567/811 OR 800–344–8377 AND LONE STAR NOTIFICATION CENTER AT 800–669–8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE §18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS, STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEM, WATER LINES, STORM DRAINAGE, AND STREET PAVING AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING, REFERENCED ABOVE, AT NO ADDITIONAL COST.
4. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, HOUSTON PUBLIC WORKS @ 832–394–9098 OR VIA FAX AT 832–395–4424 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
5. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.
6. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.
7. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.
8. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS AND RECORD AS–BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT WHO WILL MAKE THE CHANGES ON THE ORIGINAL TRACINGS, LABEL EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND RETURN IT TO THE OFFICE OF THE CITY ENGINEER.

STREET, BRIDGE AND R.O.W NOTES

1. HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN IS CONSISTENT WITH THE MINIMUM STANDARDS ESTABLISHED IN THE "INFRASTRUCTURE DESIGN MANUAL" REFERENCED AT: https://edocs.publicworks.houstontx.gov/engineering–and–construction/design–manuals.html
2. FILL AREAS ON PLANS SHALL BE FILLED IN LAYERS NOT EXCEEDING 8" IN DEPTH AND EACH COMPACTED TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY PRIOR TO INSTALLATION OF WATER LINE AND FILL AREA SHALL BE SEEDED AND FERTILIZED WITHIN 10 WORKING DAYS.
3. UTILITY CONTRACTOR SHALL PROVIDE TEMPORARY SILT BARRIER FENCE ON ALL NON–CURBED INLETS WHICH WILL REMAIN IN PLACE AFTER UNDERGROUND CONTRACT IS COMPLETE.
4. CONTRACTOR SHALL PROVIDE SILT BARRIER FENCE ON ALL STAGE 1 CURB INLETS.
5. EXISTING PAVEMENTS, CURBS, DRIVEWAYS, AND SIDEWALKS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO CITY OF HOUSTON STANDARDS, WITH LATEST ADDENDA AND AMENDMENTS THERETO.
6. CONDITION OF THE ROAD AND/OR RIGHT–OF–WAY UPON COMPLETION OF JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO SATISFACTION OF THE OWNING AUTHORITY.
8. EXPOSED 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BARS 24" LONG 24" C–C DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB WITH "PO ROC" OR EQUAL.
9. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG AREAS OF EXCAVATION.
10. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING AS SPECIFIED IN CITY OF HOUSTON ORDINANCE #87–1457.
11. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF HOUSTON STANDARDS AT ALL INTERSECTIONS WHERE SIDEWALKS EXIST AND THE EXISTING CURB OR SIDEWALK IS DAMAGED OR REMOVED DURING CONSTRUCTION.
12. WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS. WATER LINES, STORM DRAINAGE AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN SHOULD BE CONSISTENT WITH THE MINIMUM STANDARD ESTABLISHED IN THE "DESIGN MANUAL FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORMS DRAINAGE AND STREET PAVING".
13. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGES TO EXISTING WATER, WASTEWATER, STORM SEWER AND TRAFFIC SIGNAL CONDUITS, ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" WITH LATEST ADDENDA AND AMENDMENTS THERETO, AT NO COST TO THE CITY OF HOUSTON.
14. PRIOR TO STREET CONSTRUCTION, THE CONTRACTOR SHALL CONTACT HOUSTON PUBLIC WORKS AT (PHONE) 832–394–9578 AND COMPLY WITH ALL REQUIREMENTS FOR THE ISSUANCE OF NECESSARY PERMITS/WORK ORDERS FOR STREET CONSTRUCTION.
15. DOUBLE REFLECTORIZED BLUE TRAFFIC MARKERS SHALL BE PLACED 6–INCHES OFFSET OF THE CENTERLINE OF ALL FIRE HYDRANT LOCATIONS BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A BUTTON PLACED ON EACH STREET.

STORM CONSTRUCTION NOTES

1. STORM SEWER SHALL BE REINFORCED CONCRETE PIPE (C–76, CLASS III), AND SHALL BE INSTALLED, BEDDED, AND BACK FILLED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 2317–02, 02317–3, 02317–05, 02317–06, AND 02317–07 (OCT. 2002) AS APPLICABLE UNLESS OTHERWISW SHOWN ON THE DRAWINGS.
2. ALL STORM SEWER CONSTRUCTED IN SIDELOT EASMENT SHALL BE R.C.P (C–76, CLASSIII) AND SHALL BE EMBEDDED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 02317–02, 02317–03, 02317–05, 02317–06, AND 02317–07 AS APPLICABLE.
3. ALL SEWER UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE BACKFILLED WITH 1–1/2 SACK CEMENT/C.Y. STABLIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. THE REMAINING DEPTH OF TRENCH SHALL BE BACKFILLED WITH SUITABLE EARTH MATERIAL.
4. ALL TRENCH BACKFILL SHALL BE IN 8" LIFTS, WITH TESTS TAKEN AT 100 FOOT INTERVALS IN EACH LIFT, AND MECHNICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMACTION TEST (ASTM D–698/AASHTO T99).
5. CIRCULAR AND ELLIPTICAL REINFORCED CONCRETE PIPE SHALL BE INSTALLED USING RUBBER GASKET JOINT CONFORMING TO ASTM C443 AND ASTM C877 RESPECTIVELY.
6. ALL STORM SEWER PIPES AND INLET LEADS SHALL BE 24" AND LARGER R.C.P. (C–76, CLASSIII).
7. ALL PRPOSED PIPE STUB–OUTS FROM MANHOLES AND INLET LEADS ARE TO BE PLUGGED WITH 8" BRICK WALLS UNLESS OTHERWISE NOTED.
8. MINIMUM HORIZONTAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 48–INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES. MINIMUM VERTICAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 18–INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES.
9. ADJUST MANHOLE COVERS TO GRADE CONFORMING TO REQUIREMENTS OF SECTION 02086–ADJUSTING MANHOLES, INLETS, AND VALAVE BOXES TO GRADE.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING, AND RESTORING ANY BACK SLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF THIS WORK.
11. ALL DITCHES SHALL BE GRADED TO PROPOSED ELEVATIONS TO INSURE PROPER DRAINAGE. ALL OUTFALLS SHALL BE PROPERLY BACKFILLED AND COMPACTED. ALL DISTURBED AREA SHALL BE REGRADED, SEEDED, AND FERTILIZED.
12. ALL DRIVEWAYS WILL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURES.

AT&T TEXAS/SWBT FACILITIES

1. THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THEIR FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.
2. THE CONTRACTOR SHALL CALL 1-800-344-8377 (TEXAS 811)A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.
3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.
4. WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.
5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN CONDUIT IN THE AREA.
6. PLEASE CONTACT THE AT&T TEXAS DAMAGE CONTROL MANAGER MR. ROOSEVELT LEE JR. AT (713)567-4552 OR E-MAIL HIM AT rl7259@ATT.COM, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR OUR AT&T TEXAS/SWBT FACILITIES.

CAUTION: UNDERGROUND GAS FACILITIES

THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUMOF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES LOCATED.

- WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 207-5463 OR (713-945-8037) (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
- WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-3552 OR (713) 207-4200

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

CENTERPOINT ENERGY ELECTRIC NOTES

WARNING: OVERHEAD ELECTRICAL FACILITIES

OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND

OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.

PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT ENERGY AT 713-207-2222.

ACITIVITIES ON/OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207-6348 OR (713) 207-5769.

SWPPP CONSTRUCTION NOTES

1. CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES AND REINFORCED FILTER FABRIC BARRIER ALONG ROAD AND SIDE DITCHES AT LOCATIONS SHOWN ON THE TYPICAL STORM WATER POLLUTION PREVENTION (SWPP) PLANS TO KEEP SILT AND/OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM WATER INLETS AND DITCHES EVENTUALLY POLLUTING THE RECEIVING WATERS.
2. DURING THE EXCAVATION PHASE OF THE PROJECT, CONTRACTOR SHALL SCHEDULE THE WORK IN SHORT SEGMENTS SO THAT EXCAVATED MATERIAL CAN BE QUICKLY HAULED AWAY FROM THE SITE AND TO PREVENT IT FROM STAYING UNCOLLECTED ON THE EXISTING PAVEMENT. ANY LOOSE EXCAVATED MATERIAL WHICH FALLS ON PAVEMENTS OR DRIVEWAYS SHALL BE SWEPT BACK INTO THE EXCAVATED AREA,
3. CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS AND DRIVEWAYS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT OR ROCK TRACKED FROM THE EXCAVATED AREA.
4. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIALS AS CONSTRUCTION PROGRESSES.
5. CONTRACTOR SHALL INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOUR OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.
   DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.
   AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.
   STRUCTURAL CONTROL MEASURES.
   LOCATIONS WHERE VEHICLES ENTER OR EXIST THE SITE.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING EXISTING DITCHES AND/OR CULVERTS FOR UNOBSTRUCTED DRAINAGE AT ALL TIMES. WHERE SODDING IS DISTURBED BY EXCAVATION ON BACKFILLING OPERATIONS, SUCH AREAS SHALL BE REPLACED BY SEEDING OR SODDING. SLOPES 4:1 OR STEEPER SHALL BE REPLACED BY BLOCK SODDING.

WATER CONSTRUCTION NOTES

1) WATER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON INFRASTRUCTURE DESIGN MANUAL, STANDARD SPECIFICATION, AND CONSTRUCTION DETAILS.
2) ALL 4" THROUGH 12" WATER LINE TO BE AWWA C–900 PVC DR–18 BLUE PRESSURE RATED WATER MAIN WITH 2" AND SMALLER WATER SERVICE LINE TO BE CONTINUOUS TYPE K COPPER TUBING PER COH STANDARD SPECIFICATION SECTION 02503. ALL 4" THRU 54" DI PIPE WATER LINES SHALL BE AWWA C151 WITH INSIDE LINING WITH AWWA C104 AND DOUBLE WRAPPED WITH 8–MIL POLYETHYLENE SHEETS.
3) CONCRETE THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY TO PREVENT PIPE MOVEMENT. USE RESTRAINED JOINTS WHERE PREVENTING MOVEMENT OF 16" OR GREATER PIPE IS NECESSARY DUE TO THRUST.
4) ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT OF ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12" OVER PIPE AND BACKFILLED WITH CEMENT STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE.
5) ALL WATER LINE AND SEWER LINE CROSSINGS SHALL BE CONSTRUCTED PER CITY OF HOUSTON AND TCEQ REGULATIONS.
6) ALL WATER VALVES SHALL BE SUPPLIED AND INS TALLED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA C–500 AND SHALL BE OF THE RESILIENT SEAT TYPE.
7) ALL WATER LINES TO BE DISINFECTED IN CONFORMANCE WITH AWWA C–651 AND THE TEXAS STATE DEPARTMENT OF HEALTH. AT LEAST ONE BACTERIOLOGICAL SAMPLE SHALL BE COLLECTED FOR EVERY 1,000 LINEAR FEET OF WATER LINE AND SHALL BE REPEATED IF CONTMINATION PERSISTS.
8) ALL BELOW GRADE VALVES SHALL BE GASKETED, HUB–END GATE VALVES WITH A CAST IRON BOX, EXCEPT WHERE FLANGES ARE CALLED OUT ON THE PLANS.
9) 4" THRU 12" FIT TINGS SHALL BE CEMENT MORTAR LINED COMPACT DUCTILE IRON PRESSURE FITTINGS PER ANSI A21.53, OR PUSH ON FITTINGS PER ANSI A21.10 PRESSURE RATED AT 250 PSIG.
10) HYDROSTATIC TESTING: ALL WATER PIPE SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON STANDARD CONSTRUCTION SPECIFICATIONS. TESTS ARE TO BE PERFORMED ON THE ENTIRE FOOTAGE OF WATER PIPE LINE INCLUDED IN THE PROJECT.
11) ALL WATER LINES TO HAVE 4' MINIMUM COVER TO FINISHED GRADE AND MINIMUM 12" CLEARANCE TO OTHER UTILITIES AT CROSSING UNLESS OTHERWISE NOTED ON PLANS. ALL WATER LINE INSTALLED OVER 8' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS.
12) CONTRACTOR SHALL KEEP WATER PIPE CLEAN AND CAPPED (OR OTHERWISE EFFECTIVELY COVERED) OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.

GRADING NOTES

1) GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE STARTING CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
2) BEFORE STARTING CONSTRUCTION, CONTRACTOR SHALL VERIFY BENCHMARK ELEVATION AND NOTIFY ENGINEER IF ANY DISCREPANCY AND/OR CONFLICT IS FOUND.
3) CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS AND NO PONDING IN PAVED AREAS, AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
4) CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION.
5) ALL EXISTING CONCRETE PAVING, SIDEWALK, AND CURB DEMOLITION SHALL BE REMOVED AND DISPOSED OF BY CONTRACTOR. DISPOSAL SHALL BE AT AN APPROVED OFF–SITE, LAWFUL LOCATION, UNLESS DIRECTED OTHERWISE BY THE OWNER.

SANITARY NOTES:

1. ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON "STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC" AND ALL CURRENT AMENDMENTS THERETO AND BE SUBJECT TO A STANDARD EXFILTRATION TEST. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF SEWER LINE INCLUDED IN THE PROJECT. REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE, TITLE 30 CHAPTER 317, "DESIGN CRITERIA FOR SEWERAGE SYSTEMS" SHALL GOVERN WHERE CONFLICTS EXIST EXCEPT WHERE CITY REQUIREMENTS ARE MORE STRINGENT.
2. ALL MANHOLES ARE TO BE PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02082–01, 02082–02, 02082N–02, 02082–03, AND 02082N–03 UNLESS OTHERWISE NOTED. USE 2010 VERSION AS APPLICABLE.
3. SANITARY SEWER MANHOLES WILL HAVE BEDDING AND BACKFILL PER CITY OF HOUSTON STANDARD DETAILS DRAWING NO. 02317–08 UNLESS OTHERWISE NOTED.
4. THE SANITARY SEWER PVC PIPE SHALL BE ASTM D 3034 TYPE PSM SDR 26 GRAVITY SEWER PIPE, ASTM D2241 SDR 26 PRESSURE RATED SEWER PIPE OR AWWA C–900 DR–18 GREEN PVC PRESSURE RATED SEWER PIPE BASED ON CONSTRUCTION CONDITION REQUIREMENT AND CONFORMING TO ASTM D1784 AND CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02506 POLYVINYL CHLORIDE PIPE.
5. WHEN SS PRESSURE RATED PVC PIPE IS USED ON WATERLINE (WL) CROSSING UNDER CONDITION 1 OF COH IDM TABLE 7.3, THE SAME TYPE OF D2241 SDR 26 PVC PIPE OR C–900 GREEN DR–18 PVC GREEN PRESSURED TO BE UTILIZING IN–BETWEEN TWO SS MH'S. OR TO UTILIZE A DI TRANSITION ADAPTER FOR THE CONNECTING OF ASTM D–3034 PVC GRAVITY PIPE TO DI–OD AWWA C–900 PVC PIPE CENTERED AT WL WHEN CONNECTING TWO DIFFERENT TYPES OF PVC PIPES FOR SEWER CONSTRUCTION.
6. AWWA C–900 DR–18 PVC PIPE USES EITHER AWWA C900 DR–18 PVC FITTINGS OR DIP FITTINGS.
7. ALL SANITARY SEWER LINES UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL HAVE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02317–01, 02317–02, OR 02317–03 AS APPLICABLE, WITH 1 ½ SACK CEMENT/CY STABILIZED SAND BACKFILL UP TO THE BOTTOM OF THE PAVEMENT SUBGRADE. 100 PSI PERFORMANCE RESULTS ARE STILL REQUIRED.
8. ALL SANITARY SEWERS CROSSING WATER LINES WITH A CLEARANCE BETWEEN 12 INCHES AND 9 FEET SHALL HAVE A MINIMUM OF ONE 18' JOINT OF 150 PSI DUCTILE IRON OR (GREEN) C900 PVC PIPE MEETING ASTM SPECIFICATION D2241 CENTERED ON WATER LINE. WHEN WATER LINE IS BELOW SANITARY SEWER PROVIDE MINIMUM 2 FOOT SEPARATION.
9. CONTRACTOR SHALL PROVIDE A MINIMUM HORIZONTAL CLEARANCE OF 9' FEET BETWEEN WATER LINES AND SANITARY SEWER MANHOLES AND LINES.
10. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING WILL BE SET 3" – 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER PAVING WITH SLOPED BACKFILL ADDED FOR STORM WATER TO DRAIN AWAY FROM MANHOLE RIM.
11. IN WET STABLE TRENCH AREAS USE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBER 02317–02 (2002).
12. DEFLECTION TEST: DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI–RIGID SEWER PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5% IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID MANDREL, IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED AS PER 30 TAC 317.2 LATEST AMENDMENT AND WITHOUT MECHANICAL PULLING DEVICES. NO BALL–TYPE MANDREL IS ALLOWED.
13. INFILTRATION, EXFILTRATION OR LOW–PRESSURE AIR TEST: EITHER OF THE FOLLOWING TESTS SHALL BE PERFORMED AS PER TAC, TITLE 30 317.2 WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY SEWERS.
   A. INFILTRATION OR EXFILTRATION TEST: TOTAL LEAKAGE AS DETERMINED BY A HYDROSTATIC HEAD TEST SHALL NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO (2) FEET.
   B. LOW–PRESSURE AIR TEST: PERFORM TEST ACCORDING TO UNI–B–6–90 OR OTHER APPROPRIATE PROCEDURES. FOR SECTIONS OF PIPE LESS THAN 36" (INCH) AVERAGE INSIDE DIAMETER, THE MINIMUM ALLOWABLE TIME FOR PRESSURE DROP FROM 3.5 P.S.I.G. TO 2.5 P.S.I.G. SHALL BE AS FOLLOWS:

   6" 340 SECONDS OR 0.855(L) FOR TEST LENGTHS GREATER THAN 398'

   8" 454 SECONDS OR 1.520(L) FOR TEST LENGTHS GREATER THAN 298'

   10" 567 SECONDS OR 2.374(L) FOR TEST LENGTHS GREATER THAN 239'

   15" 850 SECONDS OR 5.342(L) FOR TEST LENGTHS GREATER THAN 159'

   18" 1020 SECONDS OR 7.693(L) FOR TEST LENGTHS GREATER THAN 133'

   WHERE L = LENGTH OF LINE OF SAME PIPE SIZE IN FEET.
14. "SAN. S. E." INDICATES "SANITARY SEWER EASEMENT"
15. FOR SANITARY MANHOLE (MH) RIMS SET INSIDE OF OR @ CURB & GUTTER PAVEMENT AND/OR BELOW T.C., MH RIMS WILL BE SET FLUSHED WITH AN ABUTTING PAVED SURFACE. THE (VALCUN, NEENAH OR EQUAL) HEAVY DUTY BOLTED SOLID MH COVER SHALL BE PROPERLY (AND SECURELY) ATTACHED AND SEALED TO ITS COMPATIBLE GASKETED FRAME BY USING BOTH A NEOPRENE GASKET AND (AT LEAST) 4 COUNTER–SUNK HEX–HEAD COARSE THREADED ½"–13 UNC STAINLESS STEEL BOLTS. THE HEAVY DUTY FRAME MH COVER SHALL BE SOLID (NO AIR HOLES). SAID FRAME SHALL BE BOTH EMBEDDED INTO THE MH'S TOP ALSO SECURELY ANCHORED TO THE UNDERLYING MH STRUCTURE WITH EITHER SECURELY ATTACHED EMBEDDED ANCHOR BOLTS OR THE CONCRETE MH'S EXPOSED REBARS WELDED TO THE FRAME OR OTHER EQUALLY SECURED METHODS TO PREVENT MH COVER/FRAME BLOW–OFFS/EJECTIONS.

TRAFFIC NOTES

Contractor or owner shall submit traffic control plans with the Mobility Permit application. The plans shall be drawn to scale and sealed by a licensed professional engineer in the state of Texas.

The general notes that shall be included on the traffic control plan can be found in Chapter 15 (15.12 Traffic Control Plan) of the City of Houston's (City) Infrastructure Design Manual (IDM). Below are several key notes from the IDM to be aware of:

1. The Contractor shall provide and install traffic control devices in conformance with Part VI of the Texas Manual on Uniform Traffic Control Devices (TMUTCD) latest edition with revisions during the entire construction period.
2. No work shall be performed in residential areas from 7:00PM to 7:00AM.
3. Contractor shall maintain approved number of lanes of traffic in each direction during construction working hours. Traffic Control plans shall include one–way and/or detour plans. Contractor shall maintain ADA complaint pedestrian access to bus stops and adequate bus access to the bus stop.
4. Contractor shall cover open pavement excavations for minor utility work with anchored steel plates during non–working hours, open lanes for normal traffic flow when feasible.
5. Contractor shall secure lane/sidewalk/bicycle facility closure permits from Transportation & Drainage Operations (Mobility Permit Section at www.gims.houstontx.gov) before implementing the traffic control plan. The application must be submitted at least ten business days prior to the implementation of the traffic control plan and/or beginning construction work. The Contractor shall provide traffic control plans, construction sequencing, and construction schedule with the application.
6. Contractor shall have approved traffic control plan and permit at the job site for inspection at all times
7. Access to driveways adjacent to the construction work zone shall be maintained at all times as much as possible. Additional cones and/or delineators may be required to delineate the driveway access route through the construction work zone. A minimum of one travel lane shall be maintained across the driveway, unless prior written approval is obtained from the City of Houston.
8. Additional off duty police officers/flaggers may be requested to direct traffic when lanes are blocked at the direction of the City even if they are not specifically identified on the project plans.

IDG+ ARCHITECTS

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

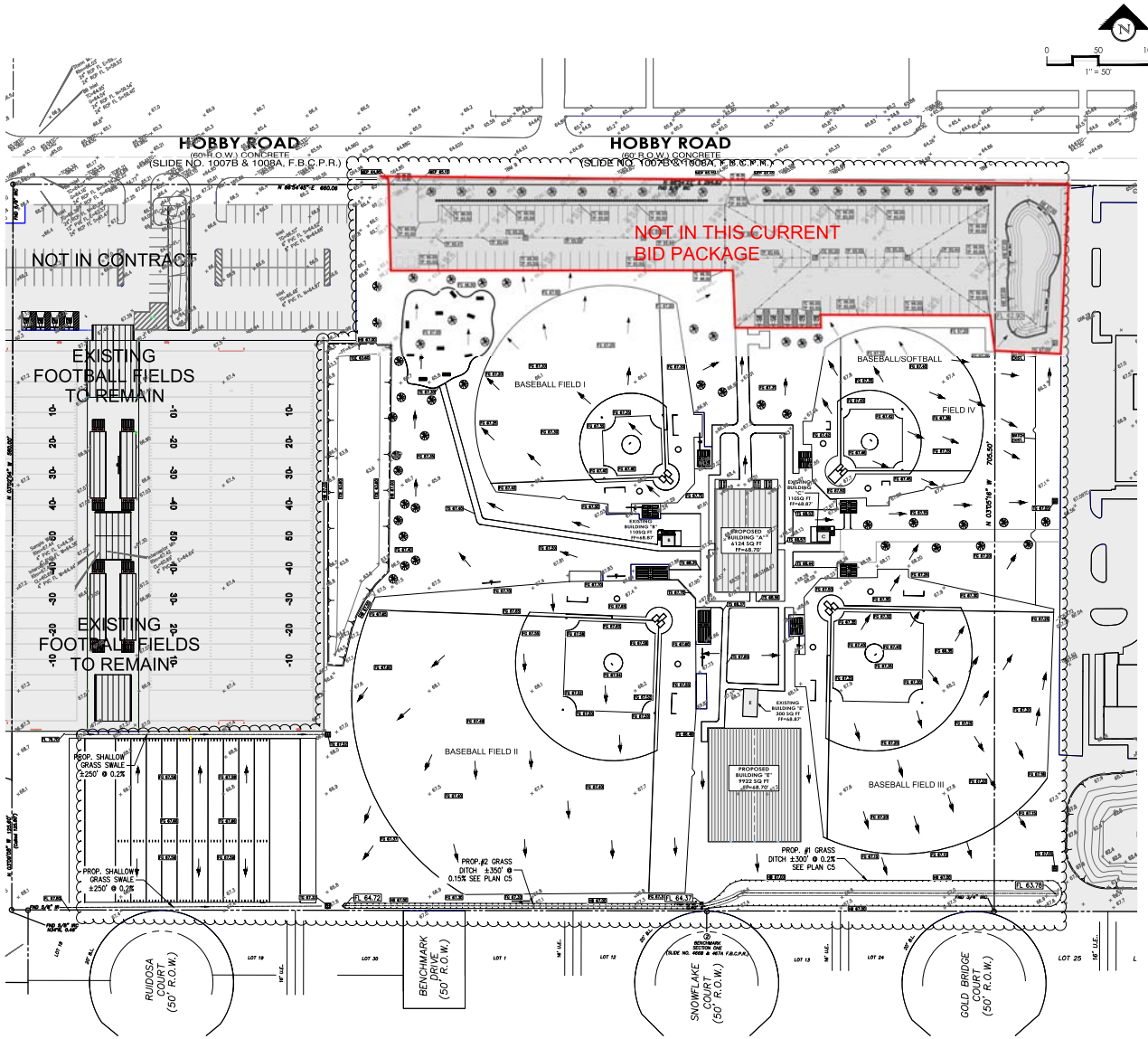
Drawing Date:	08/09/2021
Drawn:	MK
Checked:	NO
Scale:	1/32" = 1'-0"
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
CITY COMMENT	02/18/2022
ISSUE FOR BID	09/07/2022

GENERAL NOTES

C1



GENERAL NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

1. SHOULD THE CONTRACTOR AT ANY TIME DISCOVER AN ERROR IN A DRAWING OR A DISCREPANCY OR VARIATION BETWEEN THESE DRAWINGS AND THE SITE (FIELD CONDITION), THE CONTRACTOR SHALL NOT PROCEED WITH THE WORK AFFECTED UNTIL THE ENGINEER HAS BEEN NOTIFIED AND PROCEED ONLY AFTER CLARIFICATION HAS BEEN MADE.
2. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITY LINES IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION AND SHALL NOTIFY THE THE FOLLOWING AGENCIES AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION.
   A. TEXAS ONE CALL AT 713-223-4567 (HOUSTON) / 800-344-8377 (TEXAS 811)
   B. LONE STAR ONE CALL AT 800-669-8344
3. PRIOR TO ANY CONSTRUCTION ACTIVITY, CONTRACTOR IS TO ACQUIRE ALL REQUIRED CONSTRUCTION PERMITS FROM APPROPRIATE AUTHORITIES. CONTRACTOR SHALL NOTIFY ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, OR PERSONS IN CHARGE OF PUBLIC AND PRIVATE UTILITY LINES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK OR CONNECTING TO ANY EXISTING UTILITY LINES.
4. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES AND REGULATIONS REQUIRED BY AUTHORITIES HAVING JURISDICTION OVER SUCH WORK, INCLUDING ALL INSPECTIONS AND PERMITS REQUIRED BY FEDERAL, STATE AND LOCAL AUTHORITIES IN SUPPLY, TRANSPORTATION AND INSTALLATION OF MATERIALS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING SITE TRENCH SAFETY REQUIREMENTS IN ACCORDANCE WITH CITY/ COUNTY STANDARDS, OSHA REGULATIONS AND THE STATE OF TEXAS LAWS FOR ALL EXCAVATION.
6. IN ORDER TO MAINTAIN CLEAN STREETS AND PREVENT SITUATION OF DRAINAGE CHANNELS, PRACTICE SEDIMENT CONTROL DURING CONSTRUCTION. AS SOON AS EARTHWORK COMMENCES WHICH DESTROYS THE NATURAL VEGETATIVE COVER ON ANY PORTION OF A BUILDING TRACT, ONE OF TWO BASIC SEDIMENT CONTROL METHODS – HAY BALES OR FENCING – SHALL BE INSTALLED IN SUCH A WAY AS TO FILTER ALL STORM WATER RUNOFF FROM THE TRACT VIA SHEET FLOW, STORM SEWERS OR DRIVEWAYS. THE SEDIMENT CONTROL SYSTEM SHALL REMAIN IN PLACE IN GOOD REPAIR UNTIL ALL AREA OF THE TRACT ARE COVERED BY BUILDINGS, PAVING, OR PLANT MATERIALS.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A SET OF "AS-BUILT" PLANS FOR ALL WORK PERFORMED ON AND OFF SITE. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL PROVIDE AS-BUILT PLANS IDENTIFYING ALL DEVIATIONS OR VARIATIONS FROM ORIGINAL PLANS TO THE OWNER AND THE ENGINEER.
8. IF ADJACENT GRADE IS CHANGED FOR ANY REASON AROUND A FIRE HYDRANT, VALVE BOX, OR MANHOLE, CONTRACTOR MUST ADJUST THE ELEVATION OF THE FACILITY ACCORDINGLY.

OVERHEAD LINES EXIST ON THE PROPERTY

WE HAVE NOT ATTEMPTED TO MARK THOSE LINES SINCE THEY ARE CLEARLY VISIBLE, BUT CONTRACTOR SHALL LOCATE THEM PRIOR TO BEGINNING CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE, REQUIRES ALL ACTIVITIES IN WHICH PERSON OR EQUIPMENT MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. CONTRACTORS ARE LEGALLY RESPONSIBLE FOR SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CIVIL AND CRIMINAL LIABILITY.

RIGHT-OF-WAY

A. ANY DAMAGE TO EXISTING UTILITIES, ROADS, DRIVEWAYS, SIDEWALKS, OR OTHER APPURTENANCES WITHIN THE RIGHT-OF-WAY SHALL BE REPAIRED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE OWNING/ OPERATING AUTHORITY, WITH MATERIAL EQUAL TO OR SUPERIOR TO EXISTING MATERIAL, AND WITH NO COST TO THE PUBLIC, ENGINEER, OR THE OWNER.

B. ANY AREAS OF GRASS WITHIN THE RIGHT-OF-WAY WHICH ARE DISTURBED OR DUG UP DURING CONSTRUCTION SHALL BE REPLACED WITH GRASS PRODUCTS WHICH MATCHES THE GRASS REMOVED.

C. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.

D. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.

GRADING AND DRAINAGE NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

1. PRIOR TO STARTING CONSTRUCTION, CONTRACTOR SHALL VERIFY BENCHMARK ELEVATION AND NOTIFY ENGINEER IF ANY DISCREPANCY AND/OR CONFLICT IS FOUND.
2. CONTRACTOR/BUILDER SHALL FIELD-VERIFY EXISTING ELEVATIONS AND SET FINISH FLOOR (FF) ELEVATION AT LEAST 18 INCHES ABOVE THE BASE FLOOD ELEVATION, ACCORDING TO FEMA MAPS & TOPOGRAPHIC SURVEY DATA, 12 INCHES ABOVE THE NEAREST SANITARY SEWER MANHOLE RIM, OR, WHERE NO SEWER IS AVAILABLE, THE FINISHED FLOOR SHALL NOT BE LESS THAN 4 INCHES ABOVE THE CROWN OF THE STREET. NOTIFY ENGINEER IF FF ELEVATION IS DIFFERENT THAN THAT SHOWN ON PLAN.
3. PROPOSED FF ELEVATION IS MINIMUM. BUILDER MAY SET SLAB @ A HIGHER ELEVATION, BUT NOTIFY ENGINEER PRIOR TO SETTING FORM.
4. FINISHED GRADE ELEVATIONS @ SIDE & REAR PROPERTY LINES SHALL MATCH EXISTING GRADE ELEVATIONS U.O.N.
5. THE GROUND IMMEDIATELY ADJACENT TO THE FOUNDATION SHALL BE SLOPED AWAY FROM THE BUILDING AT A 5% SLOPE FOR A MINIMUM DISTANCE OF 10 FEET MEASURED PERPENDICULAR TO THE FACE OF THE WALL U.O.N.
6. IMPERVIOUS SURFACES WITHIN 10 FEET OF THE BUILDING FOUNDATION SHALL BE SLOPED A MINIMUM OF 2% AWAY FROM THE BUILDING U.O.N.
7. ON GRADED SITES, THE FOUNDATION SHALL EXTEND ABOVE THE GUTTER OR DRAINAGE DEVICE A MINIMUM OF 12 INCHES PLUS 2% U.O.N.
8. THE AREA OF FLOOR USED FOR PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOORWAY.
9. A SLOPED SURFACE IS REQUIRED TO EFFECTIVELY DRAIN WATER AWAY FROM THE FOUNDATION WALLS, INCLUDING AREAS UNDER STEPS AND DECKS U.O.N.
10. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS AND NO PONDING IN PAVED AREAS, AND SHALL NOTIFY ENGINEER IF ANY DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
11. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE SATISFACTION OF THE OWNING AUTHORITY.
12. RUNOFF FROM CONSTRUCTION SITE SHALL BE FILTERED SO AS TO PREVENT SAND, MUD AND DIRT OF ANY KIND FROM ENTERING PUBLIC STORM DRAINAGE SYSTEM.
13. THIS PROPOSED DRAINAGE SCHEME WILL NOT RESULT IN ANY STORMWATER RUNOFF ONTO ADJOINING PROPERTIES DURING A 2-YEAR STORM EVENT.
14. CONTRACTOR SHALL MAINTAIN DRAINAGE DURING CONSTRUCTION SO AS TO ENSURE THAT NO RUNOFF FROM CONSTRUCTION SITE TRAVERSES ADJOINING PROPERTIES AT ANYTIME.
15. SET STORM SEWER MANHOLE RIMS TO MATCH FINISH GRADE.
16. ALL EXCAVATED SOIL FROM FOUNDATIONS SHALL BE REMOVED FROM CONSTRUCTION SITE AND MAY NOT BE USED AS FILL UNDER DRIC, UNLESS SPECIFICALLY CALLED FOR IN EXCAVATION DRAWINGS.
17. CONSTRUCTION SITE IS TO BE MAINTAINED FREE OF ANY OPEN TRENCHES, PITS, HOLES, OR OTHER EXCAVATIONS THAT MAY HOLD WATER.
18. CONSTRUCT THE EMERGENCY SPILLWAY OR EARTH SWALE IN CUT OR STRUCTURALLY STABILIZED SOILS.

LEGEND

	PROPERTY LINE
	LOT LINE
HP HP HP	HIGH POINT / TOP OF GRADE BREAK
	BUILDING (SETBACK) LINE
	EASEMENT
	PAVING RUNOFF PATH
	DITCH/SWALE FLOWLINE
FIRE LANE	FIRE LANE
EXIST. PROP.	BASIN GRADE SLOPE
	PROPOSED CATCH BASIN / JUNCTION BOX
EXIST=FILLED PROP.=OPEN	MANHOLE
53.00	EXISTING GRADE ELEVATIONS
TC 300.00 TP 300.00	PROPOSED GRADE ELEVATIONS
	POWER POLE / LIGHT POLE

EX./PROP. MEP/MEC/MEG	
MWSE	MATCH EXISTING PAVEMENT/CURB/GRADE
FF	MAXIMUM DESIGN WATER SURFACE ELEVATION
DR	ELEVATION @ FINISHED FLOOR SLAB
TS	ELEVATION @ DOORWAY (OUTSIDE)
TC	ELEVATION @ TOP OF SIDEWALK
TP	ELEVATION @ TOP OF CURB
FG	ELEVATION @ TOP OF PAVEMENT
TG	ELEVATION @ FINISH GRADE
HP	ELEVATION @ TOP OF GRATE
	ELEVATION @ HIGH POINT

LEGAL DESCRIPTION

21.38 ACRES (931,379 SQ. FT.) (F.B.C.C. FILE NO. 2000090088) BEING ALL OF RESERVE "A" FORT BEND BOYS AND GIRLS CLUB SEC. 1 (SL. 2095/A, F.B.C.P.R.) AND 13.8 ACRES (VOL. 547, PG. 116, F.B.C.D.R.) LPONTEVENT SURVEY NO. 3, A-305 FORT BEND COUNTY, TEXAS

Wednesday, April 20, 2022 3:40 PM, Reda, ARCH full bleed D (24.00 x 36.00 Inches), Z:\PROJECTS\2021\W21120-FBC_HOBBY\CAD & BIM DRAWINGS\CIVIL 04-07-22\GRADING.dwg

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Project No: 4002–006

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4/20/22

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MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

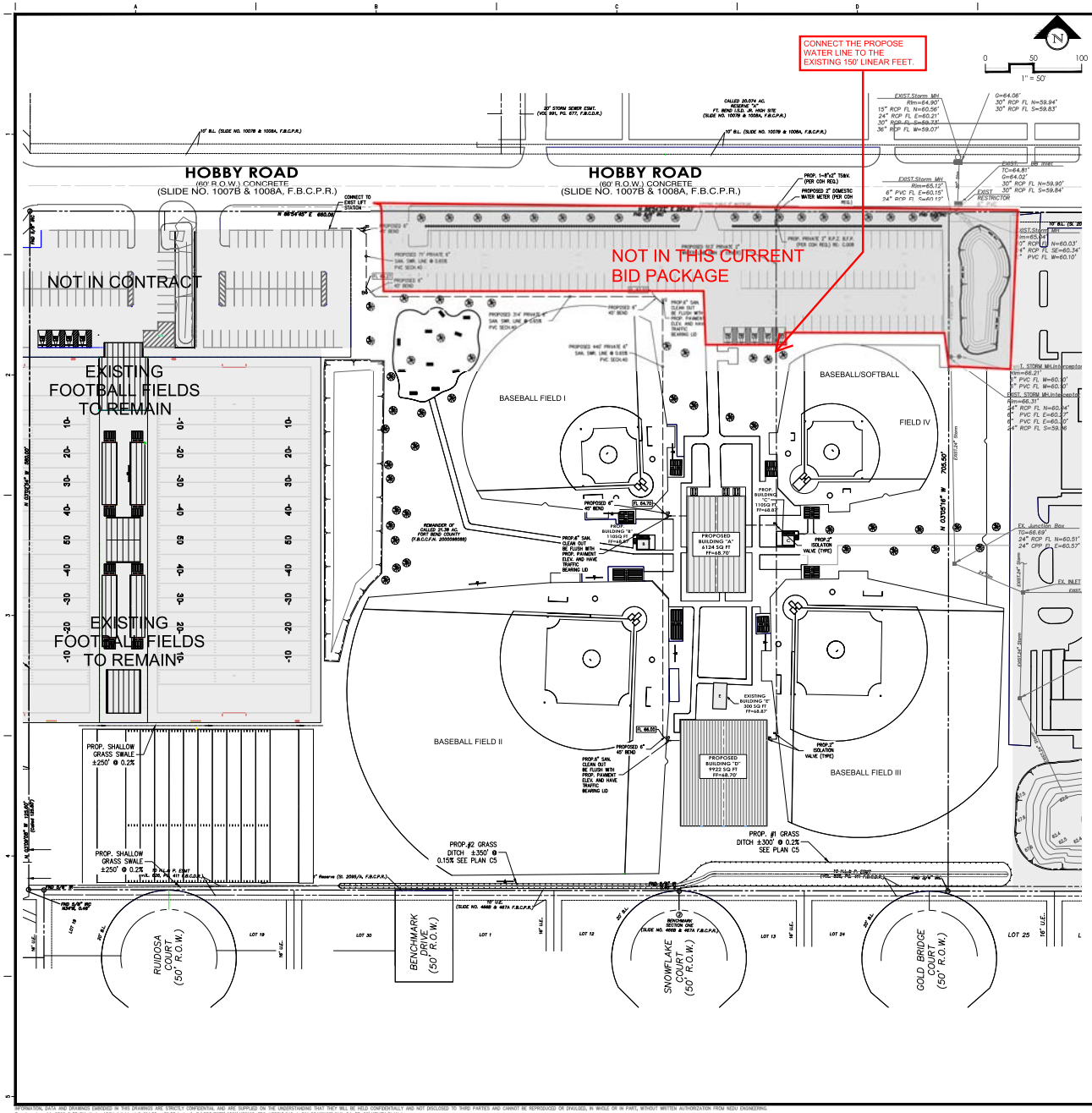
Drawing Date:
Drawn:
Checked:
Scale:
ACAD File:

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
CITY COMMENT	11/22/2021
100% CD	02/18/2022
CITY COMMENT	04/20/22
ISSUE FOR BID	09/07/2022

GRADING PLAN

C3



GENERAL UTILITIES NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

1. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL UTILITY TIE IN LOCATIONS, MATERIAL, SIZE, ELEVATION AND FIELD CONDITIONS. NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THOSE SHOWN ON THE DRAWINGS.
2. NO CONNECTIONS SHALL BE MADE TO EXISTING PUBLIC WATER LINES OR PUBLIC SANITARY SEWERS UNTIL ALL PROPOSED WATER OR SEWER LINES HAVE BEEN THOROUGHLY CLEANED, TESTED (AS REQUIRED) AND APPROVED BY THE APPROPRIATE AUTHORITIES.
3. ALL UTILITIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST LOCAL AND FEDERAL PERTAINING REGULATIONS AND STANDARDS.
4. ALL SANITARY AND WATER CROSSINGS SHALL BE IN COMPLIANCE WITH TCEQ PERTAINING PROVISIONS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR SAFELY SHORING ALL TRENCHES, IN COMPLIANCE W/ OSHA.

SANITARY SEWER SYSTEM NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

LINE SIZE AND DEPTH

1. SERVICE LEADS SHALL BE 6–INCHES IN DIAMETER (MINIMUM).
2. SEWER LINE SHALL BE LAID WITH THE TOP OF THE PIPE A MINIMUM OF 3–FEET BELOW THE SURFACE OF THE NATURAL GROUND WITHOUT SIDE DITCHES, U.O.N. WHERE THE MINIMUM COVER IS NOT POSSIBLE, THE SEWER SHALL BE LAID WITH CLASS 150 (150 PSI) PRESSURE PIPE WITH CEMENT–STABILIZED SAND BACKFILL PER PERTAINING STANDARD DETAILS.
3. SERVICE LEADS SHALL HAVE A GRADES AS FOLLOWING:
   4–6 INCH: MINIMUM 1.00% (1/8" PER FOOT) GRADE, RECOMMENDED 2.00% (1/4" PER FOOT)
   8–UP INCH: MINIMUM 0.50% (1/16" PER FOOT) GRADE, RECOMMENDED 1.00% (1/4" PER FOOT)

PIPE MATERIAL

SANITARY SEWER PIPE USED FOR CONNECTION TO SEWER IN PUBLIC RIGHT–OF–WAY SHALL BE C900 P.V.C. PIPE MEETING ASTM SPECIFICATION D3034 WITH RUBBER GASKET JOINTS. ALL OTHER PRIVATE SANITARY SEWER PIPE MATERIAL SHALL CONFORM TO ONE OF THE FOLLOWING STANDARDS U.N.O.:

A) POLYVINYL CHLORIDE (PVC) SCHEDULE 40 TO BE USED FOR PIPE SIZES 6 INCHES AND SMALLER.

B) POLYVINYL CHLORIDE (PVC) STANDARD DIMENSION RATIO (SDR) 35 OR 26 TO BE USED FOR PIPE SIZES 8 INCHES AND LARGER. SEE NOTE BELOW.

– PIPE SHALL BE BEDDED WITH A MINIMUM OF ONE FOOT OF CEMENT STABILIZED SAND. CEMENT STABILIZED SAND SHALL BE LAID IN 6" LIFTS COMPACTED TO 95% STANDARD PROCTOR OF MAXIMUM DRY DENSITY.

– A CHEMICAL WASTE SYSTEM SHALL BE COMPLETELY SEPARATED FROM THE SANITARY SYSTEM.

MANHOLES

4. ALL MANHOLE FRAMES AND COVERS ARE TO BE FLUSH WITH PROPOSED FINISHED WALKS, PAVED AREAS, SWALES, etc. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING TO BE SET 3" TO 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER GRADING OPERATIONS.
5. MANHOLES LOCATED WITHIN THE 100–YEAR FLOODPLAIN AND MANHOLES LOCATED WITHIN DRIVEWAYS SHALL BE SEALED AND VENTED PER TCEQ REQUIREMENTS. ENGINEERING JUDGMENT AND AESTHETICS SHOULD BE CONSIDERED.
6. WHEN ROUTING A SERVICE LEAD TO A MANHOLE, THE WALL PENETRATION SHALL NOT BE GREATER THAN 10–INCHES IN DIAMETER AND SHALL BE SEALED USING APPROVED WATER STOP AND GROUT.
7. ALL SEWER LINES ENTERING A MANHOLE AT A FLOWLINE HIGHER THAN 3' OR 24" ABOVE THE MANHOLE INVERT MUST BE PROVIDED WITH A DROP PIPE OUTSIDE OF THE MANHOLE.
8. ALL MANHOLES ARE TO BE CONSTRUCTED TO ALLOW FOR A MINIMUM OF 1 FOOT OF VERTICAL ADJUSTMENT.

CLEAN–OUTS

1. CLEANOUTS SHALL BE DESIGNED TO BE GAS/WATERTIGHT.
2. BUILDING SEWERS SHALL BE PROVIDED WITH CLEANOUTS LOCATED NOT MORE THAN 100–FEET (75–FEET RECOMMENDED) APART MEASURED FROM THE UPSTREAM ENTRANCE OF THE CLEANOUT.
3. A CLEANOUT SHALL BE PROVIDED FOR EACH CHANGE OF DIRECTION EXCEEDING 45 (135) DEGREE.
4. THERE SHALL BE A CLEANOUT NEAR THE JUNCTION OF THE BUILDING DRAIN AND THE BUILDING SEWER. THE CLEANOUT SHALL BE EITHER INSIDE OR OUTSIDE THE BUILDING WALL AND SHALL BE BROUGHT UP TO THE FINISHED GROUND LEVEL OR TO THE FLOOR LEVEL. AN APPROVED TWO–WAY CLEANOUT IS ALLOWED TO BE USED AT THIS LOCATION TO SERVE BOTH THE BUILDING DRAIN AND BUILDING SEWER.
5. EVERY CLEANOUT SHALL BE INSTALLED TO OPEN TO ALLOW CLEANING IN THE DIRECTION OF THE FLOW OF THE DRAINAGE PIPE OR AT RIGHT ANGLES THERETO.
6. CLEANOUTS INSTALLED UNDER CONCRETE OR ASPHALT PAVING SHALL BE MADE ACCESSIBLE BY YARD BOXES OR BY EXTENDING FLUSH WITH PAVING WITH APPROVED MATERIALS AND SHALL BE ADEQUATELY PROTECTED.
7. CLEANOUTS SHALL BE THE SAME NOMINAL SIZE AS THE PIPE THEY SERVE UP TO 4 INCHES (102 MM). FOR PIPES LARGER THAN 4 INCHES (102 MM) NOMINAL SIZE, THE SIZE OF THE CLEANOUT SHALL BE NOT LESS THAN 4 INCHES (102 MM).
8. CLEANOUTS ON 6–INCH AND SMALLER PIPES SHALL HAVE A CLEARANCE OF MIN. 18–INCHES (457 MM) FOR RODDING. 8–INCH AND LARGER PIPES SHALL BE PROVIDED WITH A CLEARANCE OF MIN. 36–INCHES.

DOMESTIC WATER SYSTEM NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

1. CONCRETE THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY TO PREVENT PIPE MOVEMENT.
2. ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12 INCHES OVER PIPE AND BACKFILLED WITH CEMENT STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE U.N.O.
3. WHERE A WATERLINE CROSSES ANOTHER UTILITY OTHER THAN A SANITARY SEWER, A MINIMUM OF 6–INCHES OF CLEARANCE MUST BE MAINTAINED.
4. ALL WATER LINE INSTALLED OVER 6' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS.
5. DO NOT PLACE WATERLINE APPURTENANCES UNDER PAVEMENT, POND OR LAKE, INSIDE RAMPS OR AT CURB.
6. DO NOT INSTALL STUB OUTS FOR FUTURE WATER SERVICES, UNLESS MENTIONED.
7. CONTRACTOR SHALL KEEP WATER PIPE CLEAN AND CAP (OR OTHERWISE EFFECTIVELY COVER) OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.
8. PIPE MATERIALS
   A. 3/4" THRU 2" WATER LINES SHALL BE CONTINUOUS TYPE K COPPER TUBING U.N.O.
   B. 2" THRU 4" WATER LINES SHALL BE P.V.C. SCHEDULE 40 U.N.O.
   C. 4" THRU 12" WATER LINES SHALL BE P.V.C. C–900 CLASS 150 DR–18, AWWA U.N.O.
   D. 4" THRU 54" D.I.P. WATER LINES SHALL BE AWWA C151 (ANSI A21.51) AND DOUBLE WRAPPED IN 8–MIL POLYETHYLENE U.N.O. PIPE SHALL BE LINED IN ACCORDANCE WITH THE AWWA C104 (ANSI A21.4).
   WATER SERVICE PIPE SHALL CONFORM TO NSF 61 AND SHALL CONFORM TO ONE OF THE STANDARDS LISTED IN TABLE 605.3 OF INTERNATIONAL PLUMBING CODE (IPC).
   WATER SERVICE PIPING MATERIALS NOT THIRD–PARTY CERTIFIED FOR WATER DISTRIBUTION SHALL TERMINATE AT OR BEFORE THE FULL OPEN VALVE LOCATED AT THE ENTRANCE TO THE STRUCTURE.

WATER METERS

1. LOCATE METERS IN AREAS WITH EASY ACCESS AND WITH PROTECTION FROM TRAFFIC AND ADJACENT TO RIGHTS–OF–WAY WHENEVER POSSIBLE.
2. DO NOT LOCATE METERS IN AREAS ENCLOSED BY FENCES.
3. PROVIDE CONCRETE METER BOXES FOR METERS LOCATED UNDER SIDEWALKS.

LEGEND

- PROPERTY LINE
- LOT LINE
- EASEMENT
- WATERLINE
- NON–POTABLE WATERLINE
- SANITARY SEWER LINE
- SANITARY SEWER FORCE MAIN
- PROPOSED FIRE LINE
- GAS LINE
- UNDERGROUND COMMUNICATION UTILITY
- UNDERGROUND OTHER UTILITIES
- OVERHEAD POWER LINE
- ABANDONED UTILITY
- CATCH BASIN / JUNCTION BOX
- MANHOLE (EXIST.=FILLED, PROP.=OPEN)
- CLEAN–OUT
- GAS METER
- WATER METER
- VALVE (EXIST.=FILLED, PROP.=OPEN)
- FIRE HYDRANT (EXIST.=FILLED, PROP.=OPEN)

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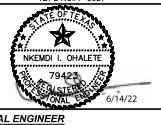

STRUCTURAL ENGINEER

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MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:

Drawn:

Checked:

Scale:

ACAD File:

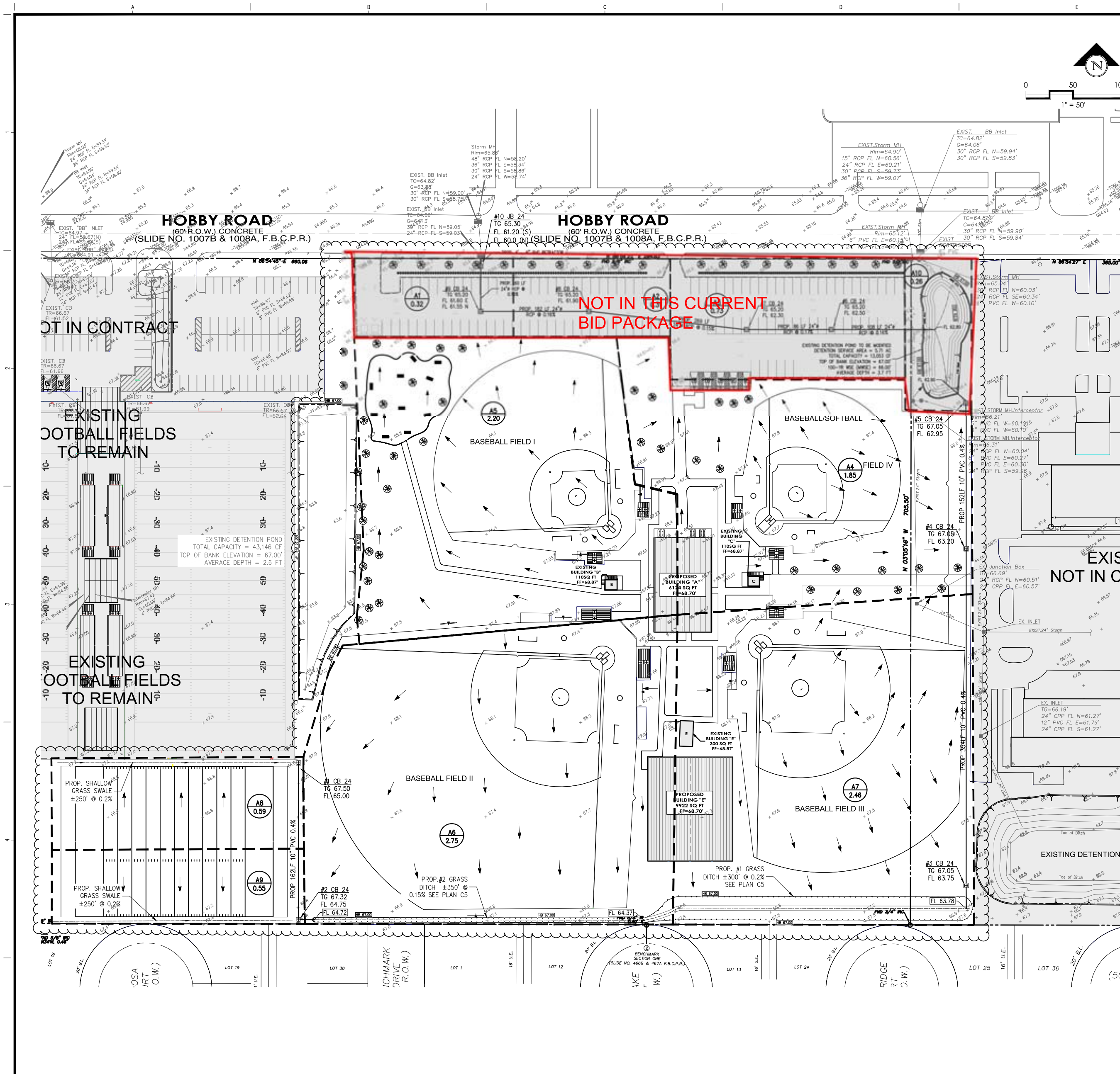
Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
CITY COMMENT	11/22/2021
100% CD	02/18/2022
ISSUE FOR BID	09/07/2022

UTILITY PLAN

C3-1

Tuesday, June 14, 2022 2:30 PM, Nedu, ARCH full bleed D (24.00 x 36.00 Inches), J:\PROJECTS\2021\#E2120–FBC_HOBBY\CAD & BIM DRAWINGS\CIVIL 04–07–22\UTILITY PLAN.dwg



STORM SEWER SYSTEM NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS, DETAILS AND/OR SPECIFICATIONS)

1. PIPE CULVERTS SHALL CONFORM TO ASTM SPECIFICATION C-76, CLASS III, FOR R.P.C.
2. STORM WATER DISCHARGING FROM A DITCH INTO A STORM SEWER SYSTEM MUST BE INTERCEPTED BY USE OF AN APPROPRIATE STRUCTURE (I.E., STUBS WITH RING GRATES OR TYPE "E" MANHOLES).
3. A MINIMUM DISTANCE OF TWO FEET (2') SHALL BE ESTABLISHED AND MAINTAINED BETWEEN THE RIGHT-OF-WAY LINE AND THE ADJACENT EDGE OF THE BANK OF A DITCH.
4. MATCH CROWNS OF PIPE AT ANY SIZE CHANGE UNLESS SEVERE DEPTH CONSTRAINTS PROHIBIT.
5. MINIMUM VERTICAL CLEARANCE BETWEEN ANY STORM PIPE OR BOX AND OTHER CROSSING PUBLIC OR PRIVATE UTILITIES SHALL BE AT LEAST 6-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY.
6. ALL STORM SEWERS UNDER OR WITHIN THREE (3) FT. OF PROPOSED OR FUTURE PAVEMENTS SHALL BE BACKFILLED WITH NO LESS THAN 1-1/2 SACKS OF CEMENT PER TON OF CEMENT STABILIZED SAND TO WITHIN ONE (1) FT. OF SUBGRADE.
7. ROOF DRAINS SHOULD PREFERABLY DISCHARGE TO STORM SEWER BY CLOSED PIPE OR EXTENDED AWAY FROM THE STRUCTURES BY 5 FEET OR AS FAR A POSSIBLE.

PIPE MATERIAL

A. STORM SEWER PIPE USED FOR CONNECTION TO STORM SEWER IN PUBLIC RIGHT-OF-WAY OR CONSTRUCTED WITHIN PUBLIC EASEMENT SHALL BE REINFORCED CONCRETE PIPE ASTM C-76, CLASS III, WITH O-RING JOINT PER ASTM C-443 AND SHALL EXTEND TO FIRST PRIVATE CATCH BASIN, INLET OR MANHOLE.

B. ALL OTHER PRIVATE STORM SEWER MAY BE SELECTED PER FOLLOWING CRITERIA:

a. CORRUGATED HIGH-DENSITY POLYETHYLENE (HDPE) (4 INCHES TO 48 INCHES IN DIAMETER): AASHTO M 294, DUAL WALL WITH WATER TIGHT (ASTM D3212) BELL-TO-BELL COUPLER, TRADE NAME N-12 BY ADS OR EQUAL.

b. POLYVINYL CHLORIDE (PVC) CORRUGATED PIPE WITH SMOOTH INTERIOR PER ASTM F 949 (4 INCHES TO 36 INCHES) WITH ELASTOMETRIC GASKET JOINTS. TRADE NAME A-2000 BY CONTECH OR EQUAL.

c. STEEL REINFORCED HIGH-DENSITY POLYETHYLENE (HDPE) (24 INCHES TO 48 INCHES IN DIAMETE.R); AASHTO M 294, HIGH PERFORMANCE JOINTS (ASTM D3212), TRADE NAME DUROMAXX OR EQUAL.

d. REINFORCED CONCRETE PIPE (RCP): ASTM C76, CLASS III WITH O-RING JOINTS PER ASTM C-443

– THE RESTRICTOR PIPE SHALL BE PVC OR OTHER MATERIAL ACCEPTABLE TO THE CITY / COUNTY.

MANHOLES / INLETS / CATCH BASINS

1. ALL MANHOLE FRAMES AND COVERS ARE TO BE FLUSH WITH PROPOSED FINISHED WALKS, PAVED AREAS, SWALES, etc. MANHOLE RIMS OUTSIDE OF PROPOSED PAVING TO BE SET 3" TO 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER GRADING OPERATIONS U.O.N.
2. ALL MANHOLES ARE TO BE CONSTRUCTED TO ALLOW FOR A MINIMUM OF 1 FOOT OF VERTICAL ADJUSTMENT.
3. CORED OR BLOCKED OUT PIPE OPENINGS MUST BE DESIGNED TO CLOSELY FIT THE OUTSIDE DIAMETER OF THE PROPOSED TIE IN AND SHALL BE SEALED USING APPROVED WATER STOP AND/OR GROUT.
4. ALL PRECAST MANHOLES AND INLETS BOXES MUST CONFORM TO ASTM C 913. PRECAST MANHOLES WITH THIN-WALL KNOCKOUTS TO ACCOMMODATE A RANGE OF PIPE SIZES WILL NOT BE ALLOWED IN THE RIGHT-OF-WAY.
5. FOR PRIVATE DEVELOPMENT WITH INTERNAL SITE DRAINAGE, ONLY ONE CONNECTION IS PERMITTED TO ANY ONE INLET, AND THAT CONNECTION (LEAD) SHALL BE MADE TO THE BACK OF THE INLET. CONNECTION SHALL NOT BE MADE TO THE FRONT FACE AND TO THE SHORT SIDES OF THE INLET UNLESS APPROVED BY THE ENGINEER/ CITY/ COUNTY.
6. FOR NEW CONNECTIONS TO CURBSIDE INLETS, EXISTING B INLETS SHALL BE ENLARGED TO BB INLETS. B INLETS ARE NOT ALLOWED U.O.N.
7. DO NOT USE "BEEHIVE" GRATE INLETS OR OTHER "SPECIALTY" INLETS.
8. DO NOT USE UNPROTECTED GRATE-TOP INLETS IN UNLINED ROADSIDE DITCH.

NOTE ON DETENTION FACILITIES:

1. STORMWATER DETENTION PONDS & SWALES SHOULD BE DESIGNED, ENGINEERED, CONSTRUCTED AND MAINTAINED FOR A MAXIMUM 48-HOUR DETENTION PERIOD AFTER THE DESIGN STORM AND REMAINS COMPLETELY DRY BETWEEN STORMS.
2. THE APPLICANT AND/OR OWNER, OR HEIRS AND ASSIGNS, SHALL BE RESPONSIBLE FOR THE PROPER OPERATION AND MAINTENANCE OF THE DETENTION BASIN AND STORMWATER MANAGEMENT FACILITIES FOR A PROPERTY.
3. SUBSURFACE DRAINAGE SYSTEM ARE REQUIRED TO BE DRAINED IN 48 HOURS.

FLOOD HAZARD WARNING SIGN:

CONTRACTOR TO PROVIDE THE PAVED PARKING AREAS WITH MULTIPLE SIGNAGE STATING THAT THE AREA IS SUBJECT TO FLOODING DURING SEVER RAINFALL EVENTS.
THE SIGNS SHALL HAVE A MINIMUM AREA OF 1.5 SQUARE FEET AND CONTAINING THE FOLLOWING MESSAGE:

WARNING

THIS AREA IS A DETENTION BASIN AND IS SUBJECT TO PERIODIC FLOODING TO A DEPTH OF 9 INCHES.

LEGEND

- PROPERTY LINE
- LOT LINE
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- DRAINAGE AREA LIMITS
- OFF-LINE DRAINAGE AREA LIMITS
- DRAINAGE SWALE
- DITCH TOP OF BANK
- CHANNEL TOP OF BANK
- CHANNEL TOE OF BANK
- CHANNEL CENTERLINE
- POND BOTTOM (TOE)
- EXIST. / PROP. BASIN GRADE SLOPE
- OFF-SITE RUNOFF DIRECTION
- PROPOSED CATCH BASIN / JUNCTION BOX
- EXIST.=FILLED PROP.=OPEN MANHOLE
- CLEAN-OUT
- DRAINAGE AREA DESIGNATION (A9 / 9.999) DRAINAGE AREA INFO

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STATE OF TEXAS
NKEMDI I. OHALETE
79...
PROFESSIONAL ENGINEER
4/20/22

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MEP ENGINEER
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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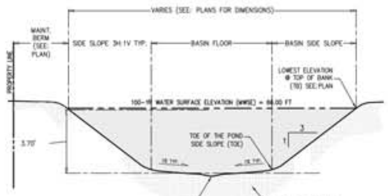
CITY COMMENT	04/20/22
ISSUE FOR BID	09/07/2022

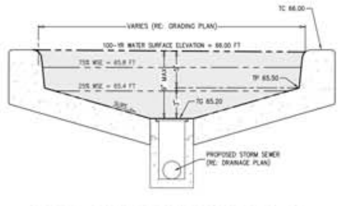
DRAINAGE PLAN

C4

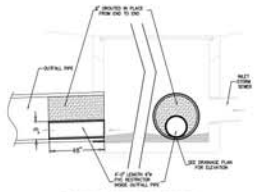


1. BASINS SHALL BE MAINTAINED TO PERFORM AS DESIGNED FOR THE LIFE OF THE PROJECT AND SHALL NOT BE CONVERTED TO A DIFFERENT USE WITHOUT AN APPROVAL.
2. THE DEPTH OF DETENTION POND SHALL BE INSPECTED ANNUALLY. DESIGN VOLUME SHALL BE RESTORED WHEN THE DEPTH OF SEDIMENT EXCEEDS 6" ANYWHERE ABOVE THE ELEVATIONS SHOWN ON PLANS HEREON.
4. INLET AND OUTLET LOCATIONS SHALL BE MAINTAINED FREE OF OBSTRUCTIONS. DEBRIS AND TRASH SHALL BE REMOVED FROM THE BASIN AT LEAST ANNUALLY.
5. THE DETENTION POND SHALL BE INSPECTED ANNUALLY AND AFTER STORM EVENTS TO ENSURE THAT POSITIVE DRAINAGE IS MAINTAINED FOR BASINS THAT DO NOT INCLUDE RETENTION VOLUME. SLOPES SHALL BE MAINTAINED TO THE ORIGINAL DESIGN CONFIGURATION.
5. 95% TURF GERMINATION SHALL BE ACHIEVED ON THE MAINTENANCE BERMS, SIDE SLOPES, AND BOTTOM TO PREVENT EROSION.

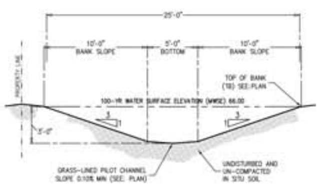
(1) TYPICAL DRY DETENTION BASIN CROSS-SECTION
N.T.S.



(1) TYPICAL PAVEMENT DETENTION CROSS-SECTION
N.T.S.

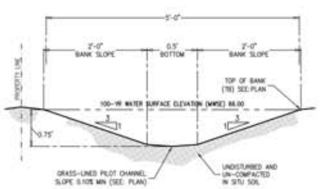


(2) TYPICAL RESTRICTOR PIPE DETAIL
N.T.S.



(A) DITCH "D1" CROSS-SECTION
N.T.S.

Width B (ft)		Length	Depth (ft)			Slope			A	P	R	Q	Q_T	V
Top	Bottom	L (ft)	Initial	End	H	Side (to 1)	Channel	n	(sf)	(ft)	(ft)	(cfs)	(cf)	(fps)
25.00	5.00	330.00	3.00	3.50	3.25	3.00	1.00%	0.013	48.75	25.55	1.91	857.1394	16,088	17.582



(A) DITCH "D2" CROSS-SECTION
N.T.S.

Width B (ft)		Length	Depth (ft)			Slope			A	P	R	Q	Q_T	V
Top	Bottom	L (ft)	Initial	End	H	Side (to 1)	Channel	n	(sf)	(ft)	(ft)	(cfs)	(cf)	(fps)
5.00	0.50	350.00	0.66	0.86	0.76	3.00	1.00%	0.013	2.09	5.31	0.39	12.8363	732	6.142

Peak Storm Runoff Calculations
(RATIONAL METHOD)

Watershed Area

- Total Area of Tract: 12.0167 Acres
- **Area affected in this phase of development (A):** **12.0167 Acres**

Time of concentration (Tc)

$Tc = 10 \times A^{0.1761} + 15$

$Tc = 10 \times (12.0167 \wedge 0.1761) + 15 =$ 30.49 min, Initial Time = 10.00 min

Time of concentration (Tc) = 40.49 min

Rainfall Intensity (I)

$I = b / (d + Tc)^e$

	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
e	0.7244	0.69	0.6623	0.6294	0.6096	0.5797
b (in)	48.55	52.32	54.48	57.79	61	60.66
d (min)	9.27	7.88	7.88	5.89	5.46	4.44

$I_{2\text{-}YR}$ = 2.06 in/hr
$I_{10\text{-}YR}$ = 4.19 in/hr
$I_{100\text{-}YR}$ = 6.68 in/hr

Watershed Coefficient (C)

$C = 0.6\,Ir + 0.2$ **where** Ir = impervious area / total area

- **Pre - Development Condition A_E:**
  - Roof: 2,356 s.f.
  - Pavement: 40,647 s.f.
  - Sidewalk: 11,042 s.f.
  - Dry Grass Pond (15% Imp.): - s.f.
  - A_E = 62,045 s.f. or 1.4244 ac
  - Ir = 0.1185 ==> **C_{EXIST} = 0.6 x 0.1185 + 0.2 = 0.27**
- **Post - Development Condition A_N:**
  - Roof: 14,089 s.f.
  - Pavement: 40,647 s.f.
  - Sidewalk: 13,200 s.f.
  - Dry Grass Pond (15% Imp.): 5,489 s.f.
  - A_N = 81,425 s.f. or 1.8693 ac
  - Ir = 0.1556 ==> **C_{PROP} = 0.6 x 0.1556 + 0.2 = 0.29**

Peak Runoff (Q)

Q = I x (CA)

- **Pre - Development Condition (Q_{EXIST}) :**
  - $Q_{(2\text{-}YR)}$ = 3.86 x (0.27 x 12.0167) = **9.2793 cfs**
  - $Q_{(100\text{-}YR)}$ = 6.68 x (0.27 x 12.0167) = **21.6733 cfs**
- **Post - Development Condition (Q_{PROP}) :**
  - $Q_{(2\text{-}YR)}$ = 2.86 x (0.29 x 12.0167) = **9.9667 cfs**
  - $Q_{(100\text{-}YR)}$ = 6.68 x (0.29 x 12.0167) = **23.2788 cfs**

RESTRICTOR ORIFICE CALCULATIONS

- Detention Basin 100% (Full) Capacity = 61,439 c.f.
- Detention Basin 75% Capacity = 0.75 x 61439 = 46,079 c.f.
- Detention Basin 25% Capacity = 0.25 x 61439 = 15,360 c.f.
- Detention basin water depth for 100% of capacity = MWSE = 66.00 ft
- Detention basin water depth for 75% of capacity = $WSE_{75\%}$ = 65.23 ft
- Detention basin water depth for 25% of capacity = $WSE_{25\%}$ = 63.68 ft
- Primary Orifice Bottom Flow Line = FL = 60.00 ft

$Q = CA(2g)^{0.5}(h)^{0.5}$ and **$D = Q^{0.5} / (2.25h^{0.25})$** Where:

Q = Outflow discharge (cfs)
C = Coefficient of Discharge
A = Orifice Area (sf)
h = Head, water surface differential (ft)
D = Orifice diameter (ft)
G = Gravitational Factor = 32.2 ft/s

Low level Restrictor (Primary Orifice) Calculations:

Total Drainage Area = 12.0167 Acres

- Q_{LL} = Outflow rate allowed for Low flow = 0.5 x 12.0167 = 6.0084 cfs
- H_{LL} = Water surface differential for low flow = 63.675-60-(6/24) = 3.43 ft
- C = Coefficient of Discharge: 0.80
- D_L = Calculated Orifice = (6.0084^0.5)/(2.25x3.43^0.25) = 0.80 ft or 9.60 in

D_{LL}	= Provided Low Level (Primary) Restrictor Size :	6.00	Inches

- a = Orifice Area = π (6/2)^2 = 0.1963 s.f.
- Q_{LL} = Flow Rate for low level restrictor = 0.8x0.1963x((2x32.2)^0.5)x((3.43^0.5)) = 2.3340 cfs

Development Information

☐ Single Family (SFR) ☐ Multi-Family Residential ☑ Commercial Development ☐ Other

Total Area of Tract: 12.0167 Acres
Total Development (Disturbed)Area (A): **12.0167 Acres**

Area of Impervious Cover

	Existing					Final				
- Building:	2,356	s.f.	or	0.0541	a.c.	14,089	s.f.	or	0.3234	a.c.
- Pavement:	40,647	s.f.	or	1.1168	a.c.	40,647	s.f.	or	1.1168	a.c.
- Sidewalk/Patio/Stair:	11,042	s.f.	or	0.2535	a.c.	13,200	s.f.	or	0.3030	a.c.
- Detention Pond:	-	s.f.	or	-	a.c.	5,489	s.f.	or	0.1260	a.c.
- Pool:	-	s.f.	or	-	a.c.	-	s.f.	or	-	a.c.
Total Area	62,045	s.f.	or	**1.4244**	**a.c.**	81,425	s.f.	or	**1.8693**	**a.c.**

Percentage of Impervious Cover: Existing = **11.85%** Final = **15.56%**

Required Detention Volume (V_T)

Detention volume criteria utilized per COH IDM :
Ref: Detention Volume for Drainage Area Less Than 50 Acres
NO DETENTION REQUIRED

V_T = [43,560 x (Detention Rate x A_D)] = 43,560 x 0.75 x 1.8693

V_T = Total Detention Volume for the proposed project (Cubic Feet)
A_D = Total Disturbed area that results in impervious surface (Acres)
A_D = 1.8693 Acres Detention Rate Required = 0.75 ac-ft/ac

- Total Detention Required V_T =	61,070	c.f.	1.4020	Acre-ft

Provided Detention Volume

100-YR Peak Water Surface Elevation (MWSE) = 66.00 ft

Pavement Detention

#	Area (s.f.)	TC (ft)	TP (ft)	TG (ft)	D1 (ft)	D2 (ft)	D (ft)	V (Volume)	
P1	40,647	66.00	65.50	65.20	0.45	0.30	0.55	26,756	c.f.

TP: Top of Pavement elevation
TG: Inlet Top of Grate elevation
D1= MWSE - TP
D2= TP - TG
D=1/3*D2+D1
V = Area x D

Subtotal: 26,756 c.f. or 0.6142 Acre-Ft

Underground Detention System

- Circular / Elliptical Pipe:

Mult.	Rise (in)	Span (in)	L (ft)	A (sf)	Single Volume		Total Volume	
1	24	24	1,523.0	3.14	4,784.65	c.f.	4,784.65	c.f.
1	-	-	-	-	-	c.f.	-	c.f.
1	-	-	-	-	-	c.f.	-	c.f.

A = πR²

Subtotal: 4,785 c.f. or 0.1098 Acre-Ft

- CB / IB Volume:

#	Desc.	TG (ft)	FL (ft)	L	W (in)	W (ft)	D (ft)	Volume	
1	CB 24	67.50	65.00	7	22	1.83	1.92	6.44	c.f.
2	CB 24	67.32	64.75	7	22	1.83	1.99	6.68	c.f.
3	CB 24	67.05	63.75	7	22	1.83	2.72	9.13	c.f.
4	CB 24	67.05	63.20	7	22	1.83	3.27	10.98	c.f.
5	CB 24	67.05	62.95	7	22	1.83	3.52	11.82	c.f.
6	IB 24	65.20	62.50	7	22	1.83	2.12	7.11	c.f.
7	CB 24	65.20	62.30	7	22	1.83	2.32	7.79	c.f.
8	CB 24	65.20	61.90	7	22	1.83	2.72	9.13	c.f.
9	CB 24	65.20	61.55	7	22	1.83	3.07	10.31	c.f.
10	CB 24	65.30	60.00	7	22	1.83	4.72	15.85	c.f.

TG: Top of grate elevation W: Inner width of Inlet structure D: Depth of Inlet structure

Subtotal: 95 c.f. or 0.0022 Acre-Ft

Channel / Ditch / Swale Capacity:

Width B (ft)		Length	Depth (ft)			Slope		Volume (cf)
Top	Bottom	L (ft)	Initial	End	H	Side (to 1)	Channel	
25.00	5.00	330.00	3.00	3.50	3.25	3.00	1.00%	16,000
5.00	0.50	350.00	0.66	0.86	0.76	3.00	1.00%	750

Subtotal: 16,750 c.f. or 0.3845 Acre-Ft

Detention Pond:

Surface Area: 5,489.00 s.f.
Bottom Area: 1,881.00 s.f.
Finished Grade Highest Elevation: 67.00 ft
Outfall Flow Line: 62.00 ft
Average Depth: 3.70 ft

Subtotal: 13,853 c.f. or 0.2997 Acre-Ft

- Total Detention provided:	61,439	c.f. or	1.4104	Acre-Ft

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX
5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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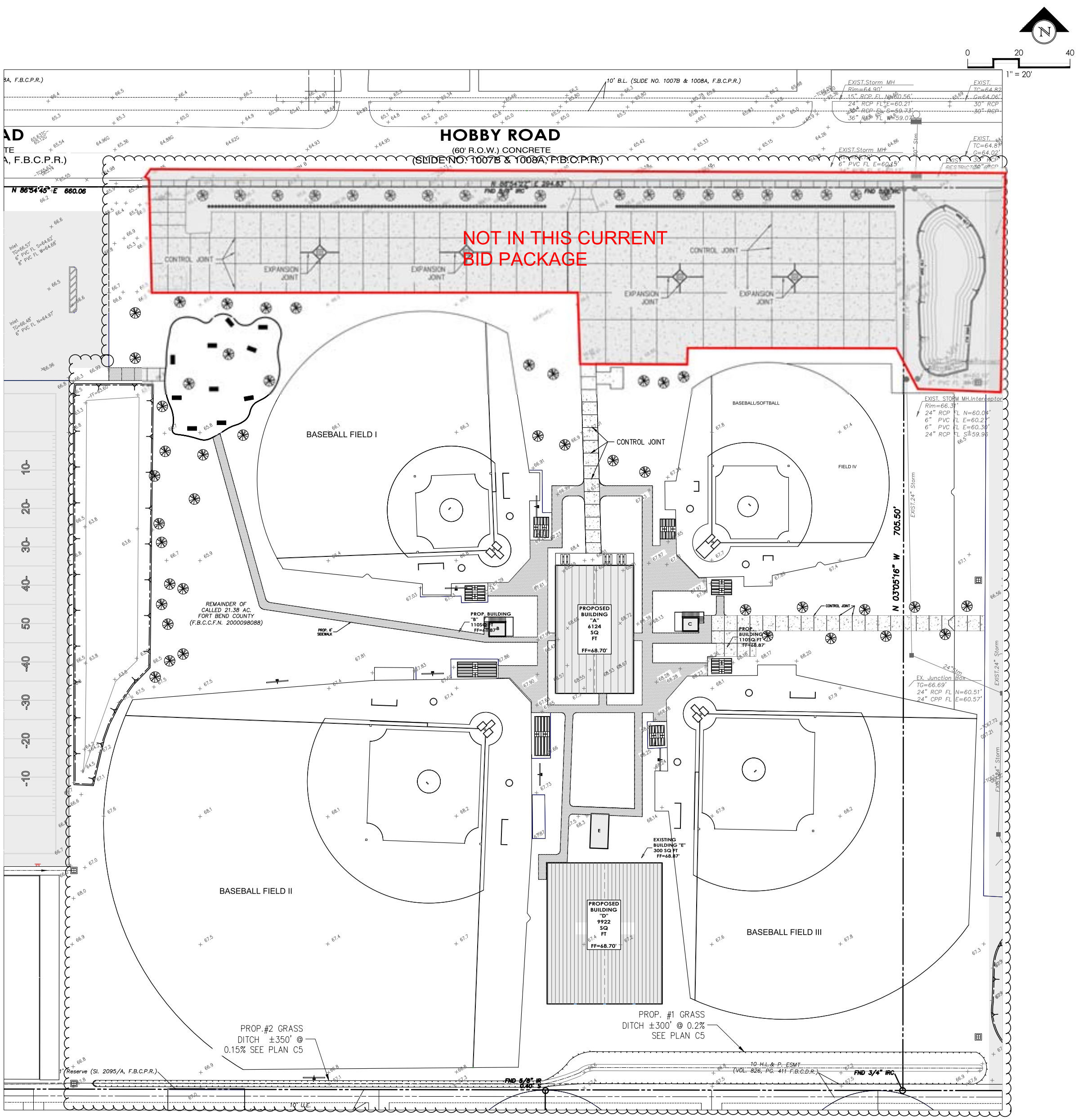
DRAINAGE CALC.
C5



GENERAL PAVING NOTES

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN GEOTECHNICAL REPORT, DETAILS AND/OR SPECIFICATIONS.)

1. PAVEMENT DESIGN AND SOIL PREPARATION RECOMMENDATIONS GIVEN IN THE GEOTECHNICAL REPORT PROVIDED BY THE OWNER SHALL BE ADHERED TO FOR BOTH MATERIALS AND PRACTICE OF INSTALLATION:
   - TITLE: XXX
   - PREPARED BY: XXX
   - PROJECT NO: XXX
   - DATE: XXX
2. CONTRACTOR SHALL FURNISH ALL PAVEMENT MARKINGS FOR FIRE LANES, ROADWAY LANES, PARKING STALLS, HANDICAPPED PARKING SYMBOLS, ACCESS AISLES, STOP BARS AND SIGNS, AND MISCELLANEOUS STRIPING WITHIN PARKING LOT AS SHOWN ON THE PLANS.
2. THE MATERIALS AND PROPERTIES OF CONCRETE SHALL MEET THE APPLICABLE REQUIREMENTS IN THE A.C.I. (AMERICAN CONCRETE INSTITUTE) MANUAL OF CONCRETE PRACTICE AS WELL AS LOCAL STANDARDS.
3. GOOD DRAINAGE SHOULD REDUCE THE POSSIBILITY OF THE SUBGRADE MATERIALS BECOMING SATURATED DURING THE NORMAL SERVICE PERIOD OF THE PAVEMENT.
4. ANY DAMAGED PAVING, CURBS ANO/OR SIDEWALK WILL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE TO THE SATISFACTION OF THE ENGINEER AND OWNER.
5. BEFORE PLACING PAVEMENT, CONTRACTOR SHALL VERIFY THAT SUITABLE HANDICAPPED ROUTES (PER A.D.A. & T.A.S) EXIST TO AND FROM EVERY DOOR IN NO CASE SHALL:
   A. HANDICAP RAMP SLOPES EXCEED I VERTICAL TO 12 HORIZONTAL.
   B. SIDEWALK CROSS SLOPES EXCEED 2.0 PERCENT.
   C. LONGITUDINAL SIDEWALK SLOPES EXCEED 5.0 PERCENT.

   CONTRACTOR SHALL CONTACT ENGINEER PRIOR TO PAVEMENT CONSTRUCTION IF ANY SLOPES EXCEED THE ABOVE LIMITS.

PAVING

THE TRAFFIC LIKELY TO USE THE PAVEMENT WILL GENERALLY CONSIST OF LIGHT TRUCK TRAFFIC FOR MAIN DRIVES AND HEAVY DUTY (DRIVES) PAVEMENTS TO ACCOMMODATE OCCASIONAL HEAVIER LOADINGS DUE TO FIRE TRUCKS AND DELIVERY VEHICLES. THE RECOMMENDED PAVEMENT SECTIONS PROVIDED ABOVE ARE CONSIDERED THE MINIMUM NECESSARY TO PROVIDE SATISFACTORY PERFORMANCE BASED ON THE PROVIDED TRAFFIC LOADING. IN SOME CASES, JURISDICTIONAL MINIMUM STANDARDS FOR PAVEMENT SECTION CONSTRUCTION MAY EXCEED THOSE PROVIDED BELOW.

PAVEMENT SUBGRADE

EXISTING FILL SOILS WERE ENCOUNTERED TO A DEPTH OF ABOUT 2 FEET BELOW THE EXISTING SITE GRADES WITHIN PORTIONS OF THE PROJECT SITE. THE DEGREE OF COMPACTION MUST BE CAREFULLY EVALUATED DURING THE CONSTRUCTION. PROPOSED PAVED AREAS SHOULD BE PROOFROLLED WITH HEAVY COMPACTION EQUIPMENT WITH LOAD OF AT LEAST 25 TONS TO ATTEMPT TO LOCATE SOFT OR UNDESIRABLE SOILS SO THEY CAN BE REMOVED AND REPLACED WITH PROPERLY PLACED AND COMPACTED SOILS. PUMPING OR RUTTING IDENTIFIED DURING PROOFROLL SHOULD BE CONDUCTED IN ACCORDANCE WITH TXDOT STANDARD SPECIFICATION ITEM 216. THE PROOFROLLING OPERATIONS SHOULD BE OBSERVED BY THE REPRESENTATIVE OF GEOTECHNICAL ENGINEER OF RECORD.

IF LIME IS USED, WE ESTIMATED APPROXIMATELY 6% HYDRATED LIME (BY DRY WEIGHT OF SOIL) BE USED TO MODIFY AND STABILIZE THE CLAY SUBGRADE SOILS. THE APPLICATION RATE CORRESPONDING TO THIS ADDITIVE AMOUNT WOULD BE APPROXIMATELY 27 POUNDS PER SQUARE YARD FOR EACH SIX-INCH OF COMPACTED THICKNESS. THE HYDRATED LIME SHOULD MEET THE REQUIREMENTS OF ITEM 264 (TYPE A) IN THE TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES, AND SHOULD BE THOROUGHLY MIXED AND BLENDED WITH THE UPPER 6 INCHES OF THE CLAY SUBGRADE (TXDOT ITEM 260). THIS MIXTURE SHOULD BE UNIFORMLY COMPACTED TO A MINIMUM OF 95% OF ITS MAXIMUM STANDARD PROCTOR DRY DENSITY (ASTM D 698) AT A MOISTURE CONTENT WITHIN OPTIMUM AND +3% ABOVE OPTIMUM AS DETERMINED BY THAT TEST. LIME TREATMENT SHOULD EXTEND AT LEAST 1 FOOT BEYOND EXPOSED PAVEMENT EDGES TO REDUCE THE EFFECTS OF SHRINKAGE AND ASSOCIATED LOSS OF SUBGRADE SUPPORT. DENSITY TESTS SHOULD BE PERFORMED AT A FREQUENCY OF 1 TEST PER 5,000 SQUARE FEET OF PAVEMENT. THE ACTUAL AMOUNT OF LIME REQUIRED SHOULD BE CONFIRMED BY ADDITIONAL LABORATORY TESTS (LIME SERIES) DURING THE CONSTRUCTION PHASE.

CONCRETE PAVEMENT DESIGNATION

SPECIFIC TRAFFIC LOADING INFORMATION WAS NOT PROVIDED; HOWEVER, LIGHT DUTY (AUTOMOBILE PARKING) PAVEMENTS ARE EXPECTED TO RECEIVE PASSENGER VEHICLES. OUR PAVEMENT SECTION RECOMMENDATIONS FOR HEAVY DUTY (DRIVES) PAVEMENTS SHOULD ACCOMMODATE OCCASIONAL HEAVIER LOADINGS DUE TO FIRE TRUCKS, DELIVERY VEHICLES AND LIGHT TRUCK TRAFFIC AND MAY BE CONSIDERED FOR MAIN DRIVES. CONCRETE SHOULD BE DESIGNED WITH 3 TO 6 PERCENT ENTRAINED AIR.

LIGHT & MEDIUM DUTY:
6" THICK CLASS "C" CONCRETE, 3500 PSI
#3 REBAR @ 18" O.C. EACH WAY
6" LIME STABILIZED SUB-GRADE**

SIDEWALK:
4" THICK CLASS "A" CONCRETE, 3000 PSI
#3 REBAR @ 24" O.C. EACH WAY
6" COMPACTED SUB-GRADE

** IN LIEU OF LIME STABILIZED SUBGRADE, THE PCC PAVEMENT THICKNESS MAY BE INCREASED BY 1 INCH.

PAVEMENT JOINTS

1. SUGGESTED LONGITUDINAL AND TRANSVERSE JOINT SPACING FOR CONCRETE PAVING IS 15-FEET.
2. THE EXPANSION JOINT SPACING (IF USED) IS APPROXIMATELY 60-FEET.
3. ALL JOINTS SHALL BE SEALED PER CITY/COUNTY SPECIFICATIONS. ALL JOINTS SHALL EXTEND THROUGH THE CURB.
4. NO SAWCUT OR CONSTRUCTION JOINTS IN VALLEY OR WITHIN 3-FEET OF AN INLET FRAME.
5. PLACE TRANSVERSE CONSTRUCTION JOINT WHEREVER CONCRETE PLACEMENT MUST BE STOPPED FOR MORE THAN 30 MINUTES.
6. INTENTIONAL STOPPAGE OF THE PLACING OF CONCRETE SHALL BE AT EITHER AN EXPANSION JOINT OR AT A WEAKENED PLANE JOINT. CONSTRUCTION JOINTS SHALL BE TOOLED TO A SUFFICIENT WIDTH AND DEPTH IN ORDER TO RECEIVE JOINT SEALANT MATERIAL.
7. FOR PAVEMENT SLABS WIDER THAN 28-FEET PROVIDE A LONGITUDINAL SAWED JOINT U.N.O.
8. LAY OUT JOINTS TO FORM SQUARE PANELS. IF NOT PRACTICAL, RECTANGLE PANELS CAN BE USED AS LONG AS THE LONGER SIDE DIMENSION IS NO MORE THAN 1.5 TIMES THE SHORT SIDE.
10. DO NOT DISCHARGE CONCRETE FROM THE MIXER DIRECTLY ON TOP OF OR ON THE SIDES OF THE EXPANSION JOINT ASSEMBLIES.
11. WHEN JOINT SPACING ARE NOT DETERMINED, SPACING SHOULD NOT EXCEED 2 TO 2.5 TIMES THE SLAB OR PAVEMENT THICKNESS IN FEET.

   RECOMMENDED SPACING:
   - THICKNESS 4" ==> SPACING 8'-12'
   - THICKNESS 5" ==> SPACING 10'-12'
   - THICKNESS 6" ==> SPACING 12'-15'
   - THICKNESS 7" ==> SPACING 14'-15'
   - THICKNESS 8"+ ==> SPACING 15'

LEGEND

- PROPERTY LINE
- EXPANSION/ISOLATION JOINT
- CONTROL (SAW CUT) JOINT
- CONSTRUCTION/LONGITUDINAL JOINT

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX
5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:
Drawn:
Checked:
Scale:
ACAD File:

Revisions:

DESCRIPTION	
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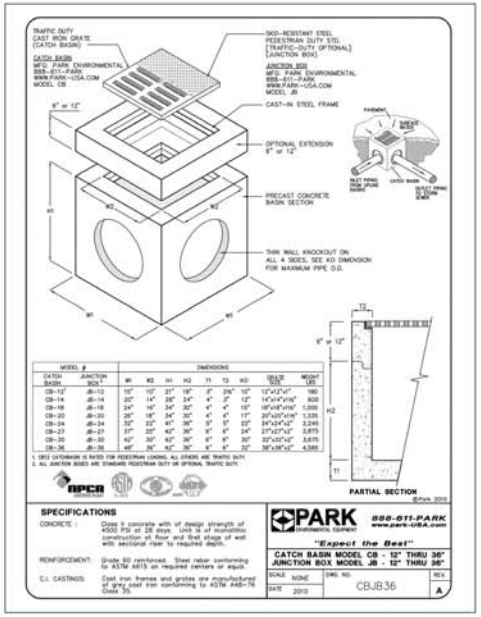
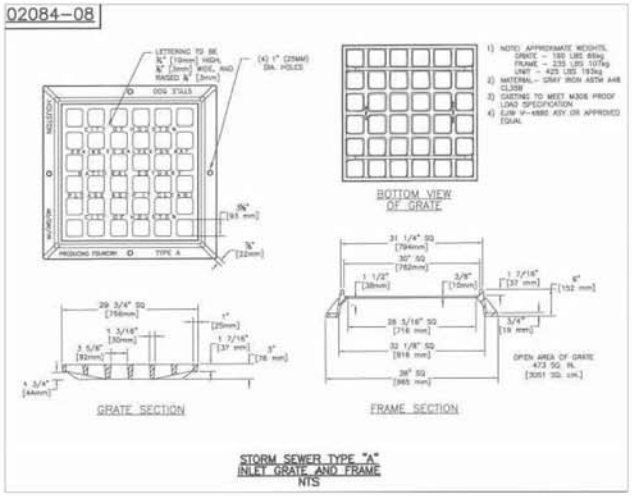
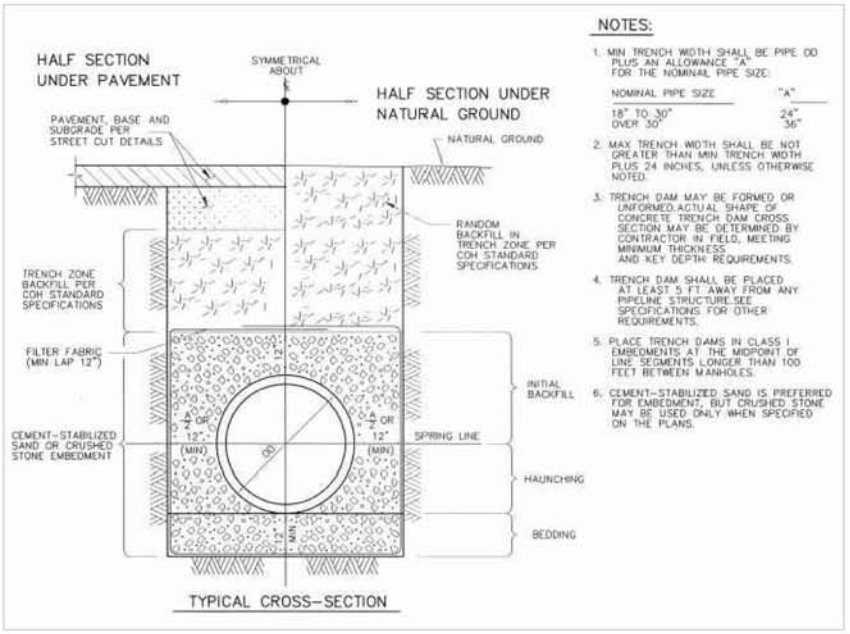
95% CD	09/27/2021
CITY COMMENT	11/22/2021
100% CD	02/18/2022
CITY COMMENT	04/20/22
ISSUE FOR BID	09/07/2022

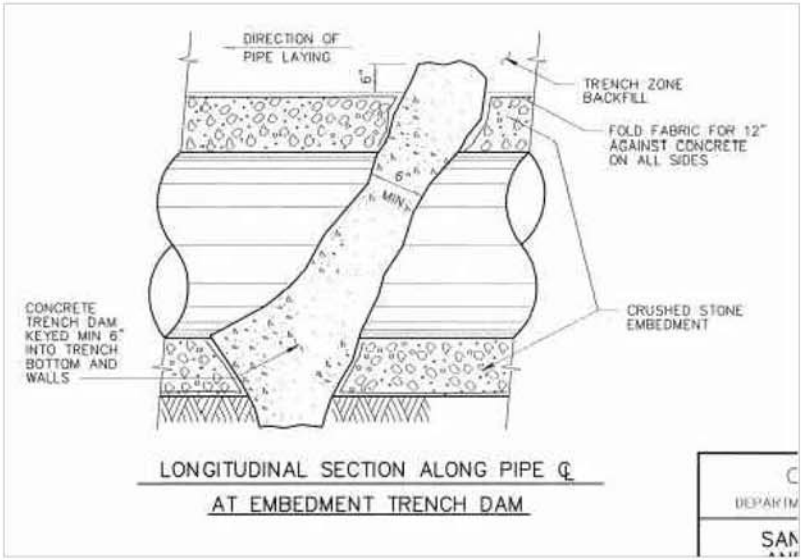
PAVING PLAN

C6









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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	08/09/2021
Drawn:	MK
Checked:	NO
Scale:	1/32" = 1'-0"
ACAD File:	

Revisions:

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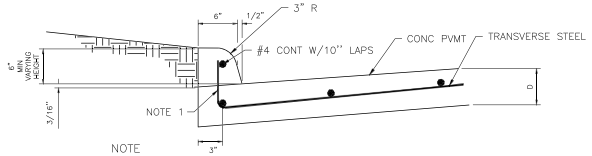
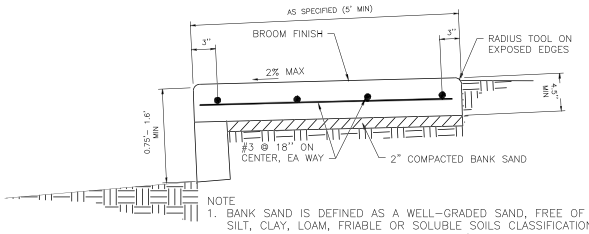
STORM DETAILS



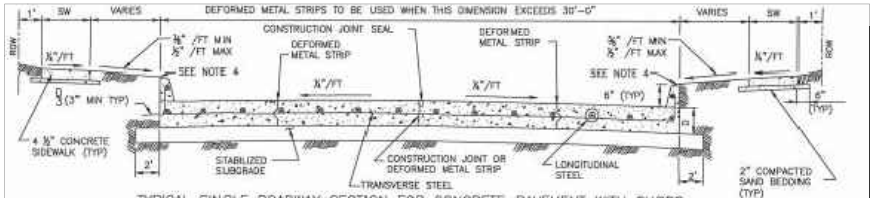
NOTE
1. WHEN CONCRETE CURB IS TO BE PLACED ON EXISTING CONCRETE BASE, #4 BARS @ 2'-0" CENTERS, 10" LONG, DOWELED AND SET IN SULPHUR OR QUICK SETTING CEMENT.
2. PLACE EXPANSION JOINTS @ 40' ON CENTERS & CONTRACTION JOINTS @ 10' ON CENTERS
3. FINISH TO BE ACCOMPLISHED BY FLOATING, STEEL TOWELING AND THEN BRUSHING, HAND FINISH NOT REQUIRED WHEN CURB AND GUTTER IS POURED BY A MACHINE, BUT CURB IS TO HAVE THE SAME OUTSIDE DIMENSIONS, AND HAVE A BRUSHED FINISH.

TYPICAL CONCRETE CURB DETAIL
NTS



NOTE
1. BANK SAND IS DEFINED AS A WELL-GRADED SAND, FREE OF SILT, CLAY, LOAM, FRIABLE OR SOLUBLE SOILS CLASSIFICATION SYSTEM GROUP SYMBOL SW CRITERIA W/A PLASTICITY INDEX OF LESS THAN 10. AND NO MORE THAN 12% OF MATERIAL CAN PASS THE No. 200 SIEVE.
2. DOWEL IN AND TIE TO ANY CONCRETE STRUCTURE ADJACENT TO SIDEWALK (DRIVEWAY, INLET BOX, CURB, JUNCTION BOX, ETC) WITH #3x12"LONG BARS @ 18" ON CENTERS. INCLUDE EXPANSION JOINT AT CONNECTION WITH BACK OF CURB.

TYPICAL SIDEWALK DETAIL @FENCE
NTS



TYPICAL SINGLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

TABLE 1
REINFORCING STEEL BAR SIZES AND SPACINGS FOR VARIOUS PAVEMENT THICKNESSES (D) WITH MAXIMUM TRANSVERSE CONTROL JOINT SPACING = 20'-0" MAXIMUM EXPANSION JOINT SPACING = 80'-0" f'c = 4,000 PSI/28 DAYS AND FY = 60,000 PSI

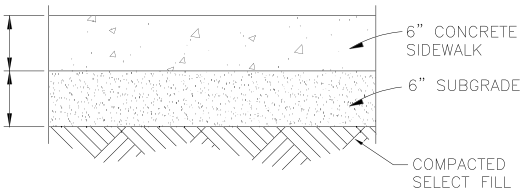
TABLE 1

PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
4 1/2	1/2	18	12
5	1/2	18	12
6	3/4	18	12
7	1	18	12

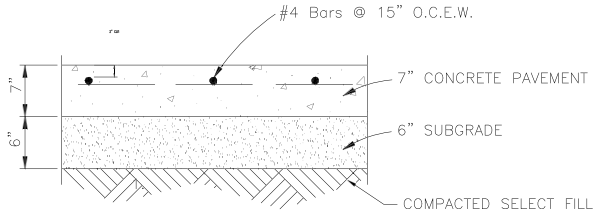
PAVEMENT THICKNESS D (IN)	PAVEMENT WIDTH (FT)	LONGITUDINAL STEEL # 4 BARS NUMBER OF BARS	# 4 BARS SPACING (IN)	# 4 BARS END BAR SPACING (IN)	# 5 BARS NUMBER OF BARS	# 5 BARS SPACING (IN)	# 5 BARS END BAR SPACING (IN)	# 6 BARS NUMBER OF BARS	# 6 BARS SPACING (IN)	# 6 BARS END BAR SPACING (IN)	TRANSVERSE STEEL # 4 BARS SPACING (IN)	# 5 BARS SPACING (IN)	# 6 BARS SPACING (IN)
6	28	17	20.50	4	–	–	–	–	–	–	36	–	–
7	25	17	18.25	4	–	–	–	–	–	–	36	–	–
7	35	24	18.00	3	–	–	–	–	–	–	36	–	–
7	36	25	17.75	3	–	–	–	–	–	–	36	–	–
7	37	25	18.25	3	–	–	–	–	–	–	36	–	–
7	41	28	18.00	3	–	–	–	–	–	–	36	–	–
7	45	31	17.75	3.75	–	–	–	–	–	–	36	–	–
8	25	20	15.50	2.75	13	24.50	3	–	–	–	36	36	–
8	34	27	15.50	2.50	17	25.00	4	–	–	–	36	36	–
8	35	27	16.00	2	18	24.25	4	–	–	–	36	36	–
8	36	28	15.75	3.25	18	25.00	3	–	–	–	30	36	–
8	44	24	15.75	4	22	24.75	4	–	–	–	30	36	–
8	45	35	15.75	2.25	23	24.25	3	–	–	–	30	36	–
9	25	22	14.00	3	14	22.50	4	–	–	–	36	36	–
9	34	31	13.50	2	19	22.25	3.50	–	–	–	30	36	–
9	35	31	13.75	3.75	20	21.75	3.50	–	–	–	30	36	–
9	36	32	13.75	3	21	21.25	3.50	–	–	–	30	36	–
9	44	39	13.75	2.75	25	21.75	3	–	–	–	24	36	–
9	45	39	14.00	4	26	21.25	4.50	–	–	–	24	36	–
10	25	24	12.75	3.5	17	18.25	4	–	–	–	36	36	36
10	34	33	12.50	4	21	20.00	4	–	–	–	30	36	36
10	35	34	12.50	3.75	23	18.75	4	–	–	–	30	36	36
10	36	35	12.50	3.5	24	18.50	3	–	–	–	30	36	36
10	44	44	12.00	4	29	18.50	4.50	–	–	–	24	36	36
10	45	44	12.50	3	29	19.00	3	–	–	–	24	36	36
11	25	27	11.25	3	17	18.25	4	12	26.75	3	36	36	36
11	34	38	11.50	2.75	24	17.50	2.5	17	25.00	4	24	36	36
11	35	37	11.50	3	24	18.00	3	17	25.75	4	24	36	36
11	36	40	11.00	2	25	17.75	3	17	26.50	4	24	36	36
11	44	48	11.125	2.5	30	18.00	3	21	26.00	4	24	36	36
11	45	49	11.125	3	31	17.75	4	22	25.50	3	24	36	36
12	25	–	–	–	19	18.25	4	13	24.50	3	36	36	36
12	34	–	–	–	26	18.00	4	18	23.50	4	24	36	36
12	35	–	–	–	26	18.50	4	19	23.00	3	24	36	36
12	36	–	–	–	27	18.25	4.5	20	22.25	4.5	24	36	36
12	44	–	–	–	33	18.25	4	24	22.50	5	24	30	36
12	45	–	–	–	35	18.75	3	25	22.25	3	24	30	36

MINIMUM LAP LENGTH (L):
A. # 4 BARS ; L = 22 INCHES
B. # 5 BARS ; L = 27 INCHES
C. # 6 BARS ; L = 32 INCHES

CONCRETE PAVEMENT DETAILS
NTS



6" CONCRETE SIDEWALK



7" CONCRETE PAVEMENT

SUBGRADE TO BE STABILIZED WITH 7% LIME IN ACCORDANCE WITH TxDOT SPECIFICATION ITEM 260. COMPACT LIME TREATED SUBGRADE TO 95% STANDARD PROCTOR DENSITY PER ASTM D-698. EXTEND LIME TREATED SUBGRADE 5' PAST PAVING LIMITS.

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2/18/22

STRUCTURAL ENGINEER
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date: 08/09/2021
Drawn: MK
Checked: NO
Scale: 1/32" = 1'-0"
ACAD File:

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
CITY COMMENT	02/18/2022
ISSUE FOR BID	09/07/2022

PAVING DETAILS

C11

SCOPE OF WORK

1. WORK INDICATED ON THESE DRAWINGS IS LIMITED IN NATURE. THIS CONTRACT DOCUMENTS ARE TO BE USED FOR FOUNDATION CONSTRUCTION ONLY.
   DESIGN CRITERIA FOR PRE-ENGINEERED BUILDING IS INDICATED ON THIS DRAWING, WHICH IS IN ADDITION TO THE RELEVENT BUILDING CODE REQUIREMENTS.
2. CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMIT FROM BUILDING OFFICIALS AS REQUIRED.

GENERAL NOTES:

1. BUILDING CODE : IBC 2012
2. CODES AND STANDARDS: LATEST U.N.O.
   REINFORCED CONCRETE: ACI 318-08 – AMERICAN CONCRETE INSTITUTE
   STRUCTURAL STEEL: AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION
3. GENERAL CONTRACTOR SHALL COORDINATE ALL DIMENSIONS AND SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES WHICH MAY EXISTS.
4. ALL OPENING THROUGH STRUCTURAL MEMBERS SHALL BE AS SHOWN ON STRUCTURAL DRAWINGS. GENERAL CONTRACTOR SHALL COORDINATE ALL OPENING REQUIREMENTS FOR MECHANICAL CONTRACTOR, ANY DEVIATION FROM THE OPENING SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION FOR HIS APPROVAL.
5. DESIGN LOADS

   DEAD LOAD

   SELF WEIGHT OF MEMBERS
   SUPERIMPOSED DEAD LOAD............7 PSF (CEILING MECHANICAL AND ELECTRIC)
   FINISHES ....AS INDICATED ON ARCHITECTURAL DRAWINGS

   LIVE LOAD

   ROOF .... 20 PSF

6. THE STRUCTURE TO BE DESIGNED TO WITHSTAND THE WIND PRESSURES SPECIFIED IN SECTION 1609 OF THE INTERNATIONAL BUILDING CODE, USING A BASIC WIND SPEED OF 139 MPH(ULTIMATE) AT A STANDARD HEIGHT OF 33 FEET ABOVE THE GROUND. WITH AN EXPOSURE "C".
7. THE GENERAL CONTRACTOR AND SUB-CONTACTOR SHALL DETERMINE THE SCOPE OF THE STRUCTURAL WORK FROM THE CONTRACT DOCUMENTS TAKEN AS A WHOLE. THE STRUCTURAL DRAWINGS SHALL NOT BE CONSIDERED SEPARATELY FOR PURPOSE OF BIDDING THE STRUCTURAL WORK OR WORK RELATED TO THE STRUCTURE, INCLUDING NECESSARY COORDINATION DESCRIBED OR IMPLIED BY THE ARCHITECTURAL AND MECHANICAL DRAWINGS.
8. WRITTEN PERMISSION MUST BE OBTAINED FROM RDP ENGINEERS, INC. PRIOR TO THE REPRODUCTIVE USE OF THE STRUCTURAL CONTRACT DOCUMENTS IN ANY FASHION AS STRUCTURAL SHOP DRAWING DOCUMENTS.

FOUNDATION:

1. FOUNDATION IS DESIGNED BASED ON GEOTECHNICAL REPORT PREPARED BY Ninyo & Moore Geotechnical & Environmental Science Consultants DATED JUNE 4, 2021 07, 2016, PROJECT NO.701202001 ADDENDUM NO 1.
   THE CONTRACTOR SHALL PERFORM EXCAVATIONS, FOOTING CONSTRUCTIONS, AND PREPARATION OF THE SUBGRADE UNDER THE SLAB ON GRADE, IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN THE GEOTECHNICAL REPORT AND THE PROJECT SPECIFICATIONS.
2. THE FOUNDATION FOR THE STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING ALLOWABLE SOIL BEARING PRESSURES AT A BEARING DEPTH OF 10 FEET BELOW ORIGINAL NATURAL GRADE:

   DEAD LOAD: 4000 PSF
   INCREASE 33% FOR TRANSIENT LOADS

3. FOUNDATION CONDITIONS NOTED DURING CONSTRUCTION, WHICH DIFFER FROM THOSE DESCRIBED IN THE GEOTECHNICAL REPORT SHALL BE REPORTED TO THE ARCHITECT, STRUCTURAL ENGINEER AND GEOTECHNICAL ENGINEER BEFORE FURTHER CONSTRUCTION IS ATTEMPTED.
4. SUBGRADE UNDER SLABS ON FILL SHALL HAVE A MAXIMUM PLATICITY INDEX OF 10 TO 20 AND SHALL BE PREPARED, PLACED AND COMPLICATED IN ACCORDANCE WITH THE RECOMMENDATIONS CONTANIED IN THE GEOTECHNICAL REPORT.
5. THE GEOTECHNICAL REPORT FOR THE ABOVE PROJECT HAS VARIOUS RECOMMENDATIONS FOR SUPPORTING GROUND FLOOR FRAMING AND GROUND LEVEL STRUCTURAL MEMBERS. HIGHLY PLASTIC SOILS ARE VERY COMMON IN TEXAS, AND ARE PRESENT AT THE ABOVE PROJECT SITE. THESE SOILS HAVE BEEN KNOWN TO CAUSE SEVER DAMAGE TO THE SLAB ON GRADE, GRADE BEAMS AND OTHER STRUCTURAL MEMBERS SUPPORTED ON SOIL AT GROUND LEVEL. IN ADDITION TO THE ABOVE THE SOILS ALSO CAUSES DAMAGE TO FLOORING, PARTITIONS, EXTERIOR WALLS AND WINDOWS. THE STRUCTURALLY SUPPORTED SLAB IS THE ONLY OPTION TO AVOID ABOVE PROBLEM, HOWEVER THE COST OF CONSTRUCTION FOR STRUCTURALLY SUPPORTED SLAB IS SIGNIFICANTLY HIGHER COMPARE TO SOIL SUPPORTED SLABS. A WAFFEL(INTERNAL GRIDS OF GRADE BEAMS WITH CLOSE SPACING OF BEAMS IN TWO DIRECTIONS) TYPE GRADE BEAM AND SLAB CONSTRUCTION WOULD HAVE BETTER PERFORMANCE COMPARE TO THE OPTION USED IN THE DESIGN FOR THIS PROJECT, HOWEVER AGAIN FOR COST CONSIDERATIONS THE SLAB HAS BEEN DESIGNED WITHOUT INTERNAL GRADE BEAMS, CONTRACTOR SHALL DISCUSS THIS WITH OWNER. IF OWNER CHOOSES AS AN ADDITIONAL SERVICE TO OUR ORIGINAL CONTRACT, RDP ENGINEERS CAN DESIGN STRUCTURALLY SUPPORTED SLAB OR WAFFLE SLAB WITH ADDITIONAL FEE, OTHERWISE IT IS CLEAR THAT THE OWNER IS TAKING CALCULATED RISK AND WISHES TO USE SOIL SUPPORTED SLAB WITHOUT WAFFLE (GRADE BEAM AND SLAB) TYPE SLAB FOR GROUND LEVEL FRAMING KNOWING ALL ABOVE POTENTIAL PROBLEMS.

   RDP ENGINEERS, INC. HAS RELIED ON THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT AND IS NOT LIABLE FOR CONSEQUENCES OF USE OF SOIL SUPPORTED SLAB AND GROUND LEVEL FRAMING.

SLAB ON GRADE:

1. ALL SLEEVES SHALL BE SCHEDULE 40 GALVANIZED STEEL PIPE OR PVC
2. NO CONDUIT LARGER THAN 1/2" DIA. SHALL BE RUN IN STRUCTURAL CONCRETE MEMBERS OR SLAB WITHOUT APPROVAL OF ENGINEER.
3. ALL UNDERGROUND UTILITIES SHALL BE COMPLETED IN ADVANCE OF FOUNDATION CONSTRUCTION.
4. CONVENTIONALLY REINFORCED SLABS ON GRADE SHALL HAVE CONTROL OR CONSTRUCTION JOINTS ON COLUMN CENTERLINES IN EACH DIRECTION. ADDITIONAL CONTROL OR CONSTRUCTION JOINTS SHALL BE ADDED SO THAT JOINT SPACING OF JOINTS DOES NOT EXCEED THE LESSER OF 24XSLAB THICKNESS OR 18 FEET IN EACH DIRECTION. ALSO, THE AREA BOUNDED BY THE JOINTS SHALL EXCEED APPROXIMATELY 325 SQUARE FEET AND THE LENGTH SHALL NOT EXCEED 1.5 TIMES THE WIDTH.
5. WHERE THE SLAB IS RECEIVE SENSITIVE FLOOR MATERIAL SUCH AS TILE THE JOINTS SHALL BE ALIGNED WITH THE JOINTS IN THE FINISHED FLOORING MATERIAL.
6. THE CONTRACTOR SHALL EXAMINE THE ARCHITECTURAL PLANS FOR THE AREAS WHERE THE SLAB ON GRADE IS STAINED, STAMPED OR TO RECEIVE A PATTERN OF CONTROL JOINTS.

CONCRETE :

MATERIAL:
1. CONCRETE SHALL BE NORMAL WEIGHT CONCRETE WITH MINIMUM f'c AS INDICATED BELOW.

   A. PIERS, FOOTINGS .... f'c=3000 PSI AT 28 DAYS.
   B. PIER CAPS, GRADE BEAM, SLAB ON GRADE .... f'c=3500 PSI AT 28 DAYS.

2. REINFORCING STEEL SHALL CONFORM TO FOLLOWING GRADE. REINFORCING BARS ASTM A-615 GRADE 60 EXCEPT NOTED WELDED WIRE FERRIC ASTM A-185 REINFORCING BARS WELDED TO STEEL SHALL BE WELDABLE GRADE 40
3. DETAILING OF REINFORCING BARS AND ACCESSORIES SHALL BE IN ACCORDANCE WITH ACI PUBLICATION 315, LATEST EDITION.
4. ALL MIXING TRANSPORTING, PLACING, CURING OF CONCRETE SHALL BE ACCORDANCE WITH RECOMMENDATION OF AMERICAN CONCRETE INSTITUTE.
5. ALL MIX DESIGN SHALL BE SUBJECT TO ENGINEER'S APPROVAL.
6. ALL REINFORCING BARS SHALL HAVE CLASS B LAP SPLICE PER ACI-318-02 SECTION 12.15 UNO ON DRAWINGS.
7. ALL LAPS FOR WELDED WIRE MESH SHALL BE ONE MESH PLUS THREE INCH AT ALL LAPS.
8. ALL REINFORCING SHALL BE SUPPORTED IN PLACE BY STANDARD CHAIRS. PROVIDE STANDARD CHAIR AT 5'-0" O.C. FOR ALL SLABS AND BEAM ABOVE GRADE. PROVIDE 3"x6"x20 GAGE SHEET METAL BAR CHAIR AT 4'-0" O.C. EACH WAY FOR ALL TOP REINFORCING FOR SLAB ON GRADE.
9. ALL CONSTRUCTION JOINTS SHALL BE SUBJECT TO ENGINEERS APPROVAL.
10. GRADE BEAM SHALL BE POURED ON CORRUGATED FIBER CARTON FORMS WHEN INDICATED ON DRAWINGS.
11. GRADE BEAM CONSTRUCTION JOINT SHALL BE LOCATED AT CENTER OF THE SPAN, ALL CONSTRUCTION JOINTS SHALL HAVE A SHEAR KEY AND ADDITIONAL REINFORCING AS SHOWN ON DRAWINGS. ALL OPENING THROUGH GRADE BEAMS SHALL BE AS INDICATED ON DRAWINGS.
12. FORMS SHALL NOT BE REMOVED UNTIL FOLLOWING STRENGTH IS REACHED. THE STRENGTH SHOWN BELOW IS THE PERCENTAGE OF 28 DAY COMPRESSIVE STRENGTH f'c.

FLOOR SHORES	85 PERCENT
SLAB, JOIST, BEAMS AND GIRDER BOTTOM	70 PERCENT
WALL, COLUMN, BEAM SIDE	40 PERCENT

13. ALL WALL SHALL BE NOT BE BACKFILLED UNTIL THE WALL SUPPORTING MEMBERS
14. HAVE ATTAINED MINIMUM OF 70 PERCENT OF THEIR 28 DAY SPECIFIED STRENGTH.
14. ALL POURED IN PLACE CONCRETE MEMBERS SHALL HAVE FOLLOWING CLEAR COVER TO REINFORCING.

FOOTING AND PIERS		3 INCH
GRADE BEAMS BOTTOM		3 INCH
	SIDE POURED AGAINST SOIL	3 INCH
	SIDE FORMED	2 INCH
	TOP	1 1/2 INCH
WALLS	SIDE EXPOSED TO EARTH	2 INCH
	ALL OTHER	3/4 INCH
SLAB ON GRADE		1 INCH (TOP)

MASONRY

1. MASONRY WORK SHALL CONFORM TO ALL REQUIREMENTS OF ACI 530, "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES", AND ACI 531, "BUILDING CODE REQUIREMENTS FOR CONCRETE MASONRY STRUCTURES".
2. ALL MASONRY HAS BEEN DESIGNED USING A COMPRESSIVE STRENGTH AS NOTED BELOW.
3. HOLLOW CONCRETE MASONRY UNITS SHALL CONFORM TO ATSM C90(NORMAL OR MEDIUM WEIGHT), GRADE N, TYPE I, RUNNING BOND, AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AS LISTED IN THE MASONRY COMPONENT SCHEDULE ACHIEVE THE DESIGN F'm.

MASONRY COMPONENT SCHEDULE

FM(PSI)	TYPE OF MORTAR	NET AREA COMPRSSIVE STRENGTH OF CONCRETE MASONRY UNITS(PSI)
1,500	M OR S	1,900
2,000	M OR S	2,800
2,500	M OR S	3,750
3,000	M OR S	4,800

4. MATERIAL

BLOCKS — GRADE N CONFORMING TO ASTM DESIGNATION C 90 AND SHALL HAVE MINIMUM COMPRESSIVE STRENGTH OF 2000 psi ON NET AREA OR NOT LESS THAN THAT REQUIRED TO PRODUCE SPECIFIED STRENGTH f'm.

MORTAR — MORTAR SHALL BE FRESHLY PREPARED AND SHALL CONFORM TO ASTM C270 AND SHALL CONFORM TO THE PROPORTION SPECIFICATION OF IBC TABLE2103.7(1). MASONRY CEMENT AND RETARDANT ADDITIVES SHALL NOT BE USED. MORTAR TYPE SHALL BE AS LISTED IN THE MASONRY COMPONENT SCHEDULE

   BELOW GRADE GRADE TYPE M
   ABOVE GRADE TYPE N –

GROUT — SHALL BE FLUID CONSISTENCY WITH 1 PART CEMENT + 2 1/2 PART SAND AND SHALL CONFORM TO IBC TABLE 2103.12 FINE OR COARSE GROUT, WITH 28 DAY COMPRESSIVE STRENGTH THAT EXCEEDS THE DESIGN FM BUT IS NOT LESS THAN 200 PSI, TESTED PER ASTM C1019.
GROUT SHALL BE FREE OF CHLORIDE WITH AN 8" MINIMUM SLUMP.

CONCRETE GROUT — f'c= 3000 psi, 8 INCH SLUMP, MAXIMUM AGGREGATE 3/4"

CEMENT — SHALL CONFORM TO ASTM C 270

LIME — QUICK ASTM C5
HYDRATED ASTM C207

AGGREGATE — MORTAR ASTM C144
GROUT ASTM C404

REINFORCING STEEL — BARS ASTM A615 FY = 60,000 psi
WELDABLE REINFORCING A706 FY = 60,000 psi

5. HORIZONTAL JOINT REINFORCING SHALL BE GALVANIZED LADDER TYPE IN CMU WALLS WITH NO.9 GAGE WIRE SPACED @16"O.C. VERTICALLY AND CONFORMING TO ASTM A951. PROVIDE MINIMUM 12" LAPS AT ALL SPLICES.
6. REINFORCING BARS SHALL BE GRADE 60 AND CONFORM TO THE REQUIREMENTS OF ASTM A615. #3 REINFORCING BAR MAY BE GRADE 40 AS PER SUPPLEMENTAL REQUIREMENTS S1.
7. SEE DETAILS, NOTES ON DRAWINGS AND SCHEDULE BELOW FOR SIZE AND SPACING OF REINFORCING BARS(IN NO CASE SHALL HAVE LESS THAN #5 VERTICAL BARS AT 32" O.C.). LAP SPLICES SHALL CONFORM TO SCHEDULES ON STANDARDS, VERTICAL BARS SHALL BE CONTINUOUS THRU BOND BEAMS.
8. PROVIDE VERTICAL DOWELS FROM FOOTINGS CONTINUOUS THROUGH STEM WALLS INTO MASONRY ABOVE DOWELS SHALL MATCH SIZE AND SPACING OF ALL VERTICAL REINFORCING AND EXTEND ALL HORIZONTAL BOND BEAM REINFORCING IN MASONRY CONTINUOUS AROUND CORNERS AND INTERSECTIONS OR PROVIDE BENT CORNER BARS TO MATCH. LAP HORIZONTAL BOND BEAM REINFORCING AT CORNERS AND INTERSECTION.
9. ALL REINFORCING IN MASONRY SHALL BE ACCURATELY LOCATED PRIOR TO GROUTING AND THE POSITION MAINTAINED DURING GROUTING.
10. ALL CELLS AND COURSES WITH REINFORCING AND ADDITIONAL GROUT SPACES AS REQUIRED BY THE DRAWINGS SHALL BE FILLED SOLID WITH GROUT. LIMIT MAXIMUM GROUT LIFT TO 5'-0" WITH EACH GROUT POUR STOPPING S 1/2 INCHES BELOW THE TOP COURSE OF LIFT. PLACE GROUT CONTINUOUSLY. DO NOT DO NOT INTERRUPT GROUTING FOR MORE THAN ONE HOUR. MECHANICALLY VIBRATE GROUT IN VERTICAL SPACES IMMEDIATELY AFTER POURING AND AGAIN 5 MINUTES LATER.
    RODDING OF GROUT IN NOT ACCEPTABLE.
11. CMU WALL REINFORCING SCHEDULE:

MASONRY WALLS

MARK(PER PLAN)	BLOCK STRESS(F'm)	VERTICAL	HORIZONTAL	NOTES
WALL 1(MW-1)	M OR S	#5@16"O.C.	9 GA. DUROWALL@16"O.C.	ALL WALLS ARE MW-1 U.N.O.

12. CMU WALLS SHALL BE CONSTRUCTED PLUMB AND LEVEL. CONSTRUCTION PHASE BRACING OF MASONRY IS THE RESPONSIBILITY OF THE CONTRACTOR.
13. CONTINUOUS BOND BEAM SHALL BE PLACED AT 10" ON CENTER VERTICALLY AND AT THE TOP OF EACH WALL. BEAMS SHALL BE GROUTED AND REINFORCED CONTINUOUSLY WITH 2#5 U.N.O. ON PLANS.
14. CMU WALLS SHALL BE SUPPORTED ON THICKENED SLAB PER TYPICAL DETAILS U.N.O. ON PLANS AND IN\ SECTIONS.
15. UNLESS NOTED OTHERWISE IN DRAWINGS, ALL CMU LINTELS SHALL BEAR 8" MINIMUM ON EACH END AND BE REINFORCED AS FOLLOWS:

SPAN	LINTEL SIZE	REINFORCING
<=5'-0"	8" HIGHX8" WIDE	2#5 BOTTOM
<=8'-0"	8" HIGHX8" WIDE	2#6 BOTTOM
<=12'-0"	16" HIGHX8" WIDE	2#4 TOP&2#7 BTM. W/#3 U-STIRRUPS@16'-O.C.

    *CONTACT ENGINEER FOR SPANS GREATER THAN 12'-0.
16. THE FIRST TWO VERTICAL CELLS AT WALL OPENINGS AND WALL END ARE TO BE CONCRETE FILLED AND REINFORCED W 2-#5 EACH VERTICALLY(3 CELLS TOTAL AT CORNERS).
17. ALL SPLICES SHALL BE CLASS "B", UNLESS NOTED OTHERWISE, AND BASED ON 23% INCREASE OVER THE 3,000 F'c REQUIREMENTS.

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TBPE FIRM REGISTRATION
NO F-573

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5535 HOBBY ROAD, HOUSTON, TEXAS 77053

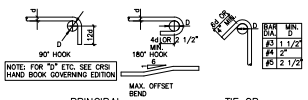
Drawing Date:	07/26/2021
Drawn:	JL
Checked:	RDP
Scale:	AS NOTED
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUED FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

GENERAL NOTES

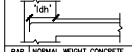
S 000



NOTES:
1. ALL BENDS SHALL BE MADE COLD.
2. #14 AND #18 BARS SHALL BE BEND-TESTED AND APPROVED PRIOR TO BENDING.

1 BAR BENDING DETAILS
SCALE: N.T.S.

MINIMUM TENSION EMBEDMENT LENGTHS 'ldh' FOR STANDARD HOOKS -GRADE 60 (FY-60,000PSI) REINFORCING BARS



BAR SIZE	NORMAL WEIGHT CONCRETE f'c=3000 psi	f'c=4000 psi	f'c=5000 psi
#3	9	8	7
#4	11	10	9
#5	14	12	11
#6	17	15	14
#7	20	17	16
#8	22	19	18
#9	25	22	21
#10	28	25	23
#11	31	27	26

2 REINFORCING 'ldh' LENGTHS
SCALE: N.T.S.

DEVELOPMENT & SPLICE LENGTH FOR BEAMS AND COLUMNS
NORMAL WEIGHT CONC.-REFER NOTES BELOW

BAR SIZE	LAP CLASS	f'c=3000 psi TOP	f'c=3000 psi OTHER	f'c=4000 psi TOP	f'c=4000 psi OTHER	f'c=5000 psi TOP	f'c=5000 psi OTHER
#3	A	22	17	19	15	17	13
	B	28	22	24	19	22	17
#4	A	29	22	25	19	22	17
	B	37	29	32	25	29	22
#5	A	36	28	31	24	28	22
	B	47	36	40	31	36	28
#6	A	43	33	37	29	33	26
	B	56	43	48	37	43	33
#7	A	63	48	54	42	49	37
	B	81	63	70	54	63	49
#8	A	72	55	62	48	55	43
	B	93	72	80	62	72	55
#9	A	81	62	70	54	63	48
	B	105	81	91	70	81	63
#10	A	91	70	79	61	70	54
	B	118	91	102	79	91	70
#11	A	101	78	97	67	78	60
	B	131	101	113	87	101	78

NOTES:
1. BARS TO BE LAPPED OR DEVELOPED SHALL HAVE CONCRETE COVER > BAR DIA
2. BAR TO BE LAPPED OR DEVELOPED SHALL BE SPACED > 2 BAR DIA.
3. BARS TO BE DEVELOPED SHALL HAVE STIRRUPS OR TIES NOT LESS THAN THE CODE MINIMUM.
4. WHEN NOTED ON DRAWINGS CASE II FOR DEVELOPMENT LENGTH OR LAP LENGTH THE DEVELOPMENT LENGTH AND LAP LENGTH SHALL BE 1.5* VALUES SHOWN ABOVE
5. DEVELOPMENT LENGTH 'ld' OF A BARS IS EQUAL TO LENGTH OF CLASS A LAP LENGTH.

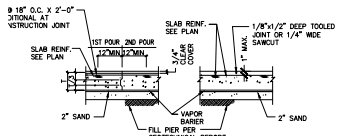
3 REINFORCING LAP LENGTHS
SCALE: N.T.S.1

DEVELOPMENT & SPLICE LENGTH FOR SLABS AND WALLS
NORMAL WEIGHT CONC.-REFER NOTES BELOW

BAR SIZE	LAP CLASS	f'c=3000 psi TOP	f'c=3000 psi OTHER	f'c=4000 psi TOP	f'c=4000 psi OTHER
#3	A	13	12	12	12
	B	17	15	16	14
#4	A	22	17	19	15
	B	28	22	24	19
#5	A	32	24	28	21
	B	41	32	36	28
#6	A	43	33	37	29
	B	56	43	48	37
#7	A	69	53	60	46
	B	90	69	78	60
#8	A	86	66	74	57
	B	111	86	96	74
#9	A	104	80	90	69
	B	135	104	117	90
#10	A	125	96	108	83
	B	162	125	140	108
#11	A	146	113	127	98
	B	190	146	165	127

NOTES:
1. WHEN NOTED ON DRAWINGS CASE II FOR DEVELOPMENT LENGTH OR LAP LENGTH THE DEVELOPMENT LENGTH AND LAP LENGTH SHALL BE 1.5* VALUES SHOWN ABOVE
2. DEVELOPMENT LENGTH 'ld' OF A BARS IS EQUAL TO LENGTH OF CLASS A LAP LENGTH.

4 REINFORCING LAP LENGTHS
SCALE: N.T.S.1



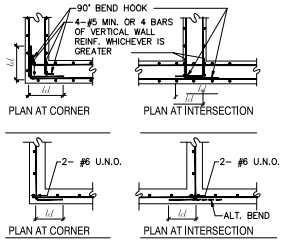
-PROVIDE CONSTRUCTION JOINT SUCH THAT AREA WITHIN JOINTS DOES NOT EXCEED 625 SF. PER POUR.
-IF POUR EXCEEDS 625 SF. FT. PROVIDE CONTROL JOINT AS SHOWN ON DET. 1B

-PROVIDE CONTROL JOINT SLIAS INDICATED ON PLAN
-SAWCUT MUST BE MADE WITHIN 12 HOUR OF PLACING CONCRETE

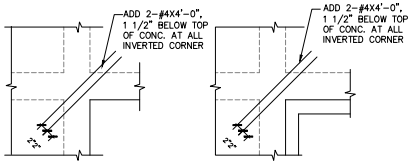
A SLAB ON GRADE CONSTRUCTION JOINT
B SLAB ON GRADE CONTROL JOINT

5 SLAB ON GRADE JOINTS
1"=1'

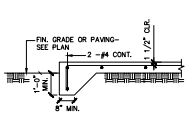
NOTE: SLAB TO BE POURED ON VAPOR BARRIER WITH 2" SAND FILL.



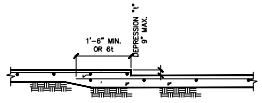
TYPM ICAL WALL OR BEAM CORNER BAR PLACING DETAIL
6 SCALE: N.T.S.



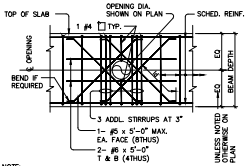
TYPICAL REINFORCEING DETAIL AT INVERTED CORNER
7 SCALE: N.T.S.



8 TYPICAL SLAB EDGE FOR SLAB ON GRADE
SCALE: N.T.S.

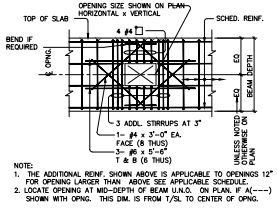


9 TYP. SLAB ON GRADE DEPRESSION DETAIL
SCALE: N.T.S.3/4



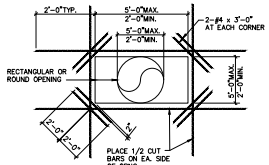
NOTE:
1. THE ADDITIONAL REINF. SHOWN ABOVE IS APPLICABLE TO OPENINGS 5"ø TO 12"ø FOR SMALLER THAN 5"ø OPENINGS, U.N.O. PROVIDE 3 ADDITIONAL STIRRUPS EA. SIDE OF OPENING.
2. LOCATE OPENING AT MID-DEPTH OF BEAM U.N.O. ON PLAN. IF A(----) DIM. IS SHOWN WITH OPNG. THIS DIM. IS FROM T/SL TO CENTER OF OPNG.

10 TYPICAL CIRCULAR OPENING THRU CONCRETE BEAM
SCALE: N.T.S.3/4

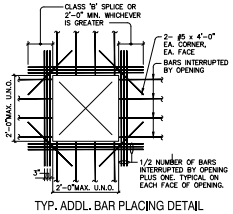


NOTE:
1. THE ADDITIONAL REINF. SHOWN ABOVE IS APPLICABLE TO OPENINGS 12" x 12". FOR OPENING LARGER THAN ABOVE SEE APPLICABLE SCHEDULE.
2. LOCATE OPENING AT MID-DEPTH OF BEAM U.N.O. ON PLAN. IF A(----) DIM. IS SHOWN WITH OPNG. THIS DIM. IS FROM T/SL TO CENTER OF OPNG.

11 TYP. RECTANGULAR OPNG. THRU CONC. BEAM
SCALE: N.T.S. 3/4

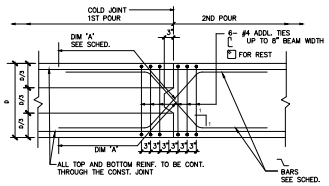


12 OPENING IN SLAB ON GRADE
SCALE: N.T.S.3/4

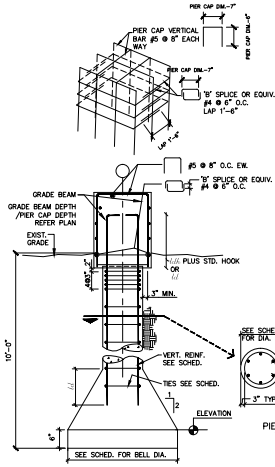


13 TYP. ADDL. BAR PLACING DETAIL FOR WALL OR SLAB OPENINGS
SCALE: N.T.S.3/4

JOINT REINF. SCHEDULE		
BEAM WIDTH IN.	BAR SIZE	DIMENSION 'A'
UP TO 6"	1 #6	4'-8
7" TO 16"	2 #6	4'-8
17" TO 24"	2 #7	6'-9
25" TO 36"	3 #7	6'-9



14 TYPICAL CONSTRUCTION JOINT DETAIL- BEAM OR JOIST
3/4"=1'
NOTE: BEAM REINFORCING NOT SHOWN FOR CLARITY.



15 TYPICAL DRILLED PIER DETAIL
SCALE: N.T.S.
SHAFTS WITH BOTH TENSION AND DOWNWARD LOAD

PIER REINF. SCHEDULE UNO ON PLAN

SHAFT/BELL DIA.	VERT. REINF.	TIES
12/24 12/30 12/36	4 #5	#3 @ 12" O.C.
18/36 18/48	6 #5	#3 @ 12" O.C.
20/60	8 #5	#4 @ 12" O.C.
24/72	8 #6	#4 @ 12" O.C.
30/90	12 #6	#4 @ 12" O.C.
36/108	12 #7	#4 @ 12" O.C.

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
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Project No: 6001-002

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R.D.PATEL 85114 LICENSED PROFESSIONAL ENGINEER
RDP ENGINEERS, INC.
TBPE FIRM REGISTRATION NO F-573

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5535 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	JL
Checked:	RDP
Scale:	AS NOTED
ACAD File:	

Revisions:

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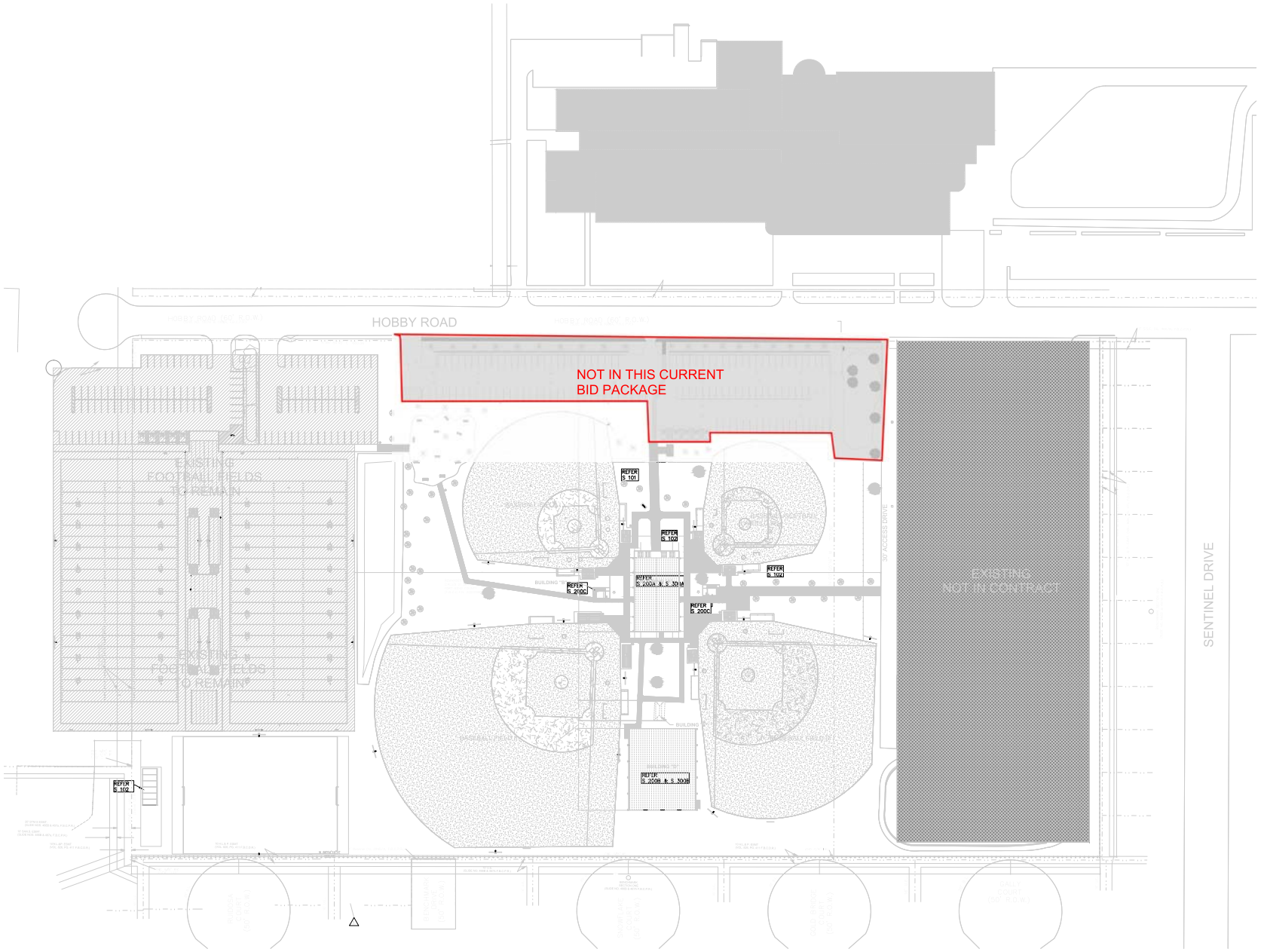
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUED FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

TYPICAL DETAILS

S001



A SITE PLAN
SCALE: 1"=50'-0"

IDG+ ARCHITECTS

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80114
LICENSED
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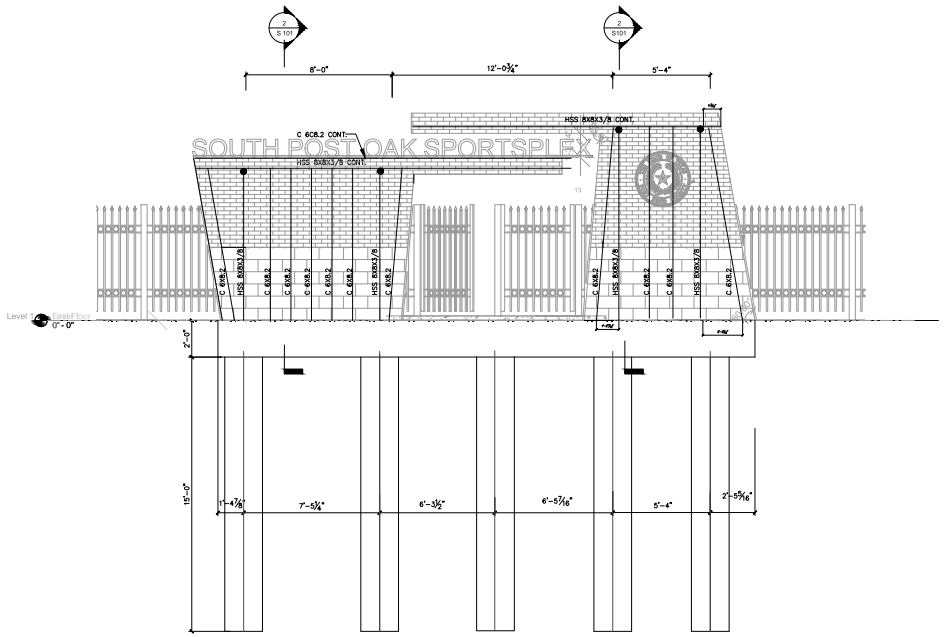
SITE PLAN

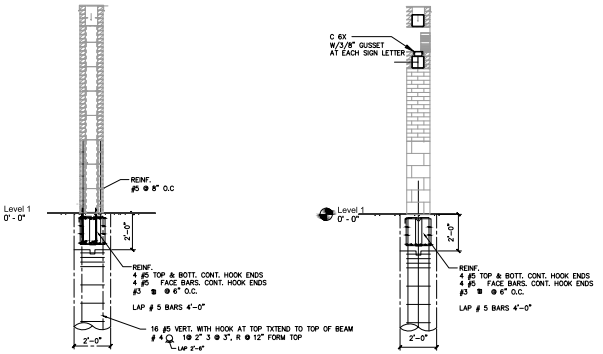
S100



1 ENTRANCE WALL - ELEVATION

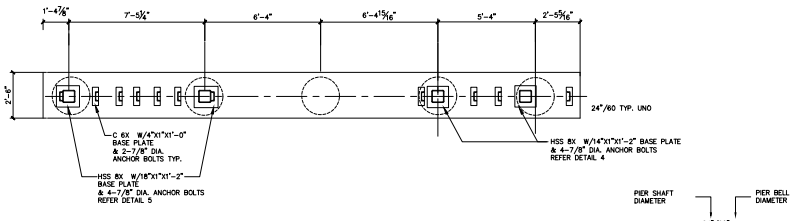
SCALE:3/8"=1'-0"

NOTES:
1. ALL STEEL TO BE HOT DIP GALVANIZED AFTER FABRICATION. ALL FIELD CONNECTIONS TO BE BOLTED CONNECTION.
2. ● INDICATES MOMENT CONNECTION.



2 SCALE: 3/8"=1'-0"

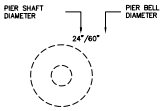
3 SCALE: 3/8"=1'-0"



A ENTRANCE WALL - FOUNDTION PLAN

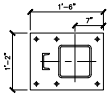
SCALE: 3/8"=1'-0"

NOTES:
1. REFER DETAIL 1/S 200A FOR ANCHOR BOLT EMBEDMENT



B PIER KEY

4 SCALE:1"=1'-0"



5 SCALE:1"=1'-0"

IDG+ ARCHITECTS

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5535 HOBBY ROAD, HOUSTON, TEXAS 77053

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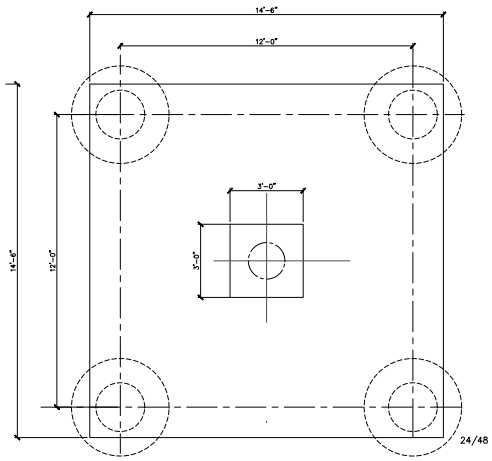
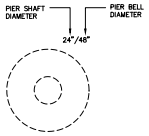
ENTRANCE WALL PLAN, ELEVATION AND DETAILS

S 101



A LIGHT POLE - FOUNDTION PLAN
SCALE: 1/2"=1'-0"



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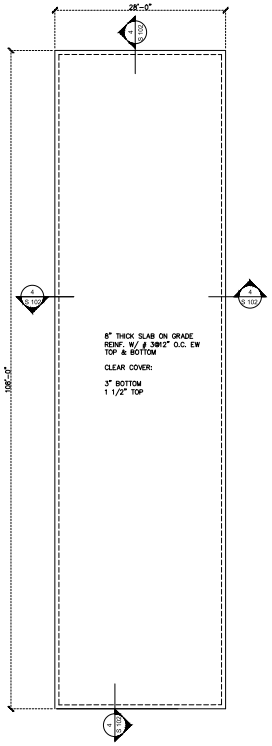
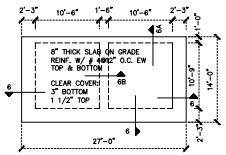
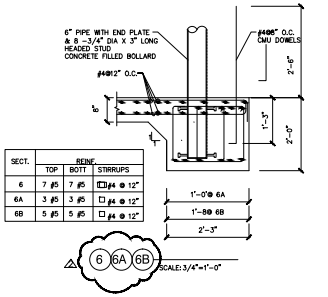


B CONTAINER STORAGE - FOUNDTION PLAN
SCALE: 1/8"=1'-0"

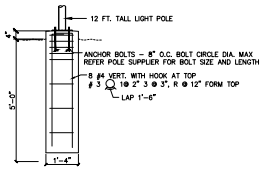


C DUMPSTER ENCLOSURE - FOUNDATION PLAN
SCALE: 1/8"=1'-0"

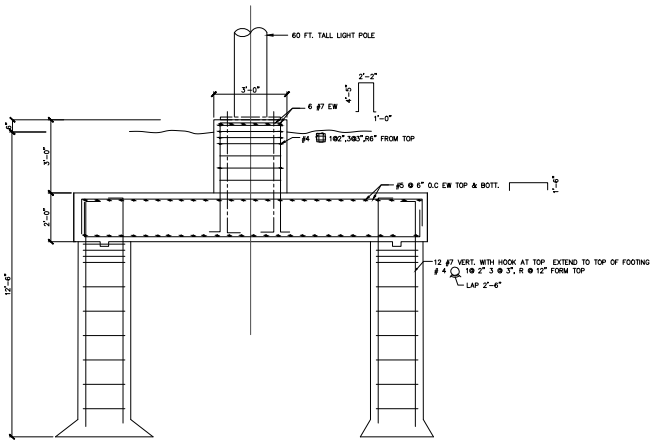


SECT.	REINF. TOP	BOTT	STIRRUPS
6	7 #5	7 #5	#4 @ 12"
6A	3 #5	3 #5	#4 @ 12"
6B	5 #5	5 #5	#4 @ 12"

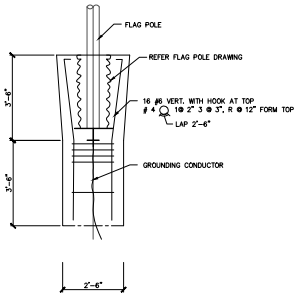
6 6A 6B SCALE: 3/4"=1'-0"



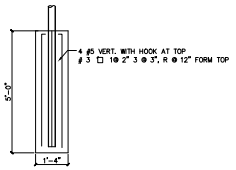
5 LIGHT POLE FOUNDATION
SCALE:1/2"=1'-0"



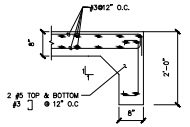
1 LIGHT POLE FOUNDATION ELEVATION/SECTION
SCALE:1/2"=1'-0"
NOTES:
1. CONTRACTOR TO SUBMIT ACTUAL POLE AND FIXTURE INFORMATION TO RDP ENGINEERS FOR VERIFICATION OF ADEQUACY OF THE FOUNDATION DESIGN. FOUNDATION MAY HAVE TO REVISED FOR THE ACTUAL POLE AND FIXTURE



2 FLAG POLE FOUNDATION
SCALE:1/2"=1'-0"



3 FOUL POLE FOUNDATION
SCALE:1/2"=1'-0"



4
SCALE:3/4"=1'-0"

IDG+ ARCHITECTS
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

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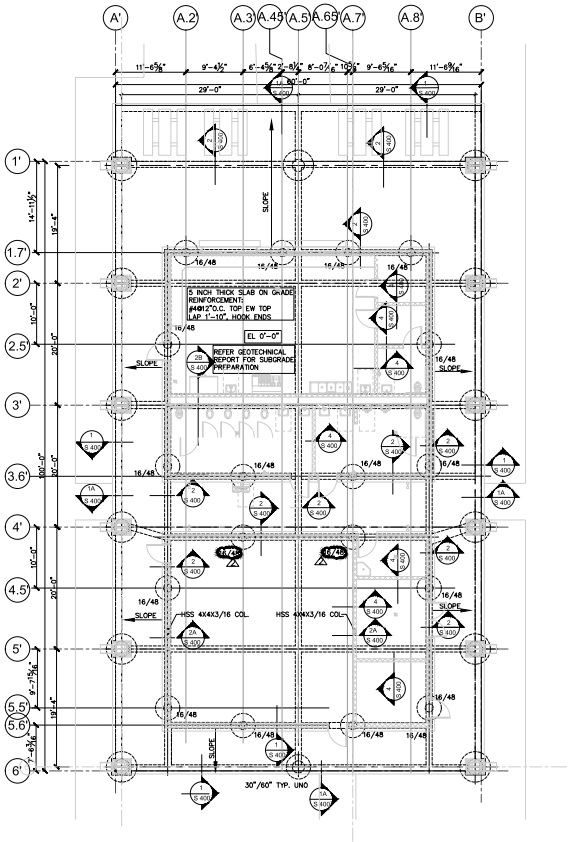
ISSUE FOR PERMIT	09/07/2022

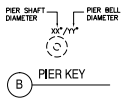
LIGHT POLE & FLAG POLE FOUNDATIONS

S 102



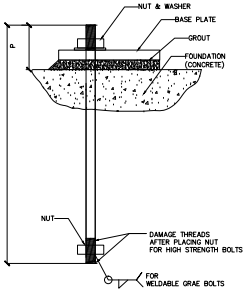
A FOUNDATION & GR. FLOOR FRAMING PLAN - CONCESSION BUILDING
SCALE: 1/8"=1'-0"

NOTES:
1. FOUNDATION DESIGN SHOWN IS BASED ON ASSUMPTIONS REGARDING SUPER STRUCTURE WHICH WILL BE A PRE-ENGINEERED BUILDING. PRE-ENGINEERED BUILDING IMPOSED LOAD (REACTION) SHALL BE PROVIDED TO RDP ENGINEERS, INC FOR VERIFICATION OF FOUNDATION DESIGN. THE ABOVE FOUNDATION MAY HAVE TO BE REVISED FOR ITS ADEQUACY TO SUPPORT PRE-ENGINEERED BUILDING IF REQUIRED.
2. PROVIDE TYPICAL PIER CAP PER DETAIL 15/S100 U.N.O.
3. REFER TYPICAL DETAIL FOR SHEET S 100 FOR ADDITIONAL REINFORCEMENT AT ANCHOR BOLTS, BEAM OPENING AND SLAB OPENING.
4. CONTRACTOR SHALL COORDINATE THE SUPER STRUCTURE CONNECTION DETAILS TO THE FOUNDATION. ALL ANCHOR BOLTS SHALL BE PER REQUIREMENTS OF THE SUPER STRUCTURE.



B PIER KEY

BOLT GRADE	BOLD DIA. INCH	"L" LENGTH INCH	"P"
A 307	⅝"	18"	AS REQUIRED MAX 5X BOLT DIA.
A 307	¾"	24"	AS REQUIRED MAX 5X BOLT DIA.
A 307	7/8"	28"	AS REQUIRED MAX 5X BOLT DIA.
A 307	1"	28"	AS REQUIRED MAX 5X BOLT DIA.



1 ANCHOR BOLT EMBEDMENT DETAIL
SCALE: NTS

IDG+ ARCHITECTS
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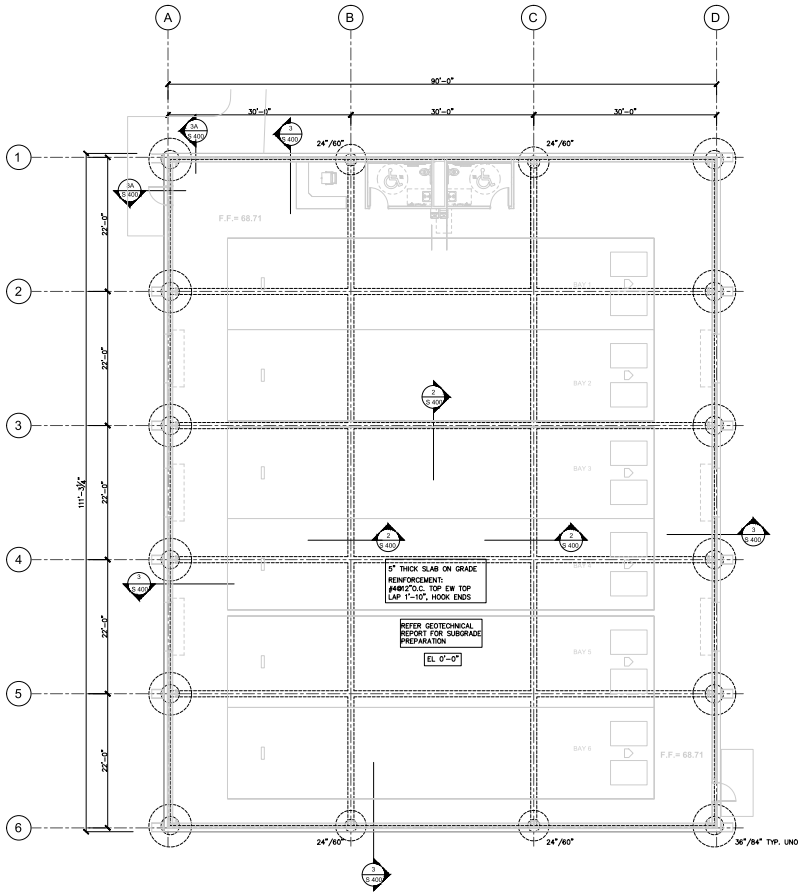
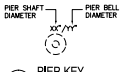
CONCESSION FOUNDATION & GR. FL. FRAMING PLAN

S 200A



A FOUNDATION & GR. FLOOR FRAMING PLAN - BATTING CAGE
SCALE: 1/8"=1'-0"

NOTES:
1. FOUNDATION DESIGN SHOWN IS BASED ON ASSUMPTIONS REGARDING SUPER STRUCTURE WHICH WILL BE A PRE-ENGINEERED BUILDING. PRE-ENGINEERED BUILDING IMPOSED LOAD (REACTION) SHALL BE PROVIDED TO RDP ENGINEERS, INC FOR VERIFICATION OF FOUNDATION DESIGN. THE ABOVE FOUNDATION MAY HAVE TO BE REVISED FOR ITS ADEQUACY TO SUPPORT PRE-ENGINEERED BUILDING IF REQUIRED.
2. PROVIDE TYPICAL PIER CAP PER DETAIL 15/S100 U.N.O..
3. REFER TYPICAL DETAIL FOR SHEET S 100 FOR ADDITIONAL REINFORCEMENT AT ANCHOR BOLTS, BEAM OPENING AND SLAB OPENING.
4. CONTRACTOR SHALL COORDINATE THE SUPER STRUCTURE CONNECTION DETAILS TO THE FOUNDATION. ALL ANCHOR BOLTS SHALL BE PER REQUIREMENTS OF THE SUPER STRUCTURE. REFER DETAIL1/S 200A FOR ANCHOR BOLT EMBEDMENT



B PIER KEY

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R.D.PATEL 80114 LICENSED PROFESSIONAL ENGINEER
RDP ENGINEERS, INC.
TBPE FIRM REGISTRATION
NO F-573

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5535 HOBBY ROAD, HOUSTON, TEXAS 77053

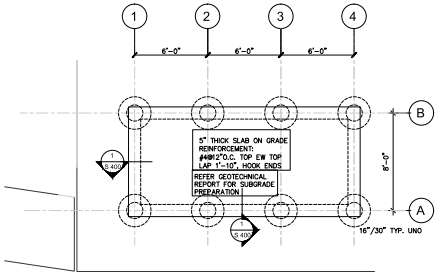
Drawing Date:	07/26/2021
Drawn:	JL
Checked:	RDP
Scale:	AS NOTED
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUED FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

BATTING CAGE FOUNDATION & GR. FL. FRAMING PLAN

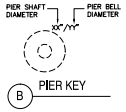
S 200B



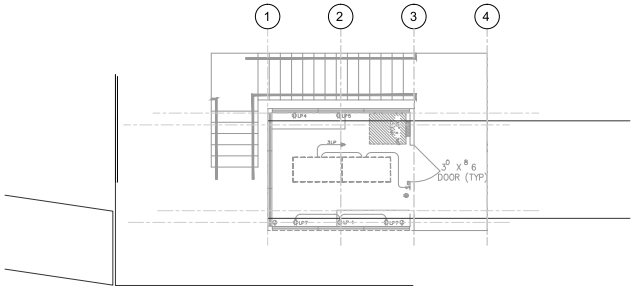
A FOUNDTION & GR. FL. FRAMING PLAN - PRESS BOX

SCALE: 1/4"=1'-0"

NOTES:
1. SUPER STRUCTURE SHALL BE DESIGN AS A PRE-ENGINEERED BUILDING. ALL THE REACTION IMPOSED ON FOUNDATION SHALL BE SUBMITTED TO RDP ENGINEERS INC.
2. CONTRACTOR SHALL COORDINATE THE SUPER STRUCTURE CONNECTION DETAILS TO THE FOUNDATION. ALL ANCHOR BOLTS SHALL BE PER REQUIREMENTS OF THE SUPER STRUCTURE.



B PIER KEY



B FRAMING PLAN PRESS BOX

SCALE: 1/4"=1'-0"

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-002

CONSULTANTS:

STRUCTURAL ENGINEER

RDP
ENGINEERS INC
ADDRESS: 104 INDISTRIAL BLVD. SUITE 111
SUGAR LAND, TEXAS 77478
PH: 281-276-1555
FAX: 281-276-1505

R.D.PATEL 85115 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

RDP ENGINEERS, INC.
TBPE FIRM REGISTRATION
NO F-573

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5535 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
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ACAD File:	

Revisions:

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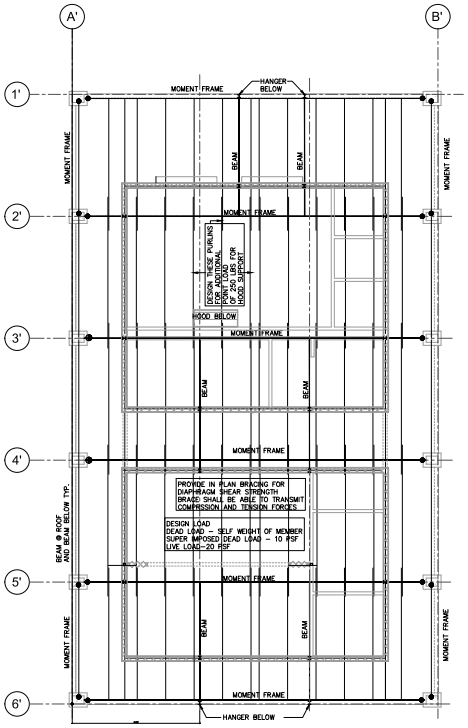
95% CD	09/27/2021
100% CD	11/22/2021
ISSUED FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

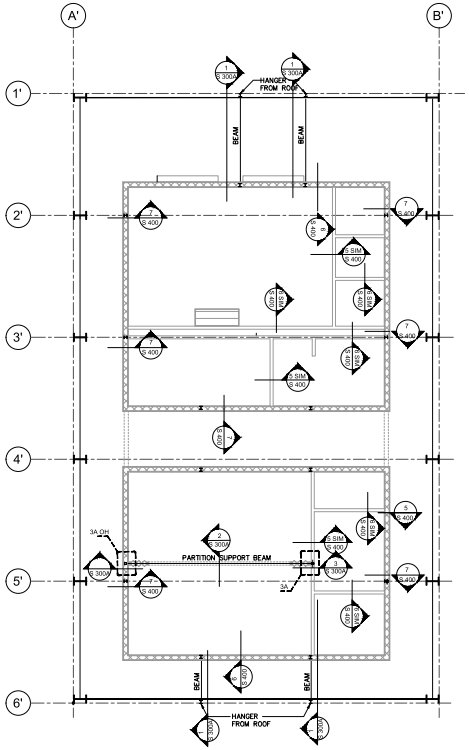
PRESS BOX FDN. , GR FL. PLAN & DETAILS

S 200C



A ROOF FRAMING PLAN - SCHEMATIC CONCESSION BUILDING
SCALE: 1/8"=1'-0"
NOTES:

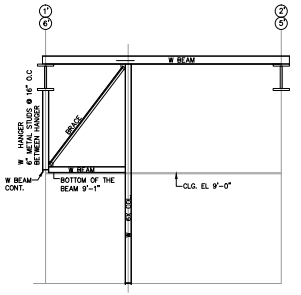
1. REFER GENERAL NOTES FOR DESIGN LOAD INFORMATION NOT SHOWN ON THIS DRAWING.
2. ● INDICATES MOMENT CONNECTION.
3. REFER ARCHITECTURAL DRAWINGS FOR DIMENSIONS
4. ADDITION PURLINS ARE REQUIRED IN ADDITION TO REQUIRED FOR ROOF FRAMING FOR LATERAL SUPPORT OF WALL STUDS AND COLUMN REFER DETAILS 5,6 AND 7 SHEET S 400 AND DETAIL 4/S 300A
5. ADDITIONAL BEAMS ARE REQUIRED IN ADDITION TO FRAME BEAMS AS INDICATED ON P[LAN AND DETAIL 1/S 300A TO SUPPORT COLUMNS AND BEAMS.



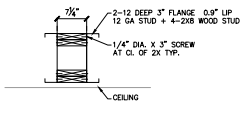
B CMU WALLPLAN - SCHEMATIC CONCESSION BUILDING
SCALE: 1/8"=1'-0"
NOTES:

1. REFER GENERAL NOTES FOR DESIGN LOAD INFORMATION NOT SHOWN ON THIS DRAWING.
2. ● INDICATES MOMENT CONNECTION.
3. REFER ARCHITECTURAL DRAWINGS FOR DIMENSIONS

1. REFER GENERAL NOTES ON SHEET S 0.0 FOR BUILDING CODE AND DESIGN LOAD. STRUCTURAL MEMBERS SHALL BE DESIGNED TO SATISFY FOLLOWINGS:
   DEFLECTION OR DRIFT TO SPAN OR HEIGHT LIMITS IN ADDITION TO THE STRENGTH REQUIREMENTS.
   VERTICAL DEFLECTION TO SPAN RATIO:
   MAIN FRAME H/240
   ROOF PANELS, PURLINS SHALL NOT EXCEED L/ 240 FOR TOTAL LOAD ,
   L/180 FOR LIVE LOAD AND WIND LOAD
   HORIZONTAL DEFLECTION TO SPAN RATIO FOR THE WIND LOAD SHALL NOT EXCEED
   MAIN FRAME H/360 WHERE H IS FRAME HEIGHT
   GIRTS – REFER ELEVATIONS
2. REFER NOTES ON SHEET S 0.0 FOR TESTING AND INSPECTION REQUIREMENTS.
3. MOMENT FRAME SHALL BE DESIGNED WITH PIN BASE CONDITION.



1 SCALE 1" = 1'-0"



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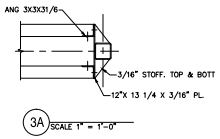
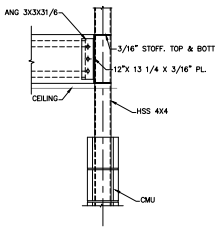
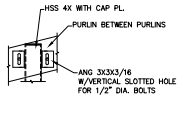


3A SCALE 1" = 1'-0"



3 SCALE 1" = 1'-0"



4 SCALE 1" = 1'-0"

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466
Project No: 6001-002

CONSULTANTS:
STRUCTURAL ENGINEER
RDP ENGINEERS INC
ADDRESS: 104 INDISTRIAL BLVD. SUITE 111
SUGAR LAND, TEXAS 77478
PH: 281-276-1555
FAX: 281-276-1505
R.D.PATEL 95114 LICENSED PROFESSIONAL ENGINEER
RDP ENGINEERS, INC. TBPE FIRM REGISTRATION NO F-573

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5535 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	JL
Checked:	RDP
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ACAD File:	

Revisions:

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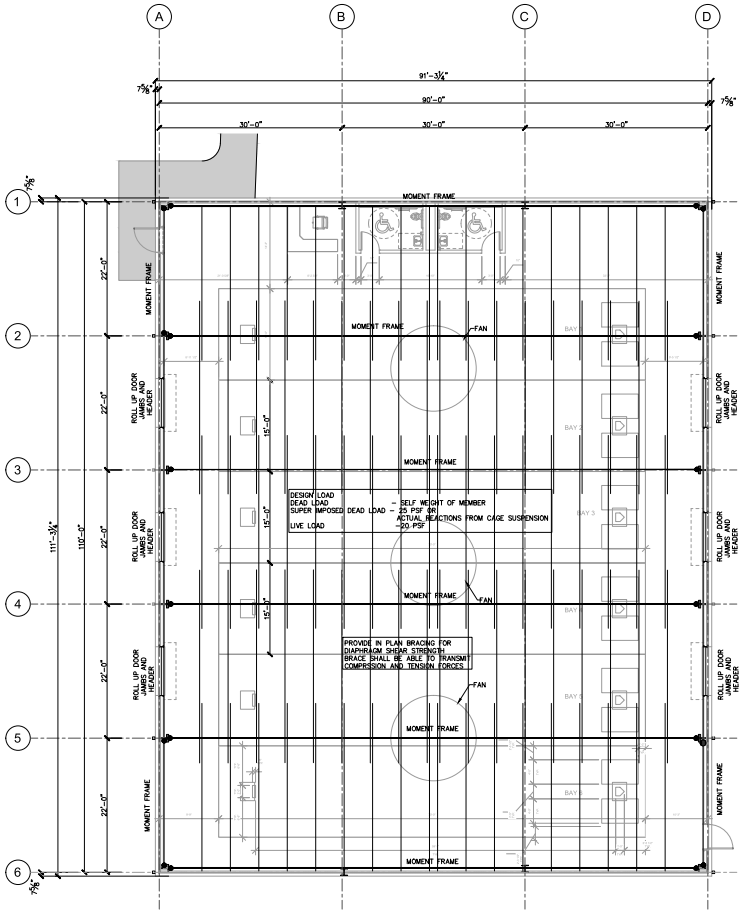
ISSUE FOR BID	09/07/2022

CONCESSION ROOF FRAMING PLAN

S 300A



A ROOF FRAMING PLAN - SCHEMATIC BATTING CAGE

SCALE: 1/8"=1'-0"

NOTES:

1. REFER SHEET S 300A FOR DESIGN CRITERIA AND REFER GENERAL NOTES FOR DESIGN LOAD INFORMATION NOT SHOWN ON THIS DRAWING.
2. ● INDICATES MOMENT CONNECTION.
3. REFER ARCHITECTURAL DRAWINGS FOR DIMENSIONS
4. FAN LOCATION MARKED ON PLAN REQUIRES A STRUCTURAL MEMBER TO SUPPORT 350 LBS WEIGHT OF FAN. IF STRUCTURAL FRAMING MEMBER ARE NOT AT THE LOCATION OF FAN PROVIDE ADDITIONAL MEMBER TO SUPPORT FANS
5. A CEILING FRAME WILL BE SUSPENDED FORM THE ROOF PURLINS TO SUPPORT AN OPERABLE RETRACTABLE BATTING CAGE SUSPENSION. CONTRACTOR TO COORDINATE DESIGN LOAD AS INDICATED ON CLAN. PROVIDE A SCHEMATIC HANGER DETAIL BETWEEN TWO PURLINS, HANGER AND BRIDGE BEAM MEMBER WILL BE PROVIDED BY THE BATTING CAGE SUPPLIER.

DESIGN CRITERIA FOR STEEL STRUCTURE

1. REFER GENERAL NOTES ON SHEET S 0.0 FOR BUILDING CODE AND DESIGN LOAD. STRUCTURAL MEMBERS SHALL BE DESIGNED TO SATISFY FOLLOWINGS:

   DEFLECTION OR DRIFT TO SPAN OR HEIGHT LIMITS IN ADDITION TO THE STRENGTH REQUIREMENTS.

   VERTICAL DEFLECTION TO SPAN RATIO:

   MAIN FRAME H/240

   ROOF PANELS, PURLINS SHALL NOT EXCEED L/ 240 FOR TOTAL LOAD ,

   L/180 FOR LIVE LOAD AND WIND LOAD

   HORIZONTAL DEFLECTION TO SPAN RATIO FOR THE WIND LOAD SHALL NOT EXCEED

   MAIN FRAME H/360 WHERE H IS FRAME HEIGHT

   GIRTS – REFER ELEVATIONS

2. REFER NOTES ON SHEET S 0.0 FOR TESTING AND INSPECTION REQUIREMENTS.
3. MOMENT FRAME SHALL BE DESIGNED WITH PIN BASE CONDITION.

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466
Project No: 6001-002

CONSULTANTS:

STRUCTURAL ENGINEER

RDP ENGINEERS INC

ADDRESS: 104 INDISTRIAL BLVD. SUITE 111
SUGAR LAND, TEXAS 77478

PH: 281-276-1555
FAX: 281-276-1505

STATE OF TEXAS R.D.PATEL 85114 LICENSED PROFESSIONAL ENGINEER

RDP ENGINEERS, INC.
TBPE FIRM REGISTRATION NO F-573

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5535 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	JL
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Revisions:

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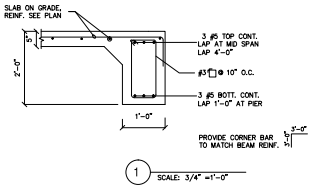
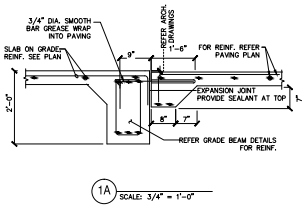
ISSUED FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

BATTING CAGE ROOF FRAMING PLAN

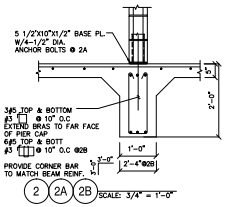
S 300B



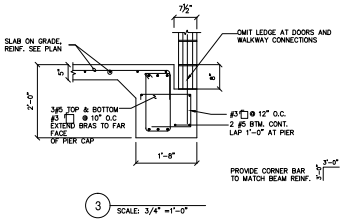
1 SCALE: 3/4" =1'-0"



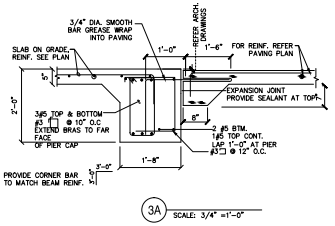
1A SCALE: 3/4" = 1'-0"



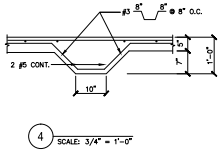
2 2A 2B SCALE: 3/4" = 1'-0"



3 SCALE: 3/4" =1'-0"



3A SCALE: 3/4" =1'-0"



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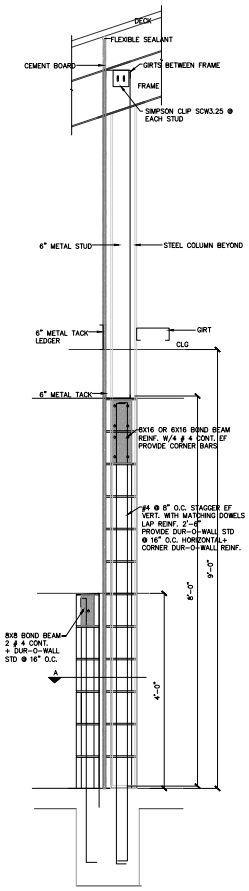
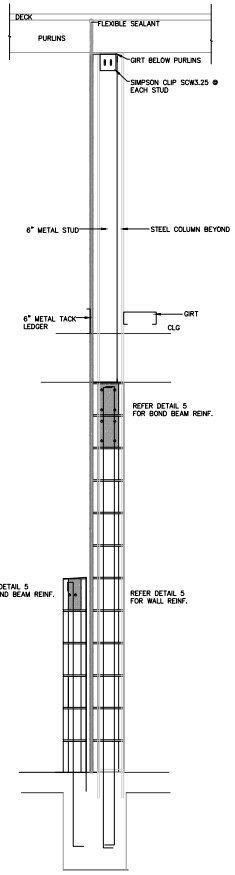


5 SCALE 1" = 1'-0"



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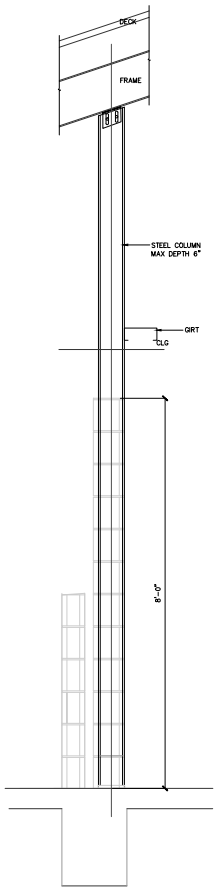
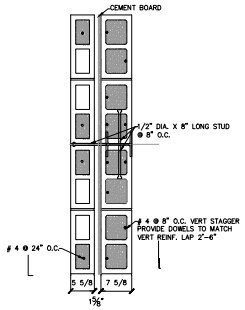


7 SCALE 1" = 1'-0"



A PLAN SCALE 1" = 1'-0"

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466
Project No: 6001-002

CONSULTANTS:
STRUCTURAL ENGINEER
RDP ENGINEERS INC
ADDRESS: 104 INDISTRIAL BLVD. SUITE 111
SUGAR LAND, TEXAS 77478
PH: 281-276-1555
FAX: 281-276-1505
R.D.PATEL 85114 LICENSED PROFESSIONAL ENGINEER
RDP ENGINEERS, INC. TBPE FIRM REGISTRATION NO F-573

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5535 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	JL
Checked:	RDP
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ACAD File:	

Revisions:

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ISSUE FOR BID	09/07/2022

DETAILS

S 400

1. DEMOLISH THE EXISTING CONCESSION BUILDING IN ITS ENTIRETY. RE: ARCHITECTURAL, STRUCTURAL & MEP DRAWINGS
2. DEMOLISH EXISTING PARKING LOT IN ITS ENTIRETY. RE: CIVIL DRAWINGS
3. EXISTING BASEBALL/SOFTBALL FIELDS FENCES POST AND POST FOUNDATION TO REMAIN. DISASSEMBLE THE CHAIN LINK FENCE FROM EACH POST (SAFELY STORE THE DISASSEMBLED FENCE FOR LATER REASSEMBLY) TO PERFORM THE REMOVAL AND REGRADING OF EXISTING GRASS PER CIVIL DRAWINGS
4. EARTHWORK/REGRADING TO BE PERFORMED IN BASEBALL/SOFTBALL FIELDS TO RECEIVE NEW TURF. RE: CIVIL DRAWINGS
5. DEMOLISH EXISTING CONCRETE CURB AND GUTTER IN ITS ENTIRETY
6. EXISTING SMALL TREES RIGHT NEXT TO THE WOODEN BOLLARDS TO BE DEMOLISHED IN THEIR ENTIRETY INCLUDING THEIR ROOTS. BACKFILL TO FINISH GRADE.
7. EXISTING ASPHALT PAVEMENT WALKWAY TO BE DEMOLISHED IN ITS ENTIRETY. RE: CIVIL DRAWINGS AND SPECIFICATIONS
8. DEMOLISH ONLY THE CORRUGATED METAL PANEL OF THE EACH FIELD DUGOUTS. EXISTING DUGOUT STRUCTURES/BLEACHER AS WELL AS THEIR CONCRETE PAD TO REMAIN AND PROTECTED DURING THE COURSES OF THE WORK.
9. EXISTING SOLAR LIGHT POLE TO REMAIN.
10. EXISTING TREE TO BE DEMOLISHED
11. EXISTING FIELD ENTRANCE GATE (ONLY) TO BE DEMOLISHED IN THEIR ENTIRETY
12. EXISTING 30 GALLON TRASH CONTAINER (PLASTIC BARREL ON WOODEN POSTS) TO BE DEMOLISHED IN ITS ENTIRETY.
13. EXISTING CONCESSION BUILDING SEPTIC TANK TO BE DEMOLISHED AND REMOVED IN ITS ENTIRETY INCLUDING THE CONNECTION LINES FROM THE BUILDING TO THE TANK. BACKFILL TO FINISH GRADE. RE: MEP FOR ADDITIONAL INSTRUCTION.
14. EXISTING HANDICAP PARKING SIGN TO BE DEMOLISHED IN ITS ENTIRETY INCLUDING THE FOOTING. BACKFILL TO FINISH GRADE.
15. EXISTING HEADSTONE TO BE CAREFULLY REMOVED AND RELOCATED TO A NEW PLACE. COORDINATE WITH OWNER FOR THE NEW RELOCATION PLACE.
16. EXISTING SIGN TO BE DEMOLISHED IN ITS ENTIRETY.
17. EXISTING FOOTBALL FIELDS SIDEWALK.
18. EXISTING STORAGE BUILDING TO REMAIN
19. EXISTING SAFETY NET (ATH FIELDS TO REMAIN DURING CONSTRUCTION)
20. EXISTING CHAIN LINK FENCE WITH SLATS WITH POST/FOOTING AND GATE TO BE DEMOLISHED IN THEIR ENTIRETY. RE: MEP DRAWINGS FOR ELECTRICAL SCOPE

NOT ON THIS CURRENT BID PACKAGE

KEYNOTES

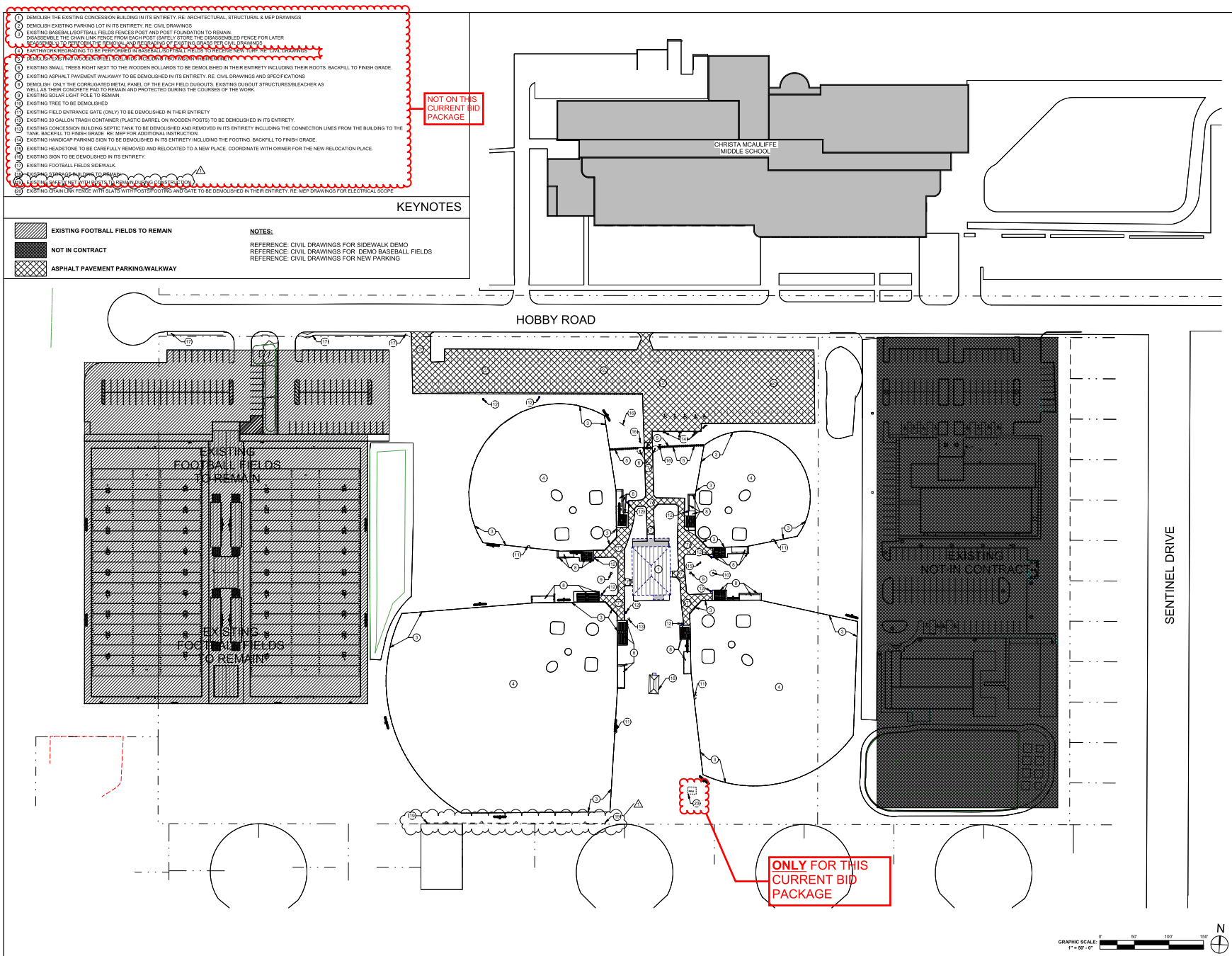
EXISTING FOOTBALL FIELDS TO REMAIN

NOT IN CONTRACT

ASPHALT PAVEMENT PARKING/WALKWAY

NOTES:

REFERENCE: CIVIL DRAWINGS FOR SIDEWALK DEMO
REFERENCE: CIVIL DRAWINGS FOR DEMO BASEBALL FIELDS
REFERENCE: CIVIL DRAWINGS FOR NEW PARKING



EXISTING SITE PLAN
1" = 50'-0"

1

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	IK
Checked:	BM, CD
Scale:	As indicated
ACAD File:	

Revisions:

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ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

DEMOLITION SITE PLAN

AD100

A

B

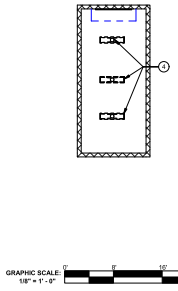
C

D

E

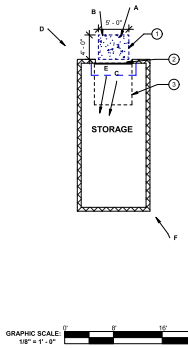
F

NOTE: EXISTING PICTURE FOR REFERENCE ONLY



GRAPHIC SCALE: 1/8" = 1'-0"

EXISTING STORAGE RCP DEMO 1/8" = 1'-0" 2



GRAPHIC SCALE: 1/8" = 1'-0"

EXISTING STORAGE DEMO PLAN 1/8" = 1'-0" 1

1. EXISTING EXTERIOR CONCRETE PAD TO BE DEMOLISH IN ITS ENTIRETY.
2. EXISTING DOOR/GATE AND FRAME TO REMAIN AND PROTECTED DURING CONSTRUCTION
3. EXISTING OVERHEAD COOLING DOOR TO BE DEMOLISH IN ITS ENTIRETY
4. REMOVE EXISTING LIGHT FIXTURE
5. INSTALL NEW LED LIGHT FIXTURE RE: MEP DRAWINGS AND SPECIFICATIONS
6. INSTALL NEW OVERHEAD COILING DOOR RE: SPECIFICATIONS
7. EXISTING EQUIPMENT IN THE STORAGE TO REMAIN PROTECTED DURING NEW WORK
8. NEW CONCRETE PAD. RE: CIVIL DRAWINGS AND SPECIFICATION

KEY NOTES

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES AND APPLICATIONS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL DIMENSIONS AND OR EXISTING FIELD CONDITIONS PRIOR TO START.
5. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO THE ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.
6. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES WITH ARCHITECT PRIOR TO BIDDING
7. THE GENERAL CONTRACTOR SHALL PROTECT ANY CONSTRUCTION OR FINISHES THAT IS TO REMAIN.
8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

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NEDU ENGINEERING SERVICES
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STRUCTURAL ENGINEER

RDP ENGINEERS
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MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
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DESIGN DEVELOPMENT	08/23/2021
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95% CD	09/27/2021
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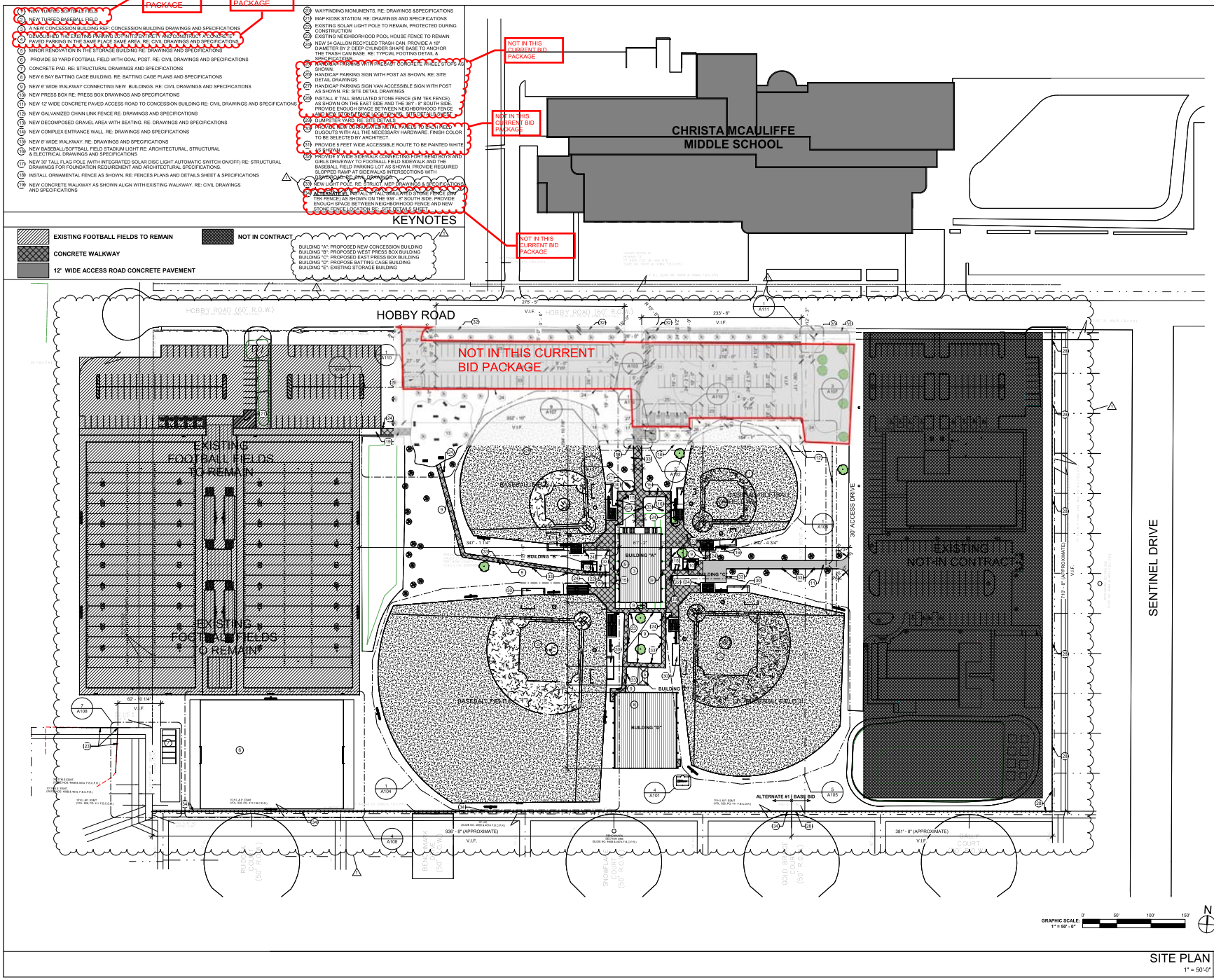
ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

EXISTING STORAGE BUILDING

AD101



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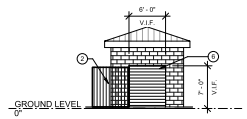
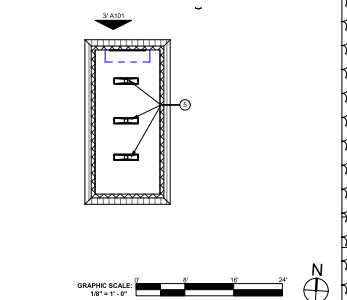
SITE PLAN

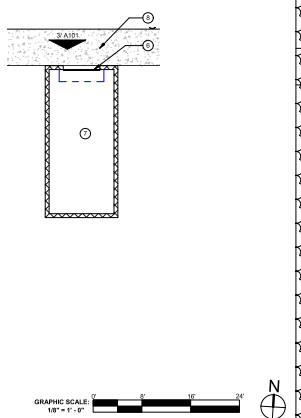
A100



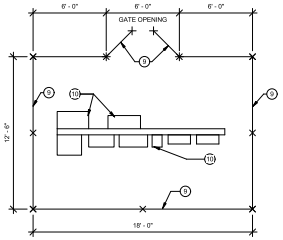
EXISTING STORAGE ELEVATION 3
1/8" = 1'-0"



EXISTING STORAGE RCP NEW LIGHTS 2
1/8" = 1'-0"



EXISTING STORAGE FLOOR PLAN 1
1/8" = 1'-0"



ELECTRICAL SERVICE DROP YARD 4
1/4" = 1'-0"

KEY NOTES

1. EXISTING EXTERIOR CONCRETE PAD TO BE DEMOLISH IN ITS ENTIRETY.
2. EXISTING DOOR/GATE AND FRAME TO REMAIN AND PROTECTED DURING CONSTRUCTION.
3. EXISTING OVERHEAD COOLING DOOR TO BE DEMOLISH IN ITS ENTIRETY
4. REMOVE EXISTING LIGHT FIXTURE
5. INSTALL NEW LED LIGHT FIXTURE RE: MEP DRAWINGS AND SPECIFICATIONS
6. INSTALL NEW OVERHEAD COILING DOOR RE: SPECIFICATIONS
7. EXISTING EQUIPMENT IN THE STORAGE TO REMAIN PROTECTED DURING NEW WORK
8. NEW CONCRETE PAD. RE: CIVIL DRAWINGS AND SPECIFICATION
9. NEW CHAIN LINK FENCE OF 8'-0" HIGH WITH NEW VINYL SLAT THROUGHOUT. PROVIDE DOUBLE GATE WITH VINYL SLAT AS SHOWN. PROVIDE NEW WEATHERPROOF AND HEAVY DUTY CHAIN & LOCK SYSTEM WITH KEYS RE: SITE DETAILS DRAWINGS FOR TYPICAL ELEVATIONS AND FOOTING REQUIREMENTS.
10. RE: MEP DRAWINGS FOR ELECTRICAL SERVICE DROP SCOPE

GENERAL NOTES

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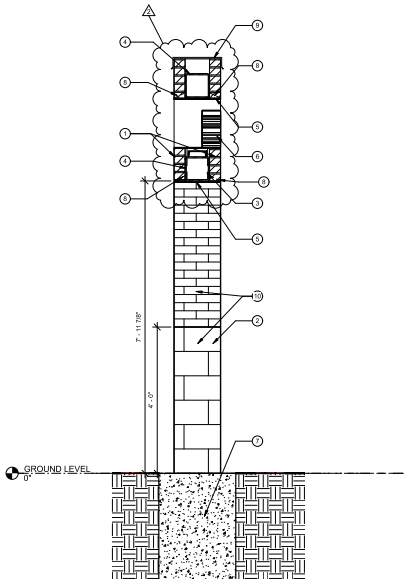
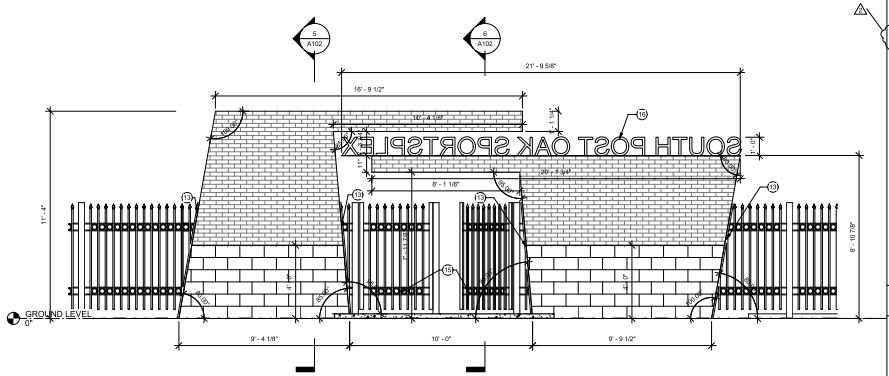
EXISTING STORAGE BUILDING & ELECTRICAL SERVICE DROP YARD

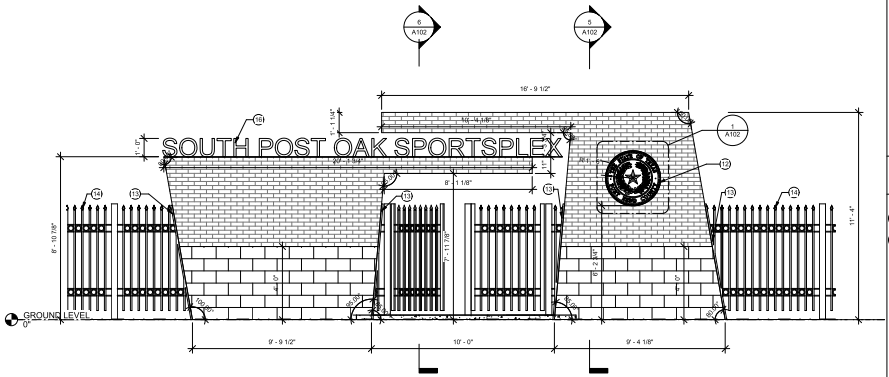
A101



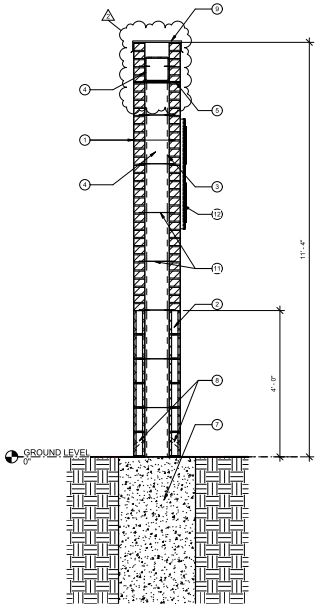
COMPLEX ENTRANCE WALL SECTION
3/4" = 1'-0" | 6



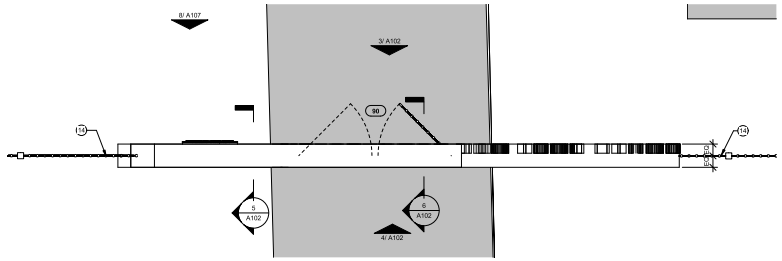
COMPLEX ENTRANCE SOUTH ELEVATION
3/8" = 1'-0" | 4



COMPLEX ENTRANCE NORTH ELEV.
3/8" = 1'-0" | 3



COMPLEX ENTRANCE WALL SECTION
3/4" = 1'-0" | 5



ENTRANCE FLOOR PLAN
3/8" = 1'-0" | 2

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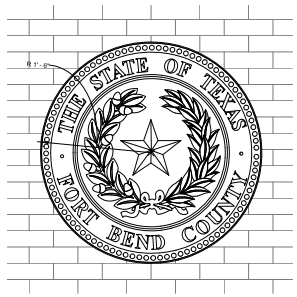
GENERAL NOTES

1. 3 5/8" BRICK WALL
2. 4" CMU BLOCK
3. STRUCTURAL STEEL TUBE COLUMN BEYOND RE: STRUCTURAL DRAWING AND SPECIFICATIONS
4. STRUCTURAL CONT. HSS BEAM. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
5. STEEL PLATE WELDED TO STRUCTURAL WIDE FLANGE TO SUPPORT BRICK WALL ABOVE RE: STRUCTURAL DRAWING AND SPECIFICATIONS
6. METAL LETTER CUT SIGNAGE WRITING ATTACHED TO A BASE PLATE RE: SPECIFICATIONS
7. WALL FOUNDATION. RE: STRUCTURAL DRAWINGS AND FOUNDATIONS
8. WEEP HOLE @ 16" O.C.
9. CONTINUOUS METAL COPING ANCHORED WITH RUBBER WASHER AT 16" O.C.
10. BRICK AND CMU WALL RETURN TO CLOSE THE GAP BETWEEN THE TWO WALL FRAMING SYSTEM. TYPICAL THROUGHOUT THE ENTRANCE WALL SYSTEM.
11. ADJUSTABLE DOVETAIL BRICK TIES AT 16" O.C. TYPICAL
12. CAST STONE STAMP SEAL SIGNAGE ON WALL BEYOND. RE: SPECIFICATIONS
13. ORNAMENTAL FENCE EDGE TO MATCH THE ENTRANCE WALL PROFILE. PROVIDE A DIAGONAL PICKET WELDED TO FENCE AND ANCHORED TO ENTRANCE WALL PROFILE AS REQUIRED.
14. ORNAMENTAL FENCE. RE: FENCE PLANS AND SPECIFICATIONS
15. ORNAMENTAL FENCE GATE WITH POST AS SHOWN. PROVIDE A RECEPTACLES FOR THE CANE BOLT WHEN GATES ARE FULLY OPENED. RE LOCK HARDWARE. RE: FENCE PLANS AND ELEVATIONS & SPECIFICATIONS.
16. ALUMINUM LETTERS. RE: SPECIFICATIONS

KEY NOTES



CAST STONE
1 1/2" = 1'-0" | 1

NOTE: SIGNS AND SIGN MONUMENTS ARE REQUIRED TO BE SUBMITTED AND PERMITTED SEPARATELY BY GENERAL CONTRACTOR

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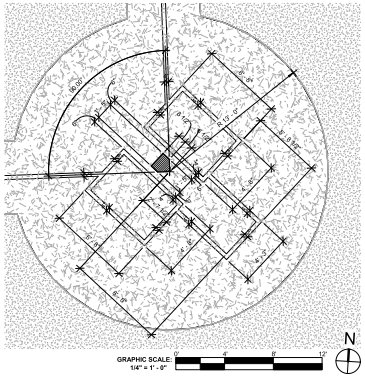
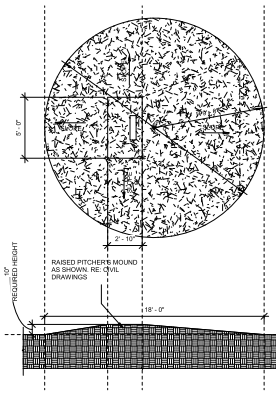
COMPLEX ENTRANCE WALL PLANS

A102

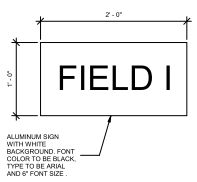


GRAPHIC SCALE 1/4" = 1' - 0"

HOME PLATE, BATTER'S & CATCHER'S BOXES 1/4" = 1'-0" 5

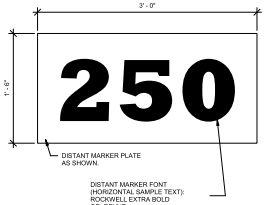


PITCHER'S MOUND DETAILS 1/4" = 1'-0" 4



SIGN 1 1/2" = 1'-0" 3

BID PACKAGE #2 ONLY



NOTES:

RIGHT FIELD DISTANCE: 178' (V.I.F.)
CENTER FIELD DISTANCE: 209' (V.I.F.)
LEFT FIELD DISTANCE: 170' (V.I.F.)

DISTANCE MARKER 1 1/2" = 1'-0" 2

1. EXISTING STADIUM LIGHT POLE TO REMAIN PROTECTED DURING CONSTRUCTION. REPLACE EXISTING STADIUM LIGHT WITH NEW LED LIGHT. RE: MEP DRAWING AND SPECIFICATIONS.
2. INSTALL NEW STADIUM LIGHT POLE WITH LED STADIUM LIGHT. RE: STRUCTURAL DRAWINGS AND SPECIFICATION FOR FOUNDATION REQUIREMENTS, RE: MEP DRAWINGS AND SPECIFICATIONS FOR LED LIGHTING REQUIREMENTS
3. EXISTING BASEBALL/SOFTBALL FIELDS FENCES POSTS AND POST FOUNDATIONS TO REMAIN, PROTECTED THROUGHOUT THE COURSE OF THE PROJECT. DISASSEMBLE THE CHAIN LINK FENCE FROM EACH POST (SAFELY STORE THE FENCE FOR LATER REASSEMBLY) IN ORDER TO PERFORM THE NEW GRADING WORK OF EACH FIELD PER THE CIVIL DRAWINGS & SPECIFICATIONS. REASSEMBLE THE FENCE TO EACH POST ONCE GRADING AND NEW WORK IS COMPLETED.
4. INSTALL NEW BASEBALL FIELD TURF AS SHOWN AND AS REQUIRED. ALL LINE REQUIREMENTS TO BE FOLLOWED PER TURF MANUFACTURER (HOME PLATE LINES, BATTERS' AND CATCHER'S BOXES, PITCHERS PLATE,1ST, 2ND & 3RD BASES, COACHES BOXES, FOUL LINE, ON-DECK CIRCLE ETC.) RE: SPECIFICATIONS
5. INSTALL NEW SOFTBALL FIELD TURF AS SHOWN AND AS REQUIRED. ALL LINE REQUIREMENTS TO BE FOLLOWED PER TURF MANUFACTURER (HOME PLATE LINES, BATTERS' AND CATCHER'S BOXES, PITCHERS PLATE,1ST, 2ND & 3RD BASES, COACHES BOXES, FOUL LINE) RE: SPECIFICATIONS
6. INSTALL NEW VINYL SLATS THROUGHOUT THE CHAIN LINK FENCE .COLOR TO BE SELECTED BY ARCHITECT. RE: DRAWINGS AND SPECIFICATIONS
7. INSTALL NEW YELLOW FENCE CAP ON FIELD CHAIN LINK FENCE. RE. DRAWINGS AND SPECIFICATIONS
8. INSTALL NEW 20' TALL FOUL POLE. RE: STRUCTURAL
9. NEW OUTFIELD DISTANCE MARKER. RE: SPECIFICATIONS
10. NEW SCORE BOARD. RE: SPECIFICATIONS
11. EXISTING BLEACHERS TO REMAIN AND PROTECTED DURING CONSTRUCTION (TYP.)
12. GREEN COLOR TURF AREA
13. CAMEL/TERRA COTTA COLOR TURF AREA
14. PITCHERS RUBBER (TYP.)
15. 1ST BASE
16. 2ND BASE
17. 3RD BASE
18. COACH BOX AS SHOWN
19. ON-DECK CIRCLE AS SHOWN
20. FOUL LINE
21. RAISED COMPACTED SOIL & INTEGRATED PITCHER'S MOUND. RE: PITCHER'S MOUND DETAIL & CIVIL DRAWINGS & SPECIFICATIONS
22. MOVABLE PITCHER'S MOUND AS SHOWN. RE: SPECIFICATIONS FOR EQUIPMENTS.
23. EXISTING DUGOUT TO REMAIN AND PROTECTED DURING CONSTRUCTION
24. RESTRAINING LINE
25. INSTALL NEW 8'-0" WIDE DOUBLE GATE. (4'-0" EACH) (V.I.F.) FOR EACH FIELD. MATCH FENCE TYPE, HEIGHT, FINISH COLOR ETC. PROVIDE NEW WEATHERPROOF AND HEAVY DUTY CHAIN & LOCK SYSTEM WITH KEYS
26. NEW FIELD SIGN (WITH NUMBERING MATCHING TO THE RESPECTED FIELD) TO BE ANCHORED/ATTACHED ON CENTER OF EACH DUGOUT LONG SIDE AS REQUIRED ON FENCE @ 9' ABOVE GROUND. RE: SPECIFICATIONS AND SIGN DETAIL
27. NEW 34 GALLON RECYCLED TRASH CAN. RE: SPECIFICATIONS
28. PROVIDE NEW CORRUGATED METAL PANELS TO EACH FIELD DUGOUTS WITH ALL THE NECESSARY HARDWARE. FINISH COLOR TO BE SELECTED BY ARCHITECT.

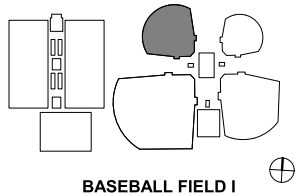
BID PACKAGE #2 ONLY

KEY NOTES

GREEN COLOR TURF AREA

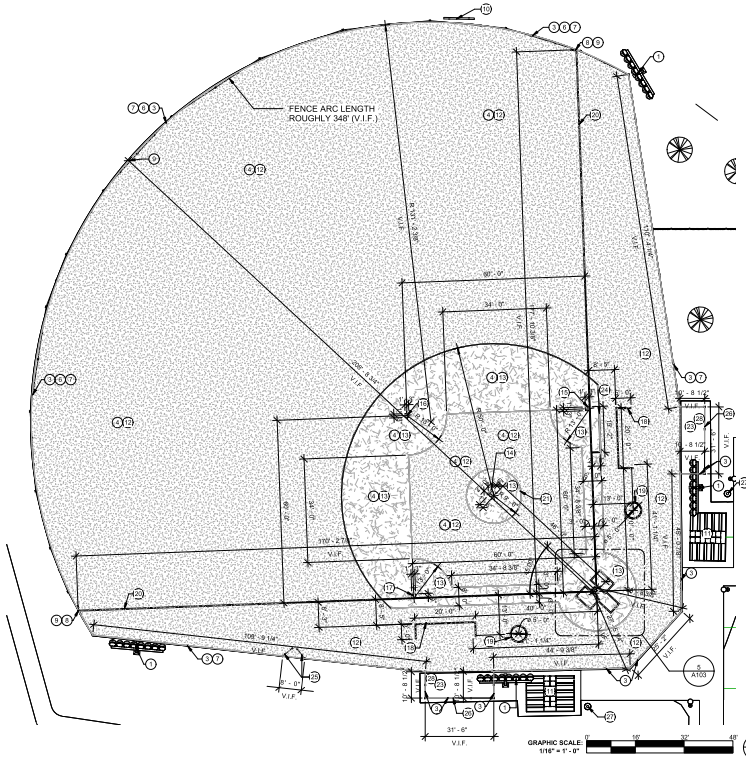
CAMEL/TERRA COTTA COLOR TURF AREA

LEGEND



BASEBALL FIELD I

KEYPLAN



BASEBALL FIELD I 1/16" = 1'-0" 1

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8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

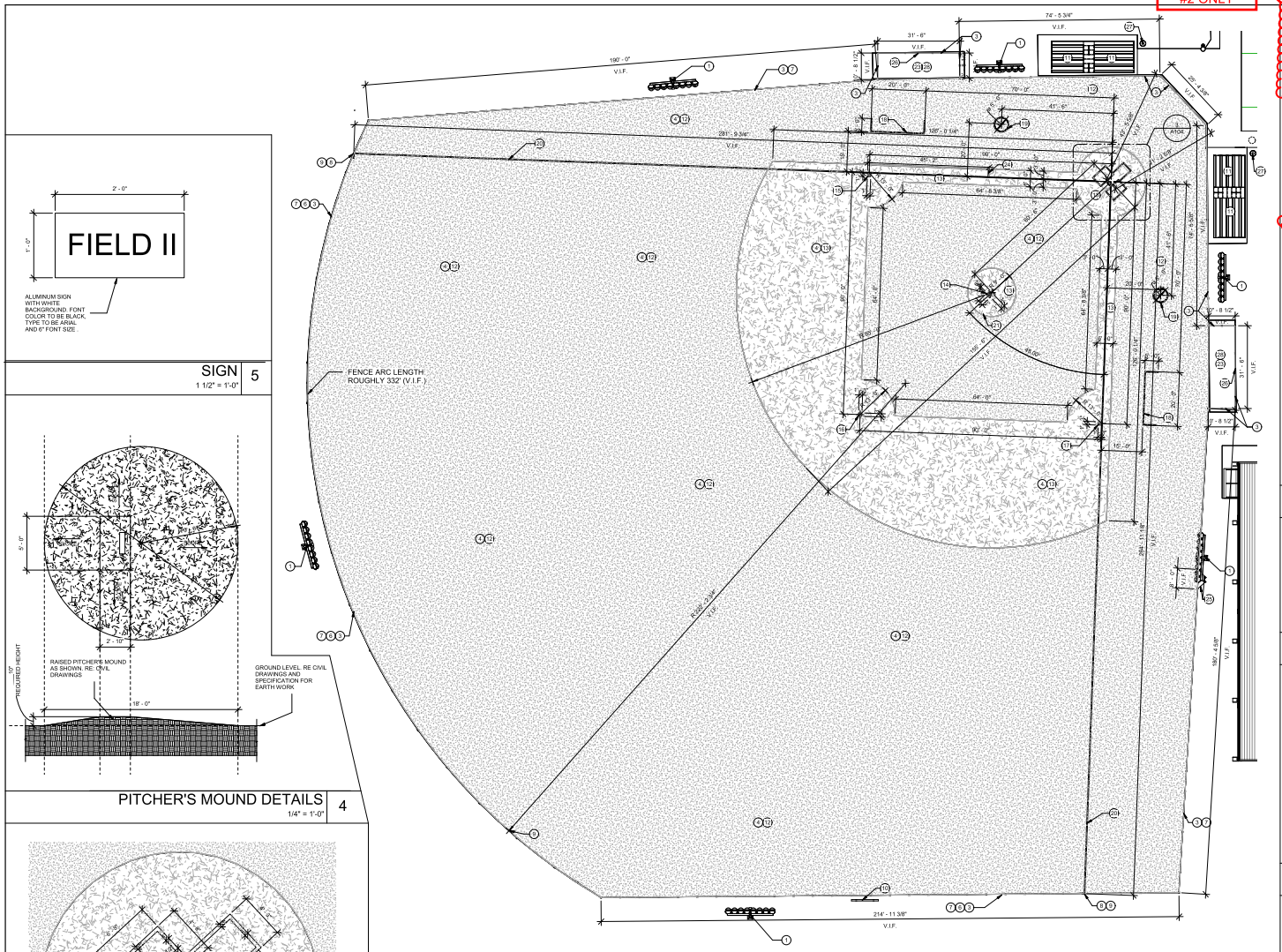
Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

BASEBALL FIELD I

A103

BID PACKAGE #2 ONLY



BID PACKAGE #2 ONLY

1. EXISTING STADIUM LIGHT POLE TO REMAIN PROTECTED DURING CONSTRUCTION. REPLACE EXISTING STADIUM LIGHT WITH NEW LED LIGHT. RE: MEP DRAWING AND SPECIFICATIONS.
2. INSTALL NEW STADIUM LIGHT POLE WITH LED STADIUM LIGHT. RE: STRUCTURAL DRAWINGS AND SPECIFICATION FOR FOUNDATION REQUIREMENTS. RE: MEP DRAWINGS AND SPECIFICATIONS FOR LED LIGHTING REQUIREMENTS.
3. EXISTING BASEBALL/SOFTBALL FIELDS FENCES POSTS AND POST FOUNDATIONS TO REMAIN, PROTECTED THROUGHOUT THE COURSE OF THE PROJECT. DISASSEMBLE THE CHAIN LINK FENCE FROM EACH POST (SAFELY STORE THE FENCE FOR LATER REASSEMBLY) IN ORDER TO PERFORM THE NEW GRADING WORK OF EACH FIELD PER THE CIVIL DRAWINGS & SPECIFICATIONS. REASSEMBLE THE FENCE TO EACH POST ONCE GRADING AND NEW WORK IS COMPLETED.
4. INSTALL NEW BASEBALL FIELD TURF AS SHOWN AND AS REQUIRED. ALL LINES REQUIREMENTS TO BE FOLLOWED PER TURF MANUFACTURER (HOME PLATE LINES, BATTERS' AND CATCHER'S BOXES, PITCHERS PLATE,1ST, 2ND & 3RD BASES, COACHES BOXES, FOUL LINE, ON-DECK CIRCLE ETC.) RE: SPECIFICATIONS
5. INSTALL NEW SOFTBALL FIELD TURF AS SHOWN AND AS REQUIRED. ALL LINE REQUIREMENTS TO BE FOLLOWED PER TURF MANUFACTURER (HOME PLATE LINES, BATTERS' AND CATCHER'S BOXES, PITCHERS PLATE,1ST, 2ND & 3RD BASES, COACHES BOXES, FOUL LINE). RE: SPECIFICATIONS
6. INSTALL NEW VINYL SLATS THROUGHOUT THE CHAIN LINK FENCE .COLOR TO BE SELECTED BY ARCHITECT. RE: DRAWINGS AND SPECIFICATIONS
7. INSTALL NEW YELLOW FENCE CAP ON FIELD CHAIN LINK FENCE. RE: DRAWINGS AND SPECIFICATIONS
8. INSTALL NEW 20' TALL FOUL POLE. RE: STRUCTURAL
9. NEW OUTFIELD DISTANCE MARKER. RE: SPECIFICATIONS
10. NEW SCOREBOARD. RE: SPECIFICATIONS
11. EXISTING BLEACHERS TO REMAIN AND PROTECTED DURING CONSTRUCTION (TYP.)
12. GREEN COLOR TURF AREA
13. CAMEL/TERRA COTTA COLOR TURF AREA
14. PITCHERS RUBBER (TYP.)
15. 1ST BASE
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17. 3RD BASE
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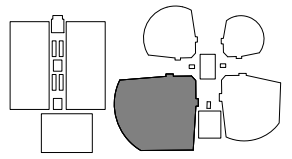
19. ON-DECK CIRCLE AS SHOWN
20. FOUL LINE
21. RAISED COMPACTED SOIL & INTEGRATED PITCHER'S MOUND. RE: PITCHER'S MOUND DETAIL & CIVIL DRAWINGS & SPECIFICATIONS
22. MOVABLE PITCHER'S MOUND AS SHOWN. RE: SPECIFICATIONS FOR EQUIPMENTS.
23. EXISTING DUGOUT TO REMAIN AND PROTECTED DURING CONSTRUCTION
24. RESTRAINING LINE
25. INSTALL NEW 8'-0" WIDE DOUBLE GATE (4'-0" EACH) (V.I.F.) FOR EACH FIELD, MATCH FENCE TYPE, HEIGHT, FINISH COLOR ETC. PROVIDE NEW WEATHERPROOF AND HEAVY DUTY CHAIN & LOCK SYSTEM WITH KEYS
26. NEW FIELD SIGN (WITH NUMBERING MATCHING TO THE RESPECTED FIELD) TO BE ANCHORED/ATTACHED ON CENTER OF EACH DUGOUT LONG SIDE AS REQUIRED ON FENCE @ 9' ABOVE GROUND. RE: SPECIFICATIONS AND SIGN DETAIL
27. NEW 34 GALLON RECYCLED TRASH CAN. RE: SPECIFICATIONS
28. PROVIDE NEW CORRUGATED METAL PANELS TO EACH FIELD DUGOUTS WITH ALL THE NECESSARY HARDWARE. FINISH COLOR TO BE SELECTED BY ARCHITECT.

KEY NOTES

GREEN COLOR TURF AREA

CAMEL/TERRA COTTA COLOR TURF AREA

LEGEND



BASEBALL FIELD II

KEYPLAN

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
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DESIGN DEVELOPMENT	08/23/2021
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95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

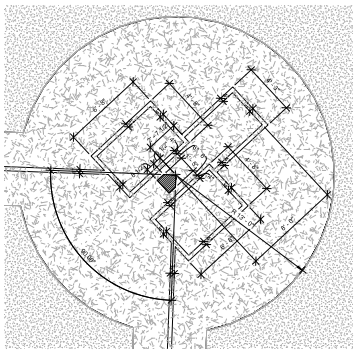
BASEBALL FIELD II

A104

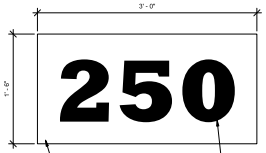
5 SIGN
1 1/2" = 1'-0"

4 PITCHER'S MOUND DETAILS
1/4" = 1'-0"

3 HOME PLATE, BATTER'S & CATCHER'S BOXES
1/4" = 1'-0"



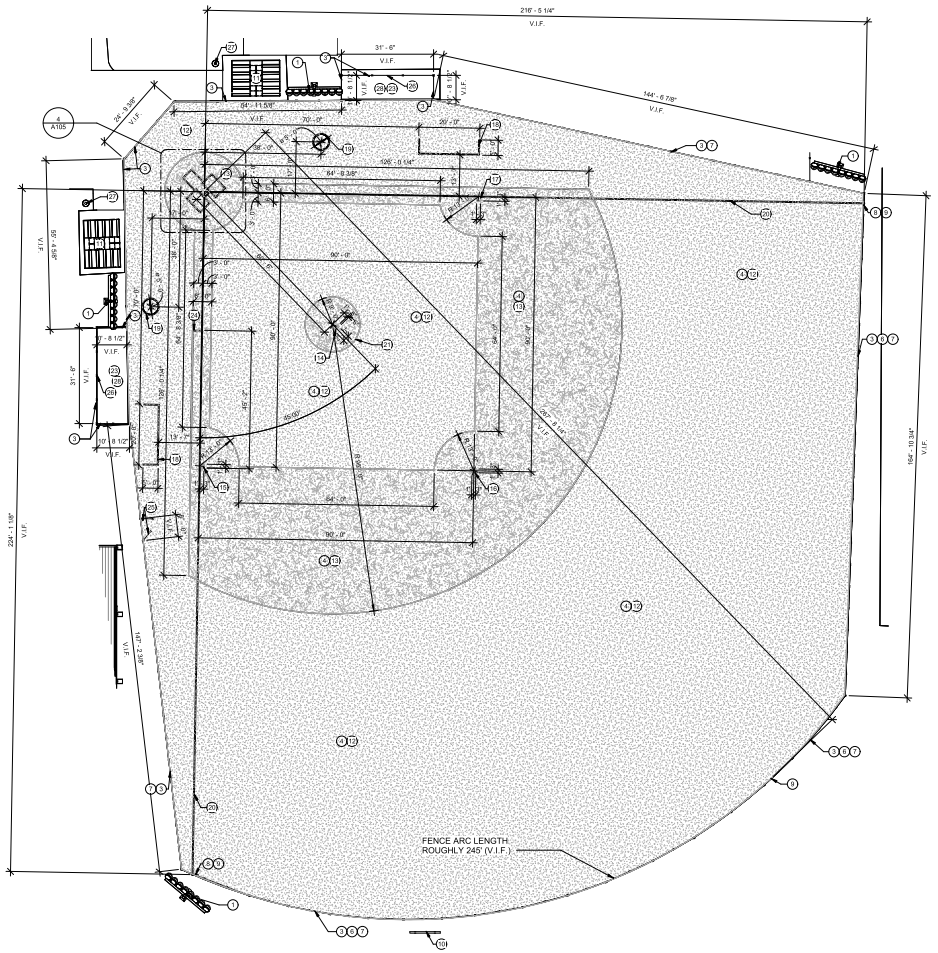
2 DISTANCE MARKER
1 1/2" = 1'-0"



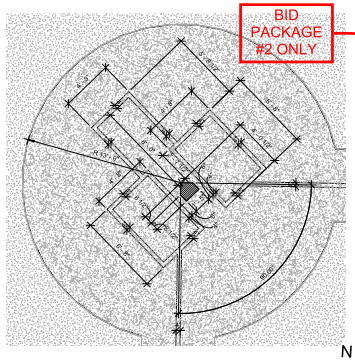
NOTES:

RIGHT FIELD DISTANCE: 282' (V.I.F.)
CENTER FIELD DISTANCE: 222' (V.I.F.)
LEFT FIELD DISTANCE: 265' (V.I.F.)

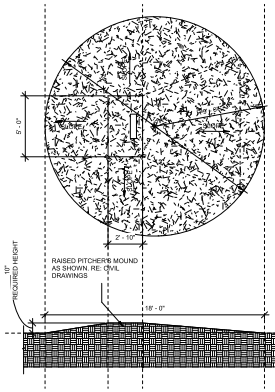
1 BASEBALL FIELD II
1/16" = 1'-0"



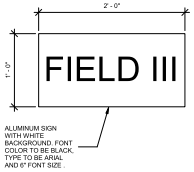
BASEBALL FIELD III
1/16" = 1'-0" 5



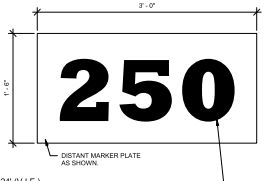
HOME PLATE, BATTER'S & CATCHER'S BOXES
1/4" = 1'-0" 4



PITCHER'S MOUND DETAILS
1/4" = 1'-0" 3



SIGN
1 1/2" = 1'-0" 2



NOTES:

RIGHT FIELD DISTANCE: 224' (V.I.F.)
CENTER FIELD DISTANCE: 268' (V.I.F.)
LEFT FIELD DISTANCE: 217' (V.I.F.)

DISTANCE MARKER
1 1/2" = 1'-0" 1

1. EXISTING STADIUM LIGHT POLE TO REMAIN PROTECTED DURING CONSTRUCTION. REPLACE EXISTING STADIUM LIGHT WITH NEW LED LIGHT. RE: MEP DRAWING AND SPECIFICATIONS.
2. INSTALL NEW STADIUM LIGHT POLE WITH LED STADIUM LIGHT. RE: STRUCTURAL DRAWINGS AND SPECIFICATION FOR FOUNDATION REQUIREMENTS, RE: MEP DRAWINGS AND SPECIFICATIONS FOR LED LIGHTING REQUIREMENTS
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4. INSTALL NEW BASEBALL FIELD TURF AS SHOWN AND AS REQUIRED. ALL LINES REQUIREMENTS TO BE FOLLOWED PER TURF MANUFACTURER (HOME PLATE LINES, BATTERS' AND CATCHER'S BOXES, PITCHERS PLATE,1ST, 2ND & 3RD BASES, COACHES BOXES, FOUL LINE, ON-DECK CIRCLE ETC.) RE: SPECIFICATIONS
5. INSTALL NEW SOFTBALL FIELD TURF AS SHOWN AND AS REQUIRED. ALL LINE REQUIREMENTS TO BE FOLLOWED PER TURF MANUFACTURER (HOME PLATE LINES, BATTERS' AND CATCHER'S BOXES, PITCHERS PLATE,1ST, 2ND & 3RD BASES, COACHES BOXES, FOUL LINE) RE: SPECIFICATIONS
6. INSTALL NEW VINYL SLATS THROUGHOUT THE CHAIN LINK FENCE. COLOR TO BE SELECTED BY ARCHITECT. RE: DRAWINGS AND SPECIFICATIONS
7. INSTALL NEW YELLOW FENCE CAP ON FIELD CHAIN LINK FENCE. RE: DRAWINGS AND SPECIFICATIONS
8. INSTALL NEW 20' TALL FOUL POLE. RE: STRUCTURAL
9. NEW OUTFIELD DISTANCE MARKER. RE: SPECIFICATIONS
10. NEW SCORE BOARD. RE: SPECIFICATIONS
11. EXISTING BLEACHERS TO REMAIN AND PROTECTED DURING CONSTRUCTION (TYP.)
12. GREEN COLOR TURF AREA
13. CAMEL/TERRA COTTA COLOR TURF AREA
14. PITCHERS RUBBER (TYP.)
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22. MOVABLE PITCHER'S MOUND AS SHOWN. RE: SPECIFICATIONS FOR EQUIPMENTS.
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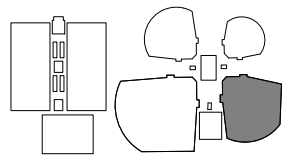
24. RESTRAINING LINE
25. INSTALL NEW 8'-0" WIDE DOUBLE GATE (4'-0" EACH) (V.I.F.) FOR EACH FIELD. MATCH FENCE TYPE, HEIGHT, FINISH COLOR ETC. PROVIDE NEW WEATHERPROOF AND HEAVY DUTY CHAIN & LOCK SYSTEM WITH KEYS.
26. NEW FIELD SIGN (WITH NUMBERING MATCHING TO THE RESPECTED FIELD) TO BE ANCHORED/ATTACHED ON CENTER OF EACH DUGOUT LONG SIDE AS REQUIRED ON FENCE @ 8' ABOVE GROUND. RE: SPECIFICATIONS AND SIGN DETAIL
27. NEW 34 GALLON RECYCLED TRASH CAN. RE: SPECIFICATIONS
28. PROVIDE NEW CORRUGATED METAL PANELS TO EACH FIELD DUGOUTS WITH ALL THE NECESSARY HARDWARE. FINISH COLOR TO BE SELECTED BY ARCHITECT.

KEY NOTES

GREEN COLOR TURF AREA

CAMEL/TERRA COTTA COLOR TURF AREA

LEGEND



BASEBALL FIELD III

KEYPLAN

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12. PROVIDE KICKERS AT 48" O.C.
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GENERAL NOTES

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Project No: 6001-02

CONSULTANTS:

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
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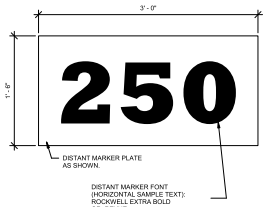
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

BASEBALL FIELD III

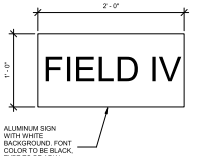
A105



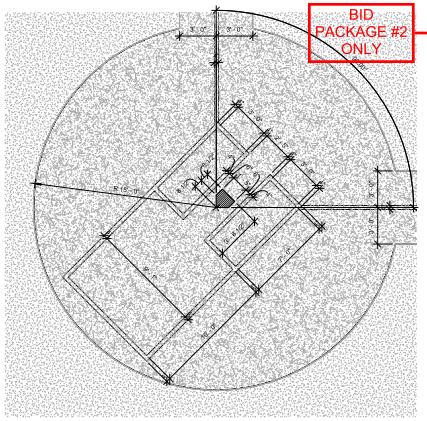
NOTES:

RIGHT FIELD DISTANCE: 127' (V.I.F.)
CENTER FIELD DISTANCE: 158' (V.I.F.)
LEFT FIELD DISTANCE: 131' (V.I.F.)

DISTANCE MARKER 4
1 1/2" = 1'-0"



SIGN 3
1 1/2" = 1'-0"



HOME PLATE, BATTER'S & CATCHER'S BOXES 2
1/4" = 1'-0"

1. EXISTING STADIUM LIGHT POLE TO REMAIN PROTECTED DURING CONSTRUCTION. REPLACE EXISTING STADIUM LIGHT WITH NEW LED LIGHT. RE: MEP DRAWING AND SPECIFICATIONS.
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7. INSTALL NEW YELLOW FENCE CAP ON FIELD CHAIN LINK FENCE. RE: DRAWINGS AND SPECIFICATIONS
8. INSTALL NEW 20' TALL FOUL POLE. RE: STRUCTURAL
9. NEW OUTFIELD DISTANCE MARKER. RE: SPECIFICATIONS
10. NEW SCORE BOARD. RE: SPECIFICATIONS
11. EXISTING BLEACHERS TO REMAIN AND PROTECTED DURING CONSTRUCTION (TYP.)
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26. NEW FIELD SIGN (WITH NUMBERING MATCHING TO THE RESPECTED FIELD) TO BE ANCHORED/ATTACHED ON CENTER OF EACH DUGOUT LONG SIDE AS REQUIRED ON FENCE @ 6' ABOVE GROUND. RE: SPECIFICATIONS AND SIGN DETAIL
27. NEW 34 GALLON RECYCLED TRASH CAN. RE: SPECIFICATIONS
28. PROVIDE NEW CORRUGATED METAL PANELS TO EACH FIELD DUGOUTS WITH ALL THE NECESSARY HARDWARE. FINISH COLOR TO BE SELECTED BY ARCHITECT.

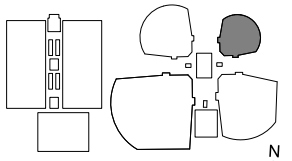
BID PACKAGE #2 ONLY

KEY NOTES

GREEN COLOR TURF AREA

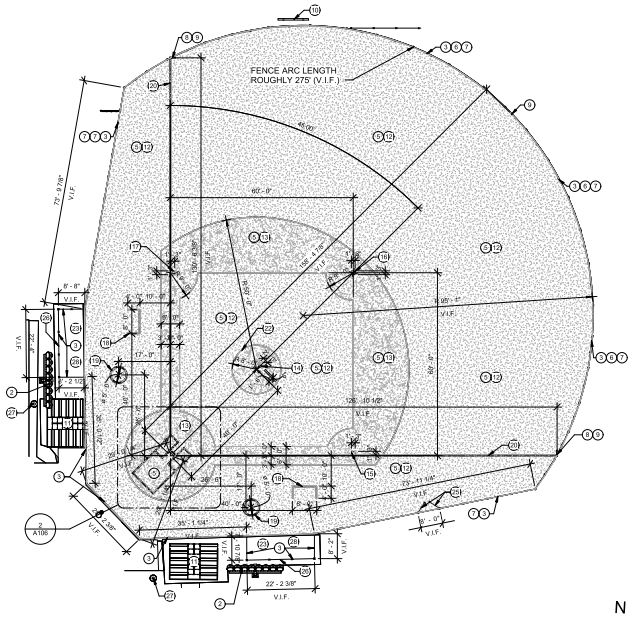
CAMEL/TERRA COTTA COLOR TURF AREA

LEGEND



BASEBALL/SOFTBALL FIELD

KEYPLAN



BASEBALL/SOFTBALL FIELD IV 1
1/16" = 1'-0"

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14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
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PH: 832-448-2462
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Project No: 6001-02

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RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

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DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
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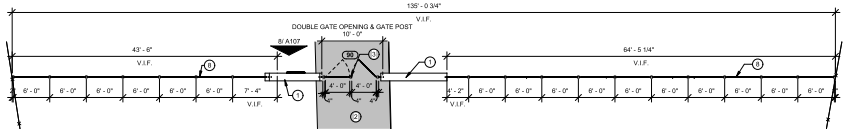
ISSUE FOR BID	09/07/2022

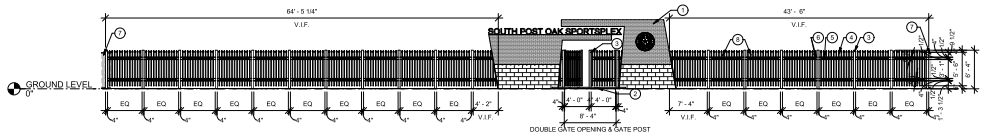
BASEBALL/SOFTBALL FIELD IV

A106



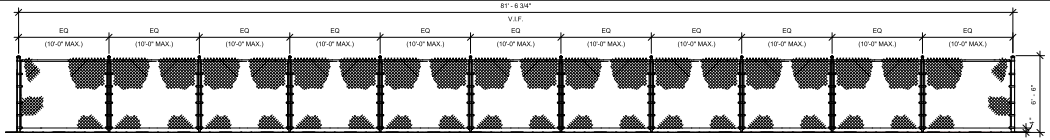
ORNAMENTAL FENCE PLAN 9

1/8" = 1'-0"



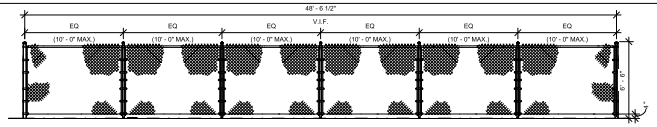
ORNEMENTAL FENCE NORTH ELEV. 8

1/8" = 1'-0"



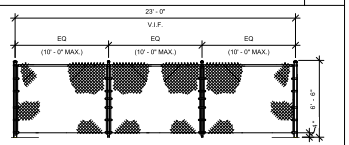
CHAIN LINK ELEVATION #1 7

1/4" = 1'-0"



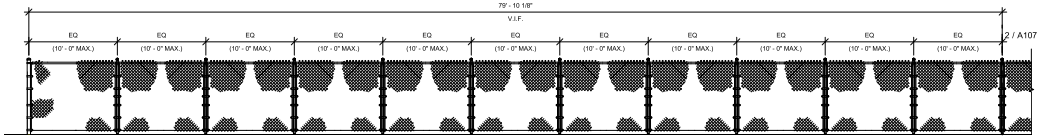
CHAIN LINK ELEVATION #3 6

1/4" = 1'-0"



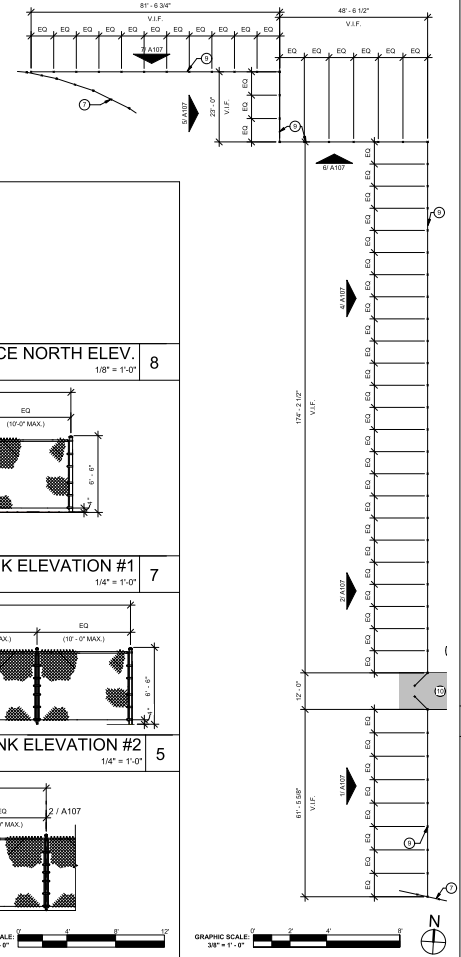
CHAIN LINK ELEVATION #2 5

1/4" = 1'-0"



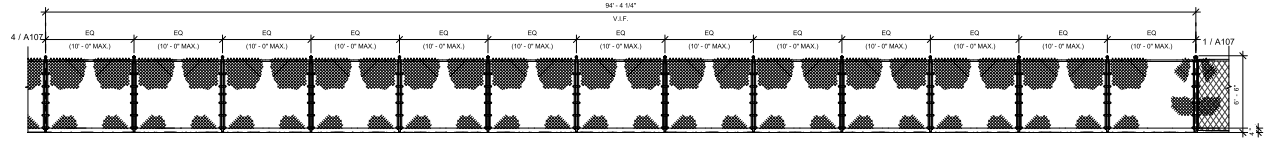
CHAIN LINK ELEVATION #4 4

1/4" = 1'-0"



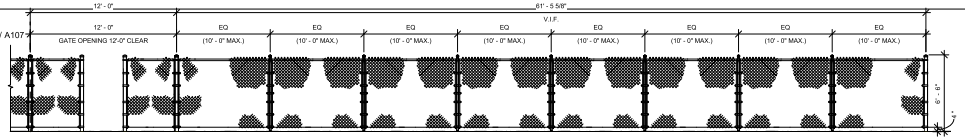
CHAIN LINK FENCE PLAN 3

1/16" = 1'-0"



CHAIN LINK ELEVATION #5 2

1/4" = 1'-0"



CHAIN LINK ELEVATION #6 1

1/4" = 1'-0"

KEY NOTES

1. ENTRANCE WALL RE: COMPLEX ENTRANCE WALL PLANS & SPECIFICATIONS
2. SIDEWALK
3. 4'X4' GATE/FENCE POST TYP.
4. PICKETS TYP. RE: SPECIFICATIONS
5. CIRCULAR RING TYP. RE: SPECIFICATIONS
6. INTERMEDIATE RAILS TYP. RE: SPECIFICATIONS
7. EXISTING BASEBALL FIELD CHAIN LINK FENCE TO REMAIN AND PROTECTED DURING CONSTRUCTION
8. NEW ORNAMENTAL FENCE, FINISH COLOR TO SELECTED BY ARCHITECT RE: DETAILS AND SPECIFICATIONS
9. NEW CHAIN LINK FENCE RE: DETAILS AND SPECIFICATIONS
10. 12' WIDE ACCESS CONCRETE PAVED
11. ORNAMENTAL/CHAIN LINK FENCE GATE WITH MANUFACTURER RECOMMENDED HARDWARE.RE: SPECIFICATIONS

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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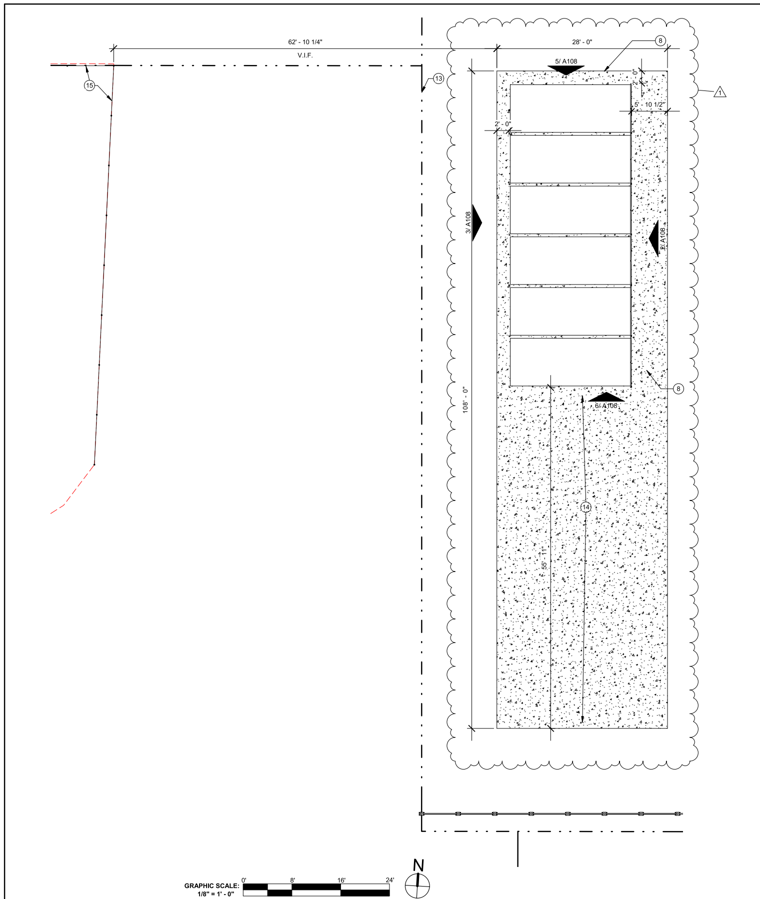
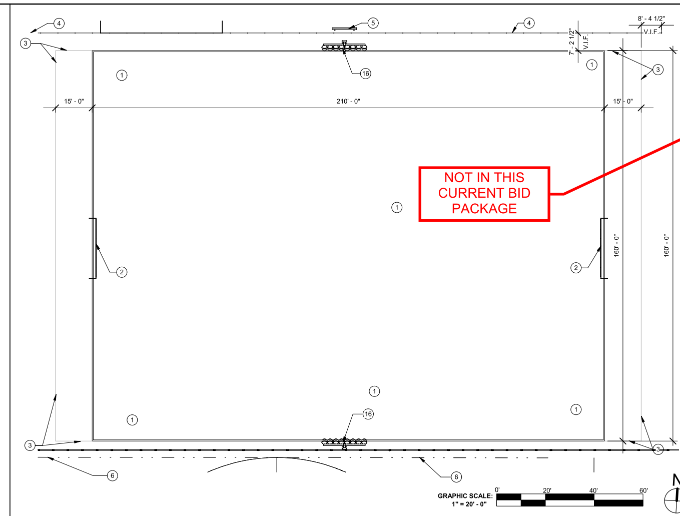
FENCE PLANS AND ELEVATIONS

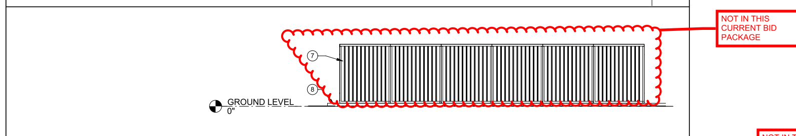
A107



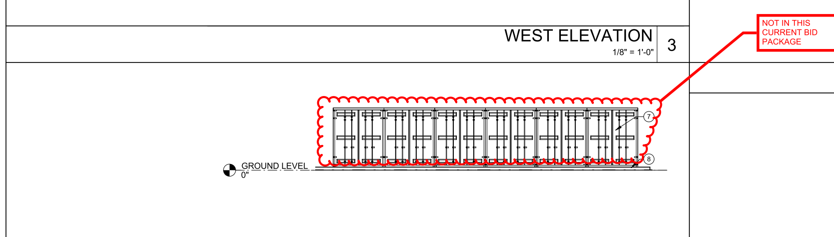
CONTAINER STORAGE ENLARGED PLAN 7
1/8" = 1'-0"



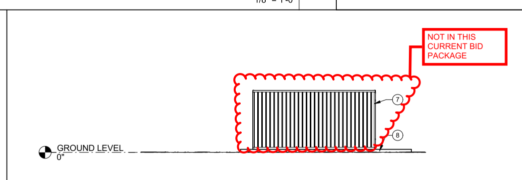
PRACTICE FIELD 4
1" = 20'-0"



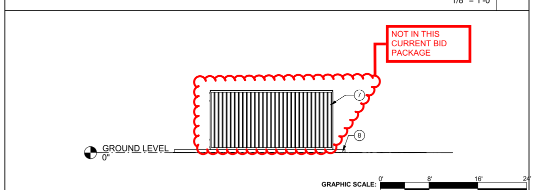
WEST ELEVATION 3
1/8" = 1'-0"



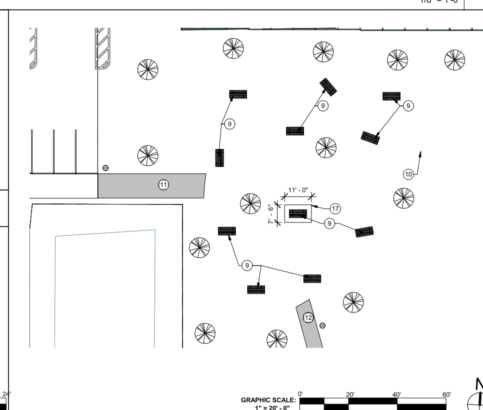
EAST ELEVATION 2
1/8" = 1'-0"



SOUTH ELEVATION 6
1/8" = 1'-0"



NORTH ELEVATION 5
1/8" = 1'-0"



OUTSIDE BENCHES AREA 1
1" = 20'-0"

KEY NOTES

1. FOOTBALL PRACTICE FIELD AS SHOWN. FIELD TO RECEIVE PERMANENT SEEDING AND TOP SOIL. GROUND TO BE PROPERLY RAISED TO DIRECT RAIN WATER AWAY. RE: PER CIVIL DRAWING & SPECIFICATIONS
2. SOCCER AND FOOTBALL COMBO GOAL POST AS REQUIRED. RE: SPECIFICATIONS
3. FOOTBALL FIELD PRACTICE FIELD WORK PERIMETER
4. EXISTING FOOTBALL FIELD FENCE TO REMAIN AND PROTECTED DURING NEW WORK
5. EXISTING FOOTBALL FIELD SCORE BOARD
6. EXISTING RESIDENTIAL PROPERTY
7. PROVIDE 20' STANDARD SHIPPING CONTAINER (TOTAL NUMBER OF 6 CONTAINERS) AS SHOWN TO BE USE AS STORAGE. RE: SPECIFICATIONS
8. NEW CONCRETE PAD AS SHOWN. RE STRUCTURAL DRAWINGS
9. PARK BENCH ANCHORED ON CONCRETE PAD AS SHOWN.
10. DECOMPOSE GRANITE AREA AS SHOWN. RE: CIVIL DRAWING FOR COMPACT INFILL REQUIREMENTS
11. NEW SIDEWALK CONNECTING THE FOOTBALL FIELD SIDE WALK AS REQUIRED. RE: CIVIL DRAWINGS
12. NEW SIDE WALK
13. PROPERTY LINE OF THE NEIGHBORHOOD POOL
14. SPACE FOR FUTURE EXPANSION FOR CONTAINER
15. NEIGHBORHOOD POOL HOUSE IRON FENCE
16. INSTALL NEW STADIUM LIGHT POLE WITH LED STADIUM LIGHT. RE: STRUCTURAL DRAWINGS AND SPECIFICATION FOR FOUNDATION REQUIREMENTS, RE: MEP DRAWINGS AND SPECIFICATIONS FOR LED LIGHTING REQUIREMENTS. PROVIDE OUT 6' - 0" TALL OUTDOOR WEATHER AND TEAR PROOF SAFETY PAD (LIGHT POLE PADDING) ON EACH NEW LIGHT POLES FOR THE PRACTICE FIELD. RE: SPECIFICATIONS
17. TYPICAL DIMENSIONS FOR THE PARK BENCH CONCRETE SLAB

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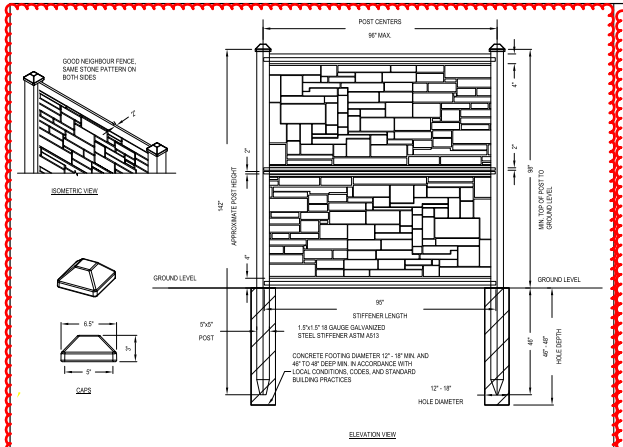
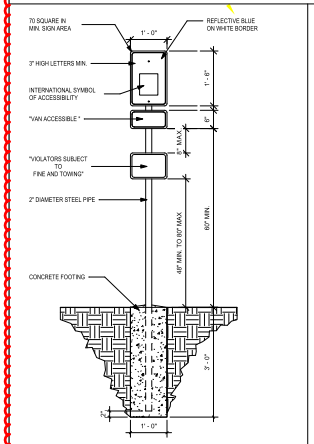
1 CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

ENLARGED SITE PLANS

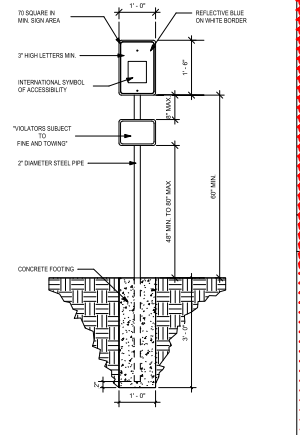
A108



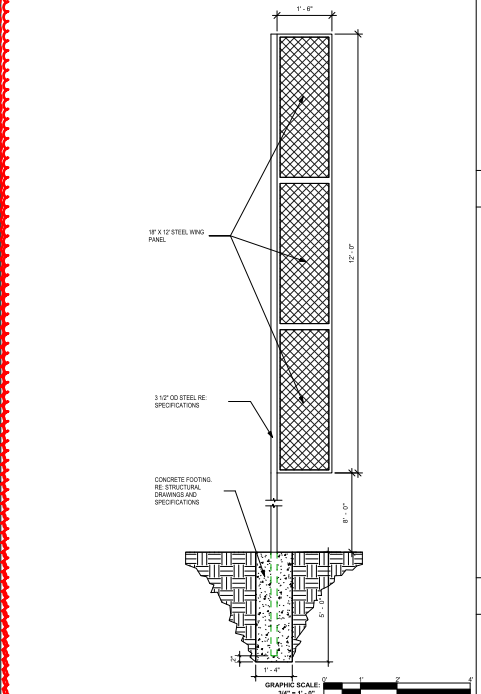
SIMULATED STONE FENCE ELEV. TYPICAL
N.T.S 10



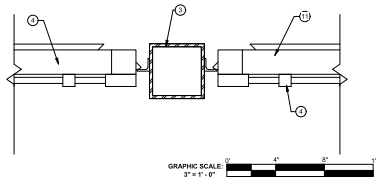
VAN ACCESSIBLE SIGNAGE
3/4" = 1'-0" 9



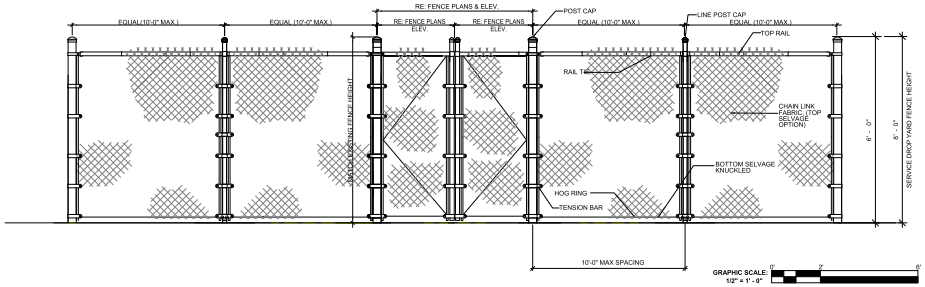
ACCESSIBLE PARKING SIGN
3/4" = 1'-0" 8



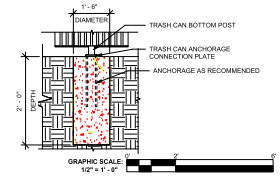
FOUL POLE FOUNDATION DETAIL
3/4" = 1'-0" 7



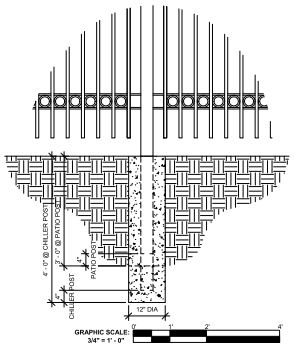
ORNAMENTAL FENCE GATE PLAN
3" = 1'-0" 6



CHAIN LINK GATE TYPICAL ELEV.
1/2" = 1'-0" 5

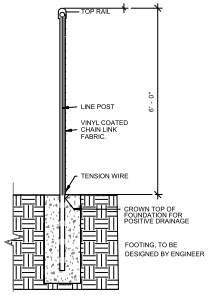


TYPICAL TRASH CAN BASE
1/2" = 1'-0" 4



FENCE FOOTING DETAIL
3/4" = 1'-0" 3

NOT IN THIS CURRENT BID PACKAGE



FENCE SECTION DETAIL
1/2" = 1'-0" 2

1. ENTRANCE WALL RE: COMPLEX ENTRANCE WALL PLANS & SPECIFICATIONS
2. SIDEWALK
3. 4'X4' GATE/FENCE POST TYP.
4. PICKETS TYP. RE: SPECIFICATIONS
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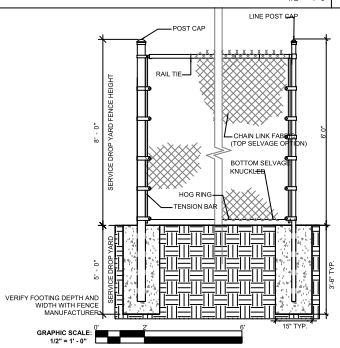
10. 12' WIDE ACCESS CONCRETE PAVED
11. ORNAMENTAL/CHAIN LINK FENCE GATE WITH MANUFACTURER RECOMMENDED HARDWARE RE: SPECIFICATIONS

KEY NOTES



FENCE FOOTING TYPICAL
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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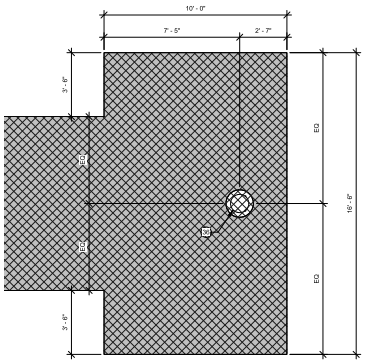
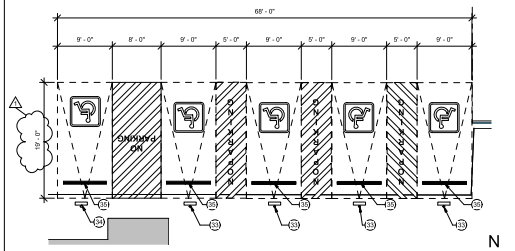
SITE DETAILS 1

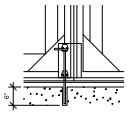
A109



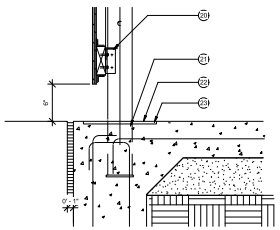
FLAG POLE
3/8" = 1'-0" | 11



HANDICAP PARKING
1/8" = 1'-0" | 7

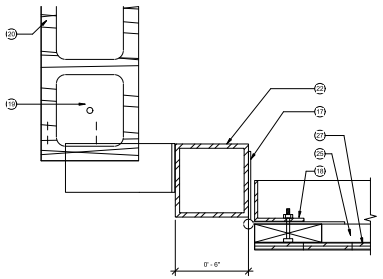


GATE DETAIL
3/4" = 1'-0" | 4

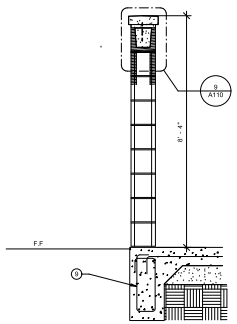


SCREEN WALL SECTION 2
1 1/2" = 1'-0" | 3

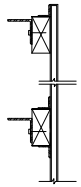
1. FACE BRICK
2. 6" DIA CONCRETE FILLED STL. BOLLARD - REF. DTL. 02 AT 4'-0" O.C. (TYP.)
3. CMU BOND BEAM - REF: STRUCTURAL
4. 8" REINF. CMU - REF: STRUCTURAL
5. MASONRY VENEER ANCHORS
6. MASTIC DAMPROOFING
7. PROVIDE 5-1/4" X 8" DRAIN OPENINGS IN BASE COURSE
8. WEEPS @ 16" O.C. W/ METAL THRU WALL FLASHING
9. STEEL REINFORCING REF: STRUCTURAL
10. 12" LONG X 1/2" DIA CANE BOLT W/ MOUNTING BRACKET
11. STEEL BACKUP PLATE - EXTEND PLATE ACROSS OPP. LEAF TO ACT AS STOP
12. CONCRETE SLAB
14. CAST STONE
15. GRAFFITI SHIELD
16. 6"X6"X3/8" STL. TUBE COLUMN
17. HEAVY DUTY HINGE; STANLEY MODEL BB855-TYP
18. 2"X2"X1/4" STL. ANGLE FRAME
19. WALL REINF. - REF: STRUCTURAL
20. 2"X2"X4" LG. ALUM. ANGLE @ 1'-0" O.C. - DRILL & TAP TO TUBE COL. PROVIDE ASPHALTIC MASTIC BETWEEN TUBE & ANGLE
21. CONC. DUMPSTER PAD W/ VAPOR BARRIER
22. WELD TO IMBED PLATE - REF: STRUCTURAL
23. IMBED PLATE - REF: STRUCTURAL
24. 1"X1" ALUMMUN ANGLE
25. 2X3 WOOD CEDAR RUNNERS
26. 2" X 2" STEEL ANGLE
27. 1 X 4 DOG-EARRED CEDAR FENCE PANELS
28. S.S. FLASHING - 2" OVERLAP
29. S.S. THRU FLASHING
30. 3/8" STL. ROD AT 3'-0" O.C.
31. CONT. STRIP RUBBERIZED ASPHALT FLASHING MEMBRANE
32. HEAVY DUTY LOCKING SLIDING BOLT GATE LATCH
33. HANDICAP PARKING SIGN WITH POST AS SHOWN. RE: SITE DETAIL DRAWINGS
34. HANDICAP PARKING SIGN VAN ACCESSIBLE SIGN WITH POST AS SHOWN. RE: SITE DETAIL DRAWINGS
35. PRECAST WHEEL STOP.
36. NEW 30' TALL FLAG POLE (WITH INTEGRATED SOLAR DISC LIGHT AUTOMATIC SWITCH ON/OFF) RE: STRUCTURAL DRAWINGS FOR FOUNDATION REQUIREMENT AND ARCHITECTURAL SPECIFICATIONS.



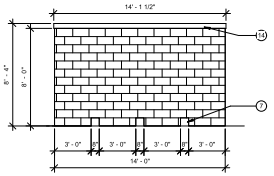
GATE JAMB DETAIL
3" = 1'-0" | 10



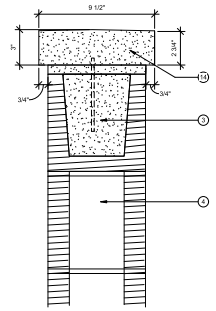
SCREEN WALL SECTION 1
3/4" = 1'-0" | 8



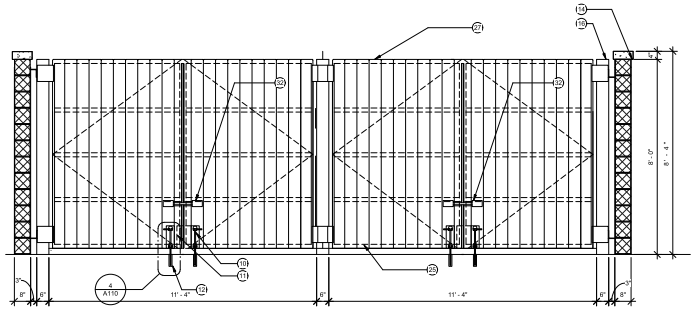
WOOD PANEL DETAIL
3" = 1'-0" | 6



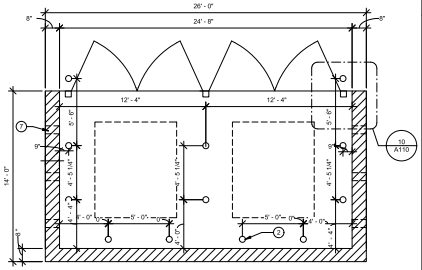
SIDE SCREEN WALL ELEVATION
1/4" = 1'-0" | 2



SCREEN WALL DETAIL 1
3" = 1'-0" | 9



FRONT SCREEN WALL ELEVATION
1/2" = 1'-0" | 5



DUMPSTER ENCLOSURE FLOOR PLAN
1/4" = 1'-0" | 1

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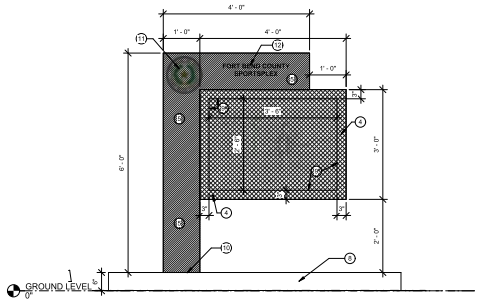
SITE DETAILS

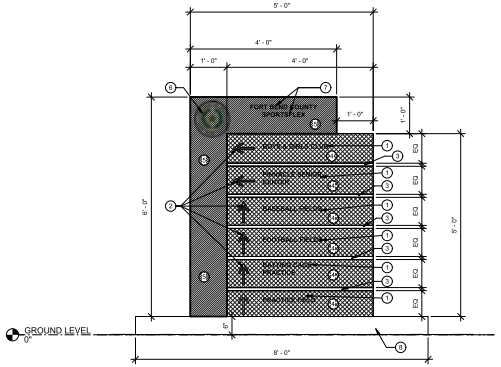
A110



NOTE:
BOTH SIDES MATERIALS AND FINISHES TO BE THE SAME.
TOTAL OF OVERALL MAP STATION: 2 (REFER SITE PLAN
FOR THEIR RESPECTIVE LOCATIONS

GRAPHIC SCALE: 3/4" = 1' - 0"

COMPLEX MAP STATION ELEV. TYPICAL
3/4" = 1'-0" | 4



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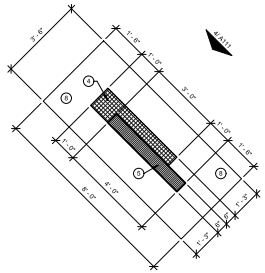
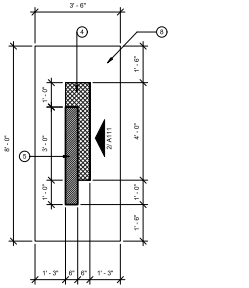
DIRECTIONAL STREET SIGN ELEV.
3/4" = 1'-0" | 2



GRAPHIC SCALE: 1/2" = 1' - 0"

MAP STATION PLAN TYPICAL
1/2" = 1'-0" | 3



GRAPHIC SCALE: 1/2" = 1' - 0"

DIRECTIONAL STREET SIGN PLAN
1/2" = 1'-0" | 1

1. ILLUMINATED LETTERING
2. ILLUMINATED DIRECTIONAL ARROW
3. SEPARATION LINE WITH DIFFERENT COLORED MATERIAL (NON ILLUMINATED)
4. COLOR #1 (MAIN COLOR TO BE SELECTED BY ARCHITECT, NON ILLUMINATED)
5. COLOR #2 (SUBSIDIARY COLOR TO BE SELECTED BY ARCHITECT, NON ILLUMINATED)
6. ILLUMINATED COUNTY SEAL
7. MAIN TITLE TO BE ILLUMINATED WITH A DIFFERENT COLOR OTHER THAN THE TYPICAL ILLUMINATION COLOR
8. CONCRETE SLAB TO BE 6" ABOVE GROUND LEVEL. PROVIDE NECESSARY FOOTING
9. MAP STATION PLAN (ON SHOWN SQUARED BOX) TO BE PRINTED WITH COLOR ON THE SHOWN LOCATIONS. RE: MAP SHEET
10. PROVIDE REQUIRED ANCHORAGE OF THE SIGNAGE TO BE STRUCTURALLY FABRICATED REFERENCE SPECIFICATIONS FOR REQUIREMENTS AND SECURILY ANCHORED TO THE CONCRETE CURB
11. NON - ILLUMINATED COUNTY SEAL
12. MAIN TITLE NON - ILLUMINATED WITH A DIFFERENT COLOR

KEY NOTES

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WAYFINDING SIGNAGE

A111

LEGEND:

YOU ARE HERE

1. CONCESSION STAND BUILDING
2. BATTING CAGE BUILDING
3. EAST PRESS BOX
4. WEST PRESS BOX
5. BASEBALL FIELD I
6. BASEBALL FIELD II
7. BASEBALL FIELD III
8. BASEBALL/SOFTBALL FIELD IV
9. FOOTBALL FIELD I
10. FOOTBALL FIELD II
11. FOOTBALL FIELDS TEAM MEETING ROOMS
12. FOOTBALL FIELDS RESTROOMS
13. FOOTBALL FIELDS COMMUNITY ROOM & PRESS BOX
14. FOOTBALL PRACTICE FIELD
15. CONTAINERS STORAGES
16. FOOTBALL FIELDS PARKING
17. BASEBALL FIELDS PARKING
18. OUTDOOR SEATING
19. BASEBALL FIELDS STORAGE BUILDING
20. BOYS AND GIRLS CLUB
21. PINNACLE SENIOR CENTER

N

GRAPHIC SCALE: 1" = 50' - 0" (0' 50' 100' 150')

MAP STATION PLAN 1" = 50'-0" 1

NOTES:

- THE NAMES ON THE LEGEND ARE SUBJECT TO CHANGE BASE ON THE OWNER PREFERENCE. COORDINATE WITH OWNER FOR FINAL CHOICE.
- ONE GRAPHICS STAR ("YOU ARE HERE") WILL BE PLACED ON EACH MAP STATION.THE 2 LOCATIONS ARE SHOWN ON THE MAP AS A GUIDE TO SHOW THE LOCATION OF EACH MAP STATION
- THE WRITING FONT SIZE TO BE ADJUSTED TO BE READABLE
- THE MAP STATTION TO BE PRINTED IN COLOR. COORDINATE WITH ARCHITECT FOR THE VECTOR FILE

MAP STATION NOTES

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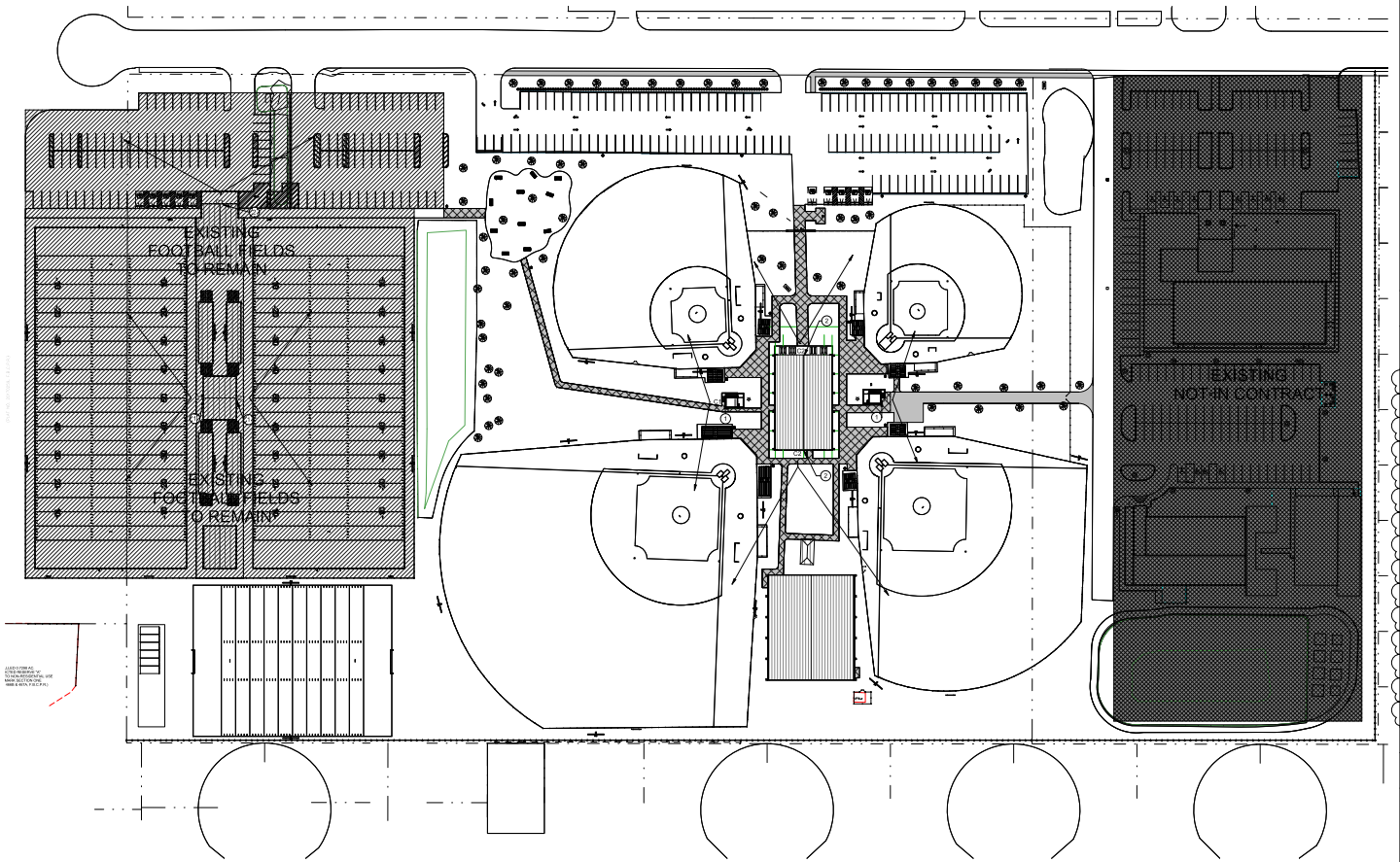
MAP STATION PLAN

A112



SITE PLAN
1" = 50'-0" | 1

GRAPHIC SCALE:
1" = 50' - 0"
0' 50' 100' 150'

N

1 ANCHOR CAMERA ON THE PRESS BOX EAST AND/OR WEST WALL(S). RE: MEP DRAWINGS & SPECIFICATIONS

2 ANCHOR CAMERA ON THE BUILDING EXTERIOR FACADE TO PROVIDE MAXIMUM VIEW ANGLE. RE: MEP DRAWINGS & SPECIFICATIONS

KEY NOTES

NOTES:

C1: CAMERA TYPE 1 MOTION ACTIVATED, NON-PANNING TYPE PROVIDE 180 DEGREE VIEW.

C2: CAMERA TYPE 2 MOTION ACTIVATED, NON-PANNING PROVIDE 90 DEGREE MIN. VIEW

LEGEND

- NOT IN CONTRACT
- EXISTING FOOTBALL FIELDS TO REMAIN
- CONCRETE WALKWAY
- 12' WIDE ACCESS ROAD CONCRETE PAVEMENT

GENERAL NOTES

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
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12. PROVIDE KICKERS AT 48° O.C.
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14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

IDG+ ARCHITECTS
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HOUSTON, TEXAS 77060
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Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
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STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

SECURITY CAMERAS LOCATION ON SITE

A113

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CONCESSION SCHEDULE

A200A-1

CONCESSION DOOR SCHEDULE

No.	Door Size	Material	Thk.	Elev.	Finish	Label	Frame Elev.	Finish	Label	Mat.	Details Head	Jamb	Sill	HW.	Remarks
100	1/3' - 0"x7' - 0"	HM	1 3/4"	A	PAINT		E	PAINT		HM	6/A901A	4 & 5/A901A	9/A901A	205	PT7
100A	1/8' - 0"x4' - 4"	STEEL	3"	D	-		C	-		STEEL	4/A504A	3/A901A	16/A504A	001	
100B	1/8' - 0"x4' - 4"	STEEL	3"	D	-		C	-		STEEL	4/A504A	3/A901A	16/A504A	001	
101	1/3' - 0"x7' - 0"	SC	1 3/4"	A	P-LAM	20 MIN.	E	PAINT	20 MIN.	HM	8/A901A	7/A901A	-	501C	ST1
102	1/3' - 0"x7' - 0"	SC	1 3/4"	A	P-LAM	20 MIN.	E	PAINT	20 MIN.	HM	8/A901A	7/A901A	-	501C	ST1
103	1/3' - 0"x7' - 0"	SC	1 3/4"	A	P-LAM	20 MIN.	E	PAINT	20 MIN.	HM	8/A901A	7/A901A	-	301	ST1
104	1/3' - 0"x7' - 0"	HM	1 3/4"	A	PAINT		E	PAINT		HM	6/A901A	4 & 5/A901A	9/A901A	805IL	PT7
105	1/3' - 0"x7' - 0"	HM	1 3/4"	A	PAINT		E	PAINT		HM	6/A901A	4 & 5/A901A	9/A901A	805IL	PT7
107	1/3' - 0"x7' - 0"	HM	1 3/4"	A	PAINT		E	PAINT		HM	6/A901A	4 & 5/A901A	9/A901A	205I	PT7
108	2/3' - 0"x7' - 0"	HM	1 3/4"	B	PAINT		B	PAINT		HM	6/A901A	4 & 5/A901A	9/A901A	214	PT7
109	1/3' - 0"x7' - 0"	HM	1 3/4"	A	PAINT		E	PAINT		HM	6/A901A	4 & 5/A901A	9/A901A	205	PT7
110	1/3' - 0"x7' - 0"	HM	1 3/4"	A	PAINT		E	PAINT		HM	6/A901A	4 & 5/A901A	9/A901A	715	PT7
111	1/3' - 0"x7' - 0"	HM	1 3/4"	A	PAINT		E	PAINT		HM	6/A901A	4 & 5/A901A	9/A901A	715	PT7
90	2/4' - 0"x6' - 4"	ROD IRON	-	-	-	-	-	-	-	-	-	-	-	J902	COMPLEX FENCE ENTRANCE GATE
106A	2/3' - 0"x8' - 4"	ROD IRON	-	-	-	-	-	-	-	-	-	-	-	J902	BREEZEWAY FENCE GATE (CONCESION.)
106B	2/3' - 0"x8' - 4"	ROD IRON	-	-	-	-	-	-	-	-	-	-	-	J902	BREEZEWAY FENCE GATE (CONCESION.)

ROOM FINISH CONCESSION BUILDING

Room No.	Room Name	Floor	Base	Walls North	Walls South	Walls East	Walls West	Ceiling	Remarks
100	CONCESSION	EP-1	RB1	FRP-1/PT4 + EPOXY	FRP-1/PT4 + EPOXY	FRP-1/PT4 + EPOXY	FRP-1/PT4 + EPOXY	VINYL COATED TILES	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
101	STORAGE	EP-1	RB1	PT4 + EPOXY	PT4 + EPOXY	PT4 + EPOXY	PT4 + EPOXY	ACOUSTICAL TILE	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
102	FOYER	EP-1	RB1	PT4 + EPOXY	PT4 + EPOXY	PT4 + EPOXY	PT4 + EPOXY	ACOUSTICAL TILE	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
103	RESTROOM	EP-2	-	PT4 + EPOXY	PT4 + EPOXY	PT4 + EPOXY	PT4 + EPOXY	GYP. BOARD	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
104	WOMEN	EP-2	-	PT6 + EPOXY	PT3 + EPOXY	PT3 + EPOXY	PT3 + EPOXY	GYP. BOARD	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
105	MEN	EP-2	-	PT5 + EPOXY	PT2 + EPOXY	PT2 + EPOXY	PT2 + EPOXY	GYP. BOARD	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
106	BREEZEWAY	SC	-	-	-	-	-	GYP. BOARD	RE SPECIFICATIONS FOR EXT. CEILING GYP. BOARD
107	JANITOR	SC	RB1	PT1 + EPOXY	PT1 + EPOXY	PT1 + EPOXY	PT1 + EPOXY	ACOUSTICAL TILE	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
108	MECHANICAL	SC	-	PT1 + EPOXY	PT1 + EPOXY	PT1 + EPOXY	PT1 + EPOXY	ACOUSTICAL TILE	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
109	STORAGE	SC	RB1	PT4 + EPOXY	PT4 + EPOXY	PT4 + EPOXY	PT4 + EPOXY	ACOUSTICAL TILE	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
110	MEETING ROOM I	VCT1	RB1	PT8 + EPOXY	-	PT7 + EPOXY	PT7 + EPOXY	ACOUSTICAL TILE	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
111	MEETING ROOM II	VCT1	RB1	-	PT8 + EPOXY	PT7 + EPOXY	PT7 + EPOXY	ACOUSTICAL TILE	PT1+ EPOXY ABOVE 8' FF ON GYP. BOARD
Grand total: 12									

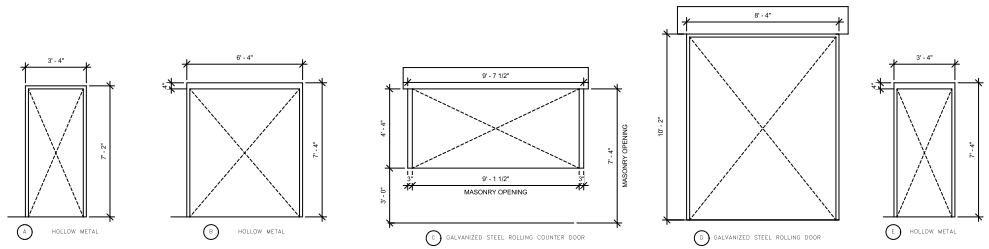
ROOM FINISH LEGEND

Mark	Material	Manufacturer	Product #	Color	General Area	Remarks
FLOORS						
EP-1	EPOXY FLOOR	PPG PAINTS	PPG1011-2	ELEMENTAL	CONCESSION, CONCESSION STORAGE, FOYER	PPG HPC HIGH GLASS EPOXY
EP-2	EPOXY FLOOR	EVERLAST EPOXY	EVERLAST FLOOR	SLATE	ALL RESTROOMS	PPG HPC HIGH GLASS EPOXY
SC	SEALED CONCRETE				MECHANICAL & JANITOR, STORAGE, CORRIDOR	DIAMOND POINT FINISH
VCT1	VINYL COMPOSITE TILE	ARMSTRONG	51941	POLAR WHITE	MEETING ROOMS	SIZE: 12 X 12 TILE
DOORS						
PT7	PAINT	PPG	PPG10-17	BLUE OPAL	AT ALL HOLLOW METAL DOORS	MATCH EXISTING EXTERIOR COLOR
ST1	WOOD STAIN	WILSONART	7976K-12	WHITE CYPRESS	DOOR FOR CONCESSION 100, STORAGE 101, FOYER 102, RESTROOM 103	CUSTOM MATCH EXISTING WOOD DOORS
WALLS						
FRP-1	FIBERGLASS REINFORCED PANEL			WHITE	CONCESSION, BATTING CAGE WOMEN RESTROOM #202	4' X 8' PANELS
FRP-2	FIBERGLASS REINFORCED PANEL			GRAY	BATTING CAGE MEN RESTROOM #201	4' X 8' PANELS
PT1	PAINT	PPG	1001-1	DELICATE WHITE	JANITOR, MECHANICAL	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT2	PAINT	PPG	PPG1242-3	VIVA LA BLEU	MEN RESTROOM	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT3	PAINT	PPG	PPG1232-3	SILENT RIPPLE	WOMEN RESTROOM	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT4	PAINT	PPG	PPG10-27	TRADEWINDS	CONCESSION 100, STORAGE 101, RESTROOM 103, FOYER 102, STORAGE 109	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT5	PAINT	PPG	PPG1242-7	SUDDENLY SAPPHIRE	MEN RESTROOM	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT6	PAINT	PPG	PPG1232-7	TORRID TURQUOISE	WOMEN RESTROOM	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT7	PAINT	PPG	PPG10-17	BLUE OPAL	BATTING CAGE RR EXTERIOR WALLS, MEETING ROOMS (EAST, WEST)	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT8	PAINT	PPG	PPG13-23	AMETHYST HAZE	MEETING ROOMS (NORTH/SOUTH)	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
MILLWORK						
PLAM1	PLASTIC LAMINATE	WILSONART	7921-38	WALNUT		
BASE						
RB1	RUBBER BASE	ARMSTRONG	48SW	STONEWASH		STYLE: COVED ROLL , THROUGH OUT
CEILINGS						
ACOUST1	ACOUSTICAL TILE	ARMSTRONG	FINE FISSURED- 465	WHITE	THROUGHOUT	SIZE: 24 X 24 TILE
ACOUST2	ACOUSTICAL TILE	ARMSTRONG	CLEAN ROOM VL 868	WHITE	CONCESSION KITCHEN	SIZE: 24 X 24 TILE, VINYL COATED
GYP1	GYPSUM BOARD			PT1		
PT2	PAINT	PPG				

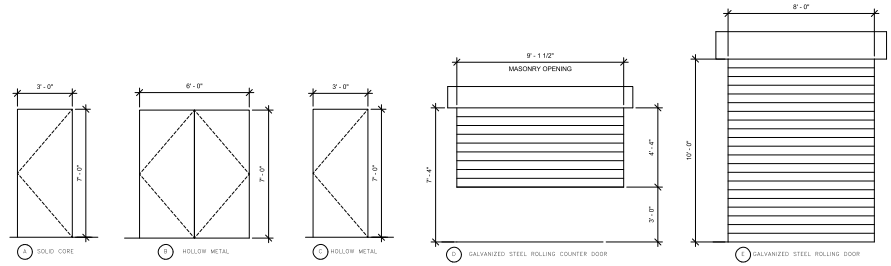
NOTE: ALL INTERIOR FINISHES SHALL COMPLY WITH CLASS A,B, OR C PER LOCATION 1

ALL INTERIOR FLOOR FINISHES SHALL COMPLY WITH CLASS II PER LOCATION 2

3 DOOR SCHEDULE AND ROOM SCHEDULE / LEGEND

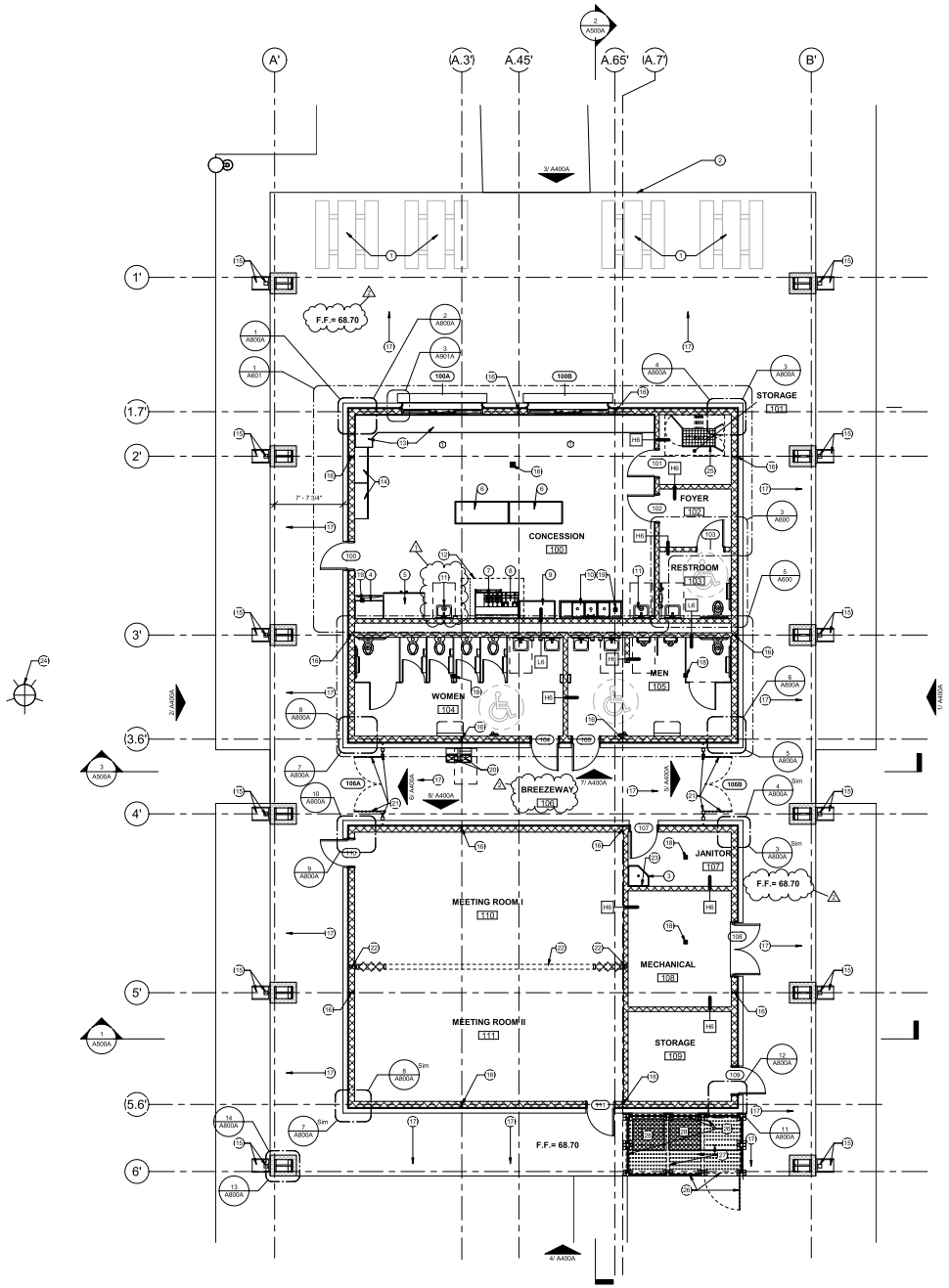


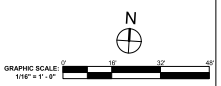
2 FRAME TYPES



GRAPHIC SCALE: 3/8" = 1' - 0"

1 DOOR TYPES





BUILDING "A" CONCESSION FLOOR PLAN
3/16" = 1'-0"

1

1. EXISTING BENCH TO BE RELOCATED AS SHOWN WITH BENCH LEGS PROPERLY EMBEDDED WITH FOOTING REQUIREMENT
2. SLAB EDGE RE: STRUCTURAL & CIVIL DRAWINGS AND SPECIFICATIONS
3. MOP SINK RE: MEP
4. ICE MACHINE RE: ARCHITECTURAL SPECIFICATIONS AND MEP DRAWINGS AND SPECIFICATIONS
5. HEAVY DUTY STAINLESS INTERIOR/EXTERIOR DUAL REFRIGERATOR-FREEZER. RE: ARCHITECTURAL SPECIFICATIONS AND DRAWINGS AND SPECIFICATIONS
6. KITCHEN GRADE STAINLESS STEEL WORK TABLE WITH WHEELS AND LOCK WITHOUT SPLASHBACK. RE: SPECIFICATIONS
7. 36" RANGE (OVEN, 4 BURNER & 2 GRIDDLE). RE: ARCHITECTURAL SPECIFICATIONS & MEP DRAWINGS AND SPECIFICATIONS
8. FRYER. RE: ARCHITECTURAL SPECIFICATIONS & MEP DRAWINGS AND SPECIFICATIONS
9. KITCHEN GRADE STAINLESS STEEL WORK TABLE WITH SPLASHBACK. RE: SPECIFICATIONS
10. 3 COMPARTMENT SINK WITH 18" DRAINBOARD ON EACH SIDE. RE: SPECIFICATIONS
11. HAND SINK WITH MIRROR (#6) AND SOAP DISPENSER (#9) (RE: #6 & #9 1/A600 MOUNTING HEIGHTS) AS SHOWN IN THE ELEVATIONS RE: MEP DRAWINGS & SPECIFICATIONS
12. KITCHEN HOOD WITH INTEGRATED GREASE TRAP AND FIRE EXTINGUISHER. RE: MEP DRAWINGS AND SPECIFICATIONS
13. KITCHEN GRADE STAINLESS STEEL COUNTER WITH SHELVES BELOW. RE: DRAWINGS AND SPECIFICATIONS
14. LOCKABLE BUILT-IN MILLWORK. EACH CABINET TO HAVE AN LOCK AND A KEY. PROVIDE A MASTER KEYS OPENING ALL 4 THE CABINETS FOR THE OWNER USAGE RE: DRAWINGS AND SPECIFICATIONS
15. 5"X5" DOWNSPOUT AND PRECAST CONCRETE SPLASH BLOCK. RE: SPECIFICATIONS
16. STRUCTURAL COLUMN. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
17. PROVIDE 1/4" PER FOOT SLOPE ON THE SLAB TO DIRECT MISCELLANEOUS WATER AWAY THE EXTERIOR PERIMETER WALLS
18. FLOOR DRAIN: PROVIDE ADEQUATE DRAINING SLOPE (1/4" PER FOOT) TO THE FLOOR DRAIN RE: MEP DRAWINGS AND SPECIFICATIONS
19. FLOOR SINK: PROVIDE ADEQUATE DRAINING SLOPE (1/4" PER FOOT) TO THE FLOOR DRAIN RE: MEP DRAWINGS AND SPECIFICATIONS
20. NEW BI-LEVEL WATER DRINKING FOUNTAIN WITH WATER BOTTLE REFILLING STATION AND ADA CANE DETECTION APRON. RE: MEP DRAWINGS AND SPECIFICATIONS
21. INSTALL 8' -4" TALL ORNAMENTAL FENCE IN THE ENTIRE LENGTH OF THE CORRIDOR WIDTH WITH 6' - 0" OPENING GATE. PROVIDE A RECEPTACLES FOR THE CANE BOLT WHEN GATES ARE FULLY OPENED
22. INSTALL MODERN FOLD ACCORDION PARTITION AS SHOWN ON FLOOR PLAN FROM FINISHED LEVEL TO THE SCHEDULED CEILING. THE ACCORDION PARTITION IS SUSPENDED TO THE CEILING BY TWO HEAVY GAUGE STUDS SUPPORTED BY TWO COLUMNS AS SHOWN (RE STRUCTURAL DRAWINGS FOR THE COLUMNS AND BEAM). RE: SPECIFICATIONS.
23. PROVIDE A MOP AND BROOM RACK ON THE MOP SINK WALL SIDE. RE: SPECIFICATIONS
24. EXISTING SOLAR LIGHT POLE TO REMAIN AND PROTECTED DURING NEW CONSTRUCTION.
25. IT EQUIPMENT & RACK PROVIDED BY OWNER
26. INSTALL NEW 7' - 0" TALL COMPLETE ORNAMENTAL FENCE ENCLOSURE (ALL 4 SIDES & TOP SIDE) AS SHOWN. EACH PERIMETER FENCE POST TO BE ATTACHED TO THE FOUNDATION SLAB WITH HEAVY DUTY ANCHOR PLATE AND BOLTS. PROVIDE 4' - 0" GATE AS SHOWN. PROVIDE NEW WEATHERPROOF AND HEAVY DUTY CHAIN & LOCK SYSTEM WITH KEYS.
27. TOP SIDE FENCE POSTS & PICKETS ABOVE SHOWN IN DASHED LINES. ORNEMENTAL TOP SIDE FENCE POSTS TO BE WELDED TO THE PERIMETER FENCE POST AS SHOWN.
28. CONDENSING UNIT RE: MEP DRAWINGS AND SPECIFICATIONS

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GENERAL NOTES

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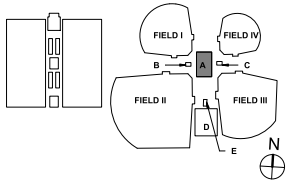

KEY

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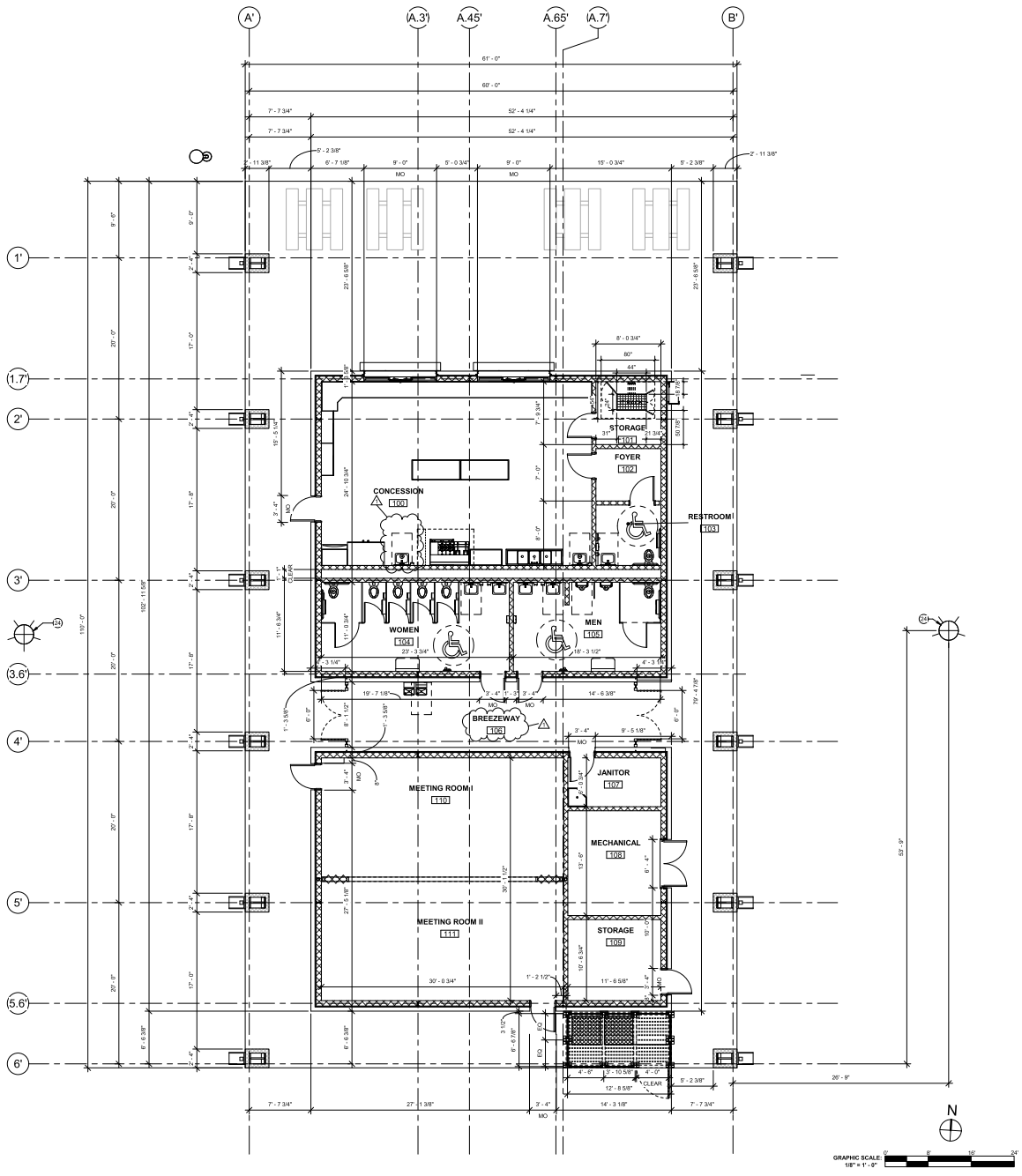
CONCESSION FLOOR PLAN

A200A-2



BUILDING "A" CONCESSION DIMENSION CONTROL PLAN
3/16" = 1'-0"

1

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3. MOP SINK. RE: MEP
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8. FRYER. RE: ARCHITECTURAL SPECIFICATIONS & MEP DRAWINGS AND SPECIFICATIONS
9. KITCHEN GRADE STAINLESS STEEL WORK TABLE WITH SPLASHBACK. RE: SPECIFICATIONS
10. 3 COMPARTMENT SINK WITH 18" DRAINBOARD ON EACH SIDE. RE: SPECIFICATIONS
11. HAND SINK WITH MIRROR (#5) AND SOAP DISPENSER (#9) (RE: #6 & #9 1/4600 MOUNTING HEIGHTS) AS SHOWN IN THE ELEVATIONS RE: MEP DRAWINGS & SPECIFICATIONS
12. KITCHEN HOOD WITH INTEGRATED GREASE TRAP AND FIRE EXTINGUISHER. RE: MEP DRAWINGS AND SPECIFICATIONS
13. KITCHEN GRADE STAINLESS STEEL COUNTER WITH SHELVES BELOW. RE: DRAWINGS AND SPECIFICATIONS
14. LOCKABLE BUILT-IN MILLWORK. EACH CABINET TO HAVE AN LOCK AND A KEY. PROVIDE A MASTER KEYS OPENING ALL 4 THE CABINETS FOR THE OWNER USAGE RE: DRAWINGS AND SPECIFICATIONS
15. 5"X5" DOWNSPOUT AND PRECAST CONCRETE SPLASH BLOCK. RE: SPECIFICATIONS
16. STRUCTURAL COLUMN. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
17. PROVIDE 1/4" PER FOOT SLOPE ON THE SLAB TO DIRECT MISCELLANEOUS WATER AWAY THE EXTERIOR PERIMETER WALLS
18. FLOOR DRAIN. PROVIDE ADEQUATE DRAINING SLOPE (1/4" PER FOOT) TO THE FLOOR DRAIN RE: MEP DRAWINGS AND SPECIFICATIONS
19. FLOOR SINK. PROVIDE ADEQUATE DRAINING SLOPE (1/4" PER FOOT) TO THE FLOOR DRAIN RE: MEP DRAWINGS AND SPECIFICATIONS
20. NEW BI-LEVEL WATER DRINKING FOUNTAIN WITH WATER BOTTLE REFILLING STATION AND ADA CANE DETECTION APRON. RE: MEP DRAWINGS AND SPECIFICATIONS
21. INSTALL 8' - 4" TALL ORNAMENTAL FENCE IN THE ENTIRE LENGTH OF THE CORRIDOR WIDTH WITH 6' - 0" OPENING GATE. PROVIDE A RECEPTACLES FOR THE CANE BOLT WHEN GATES ARE FULLY OPENED
22. INSTALL MODERN FOLD ACCORDION PARTITION AS SHOWN ON FLOOR PLAN FROM FINISHED LEVEL TO THE SCHEDULED CEILING. THE ACCORDION PARTITION IS SUSPENDED TO THE CEILING BY TWO HEAVY GAUGE STUDS SUPPORTED BY TWO COLUMNS AS SHOWN (RE STRUCTURAL DRAWINGS FOR THE COLUMNS AND BEAM). RE: SPECIFICATIONS.
23. PROVIDE A MOP AND BROOM RACK ON THE MOP SINK WALL SIDE. RE: SPECIFICATIONS
24. EXISTING SOLAR LIGHT POLE TO REMAIN AND PROTECTED DURING NEW CONSTRUCTION.
25. IT EQUIPMENT & RACK PROVIDED BY OWNER
26. INSTALL NEW 7' - 0" TALL COMPLETE ORNAMENTAL FENCE ENCLOSURE (ALL 4 SIDES & TOP SIDE) AS SHOWN. EACH PERIMETER FENCE POST TO BE ATTACHED TO THE FOUNDATION SLAB WITH HEAVY DUTY ANCHOR PLATE AND BOLTS. PROVIDE 4' - 0" GATE AS SHOWN. PROVIDE NEW WEATHERPROOF AND HEAVY DUTY CHAIN & LOCK SYSTEM WITH KEYS.
27. TOP SIDE FENCE POSTS & PICKETS ABOVE SHOWN IN DASHED LINES. ORNEMENTAL TOP SIDE FENCE POSTS TO BE WELDED TO THE PERIMETER FENCE POST AS SHOWN.
28. CONDENSING UNIT RE: MEP DRAWINGS AND SPECIFICATIONS

KEY NOTES

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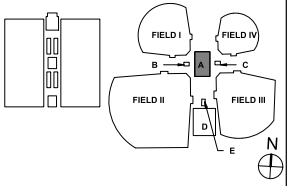

KEY PLAN

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	IK
Checked:	BM, CD
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
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ISSUE FOR PERMIT	12/22/2021
1 CITY OF HOUSTON COMMENTS	01/18/2022
2 CITY OF HOUSTON COMMENTS	04/11/2022
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CONCESSION DIMENSION CONTROL PLAN

A200A-3

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BATTING CAGE SCHEDULE

A200B-1

BATTING CAGE DOOR SCHEDULE

Door							Frame				Details				
No.	Size	Material	Thk.	Elev.	Finish	Label	Elev.	Finish	Label	Mat.	Head	Jamb	Sill	HW.	Remarks
200	1'3" - 0"x7' - 0"	HM	1 3/4"	A	PAINT		A	PAINT		HM	12/A503B	7 & 8/A901B	6/A901B	715	
200A	1'8" - 0"x10' - 0"	STEEL	1 3/4"	E	PAINT		D	PAINT		STEEL	5 OR 8/A503B	4 & 5/A901B	4 OR 7/A503B	001	
200B	1'8" - 0"x10' - 0"	STEEL	1 3/4"	E	PAINT		D	PAINT		STEEL	5 OR 8/A503B	4 & 5/A901B	4 OR 7/A503B	001	
200C	1'8" - 0"x10' - 0"	STEEL	1 3/4"	E	PAINT		D	PAINT		STEEL	5 OR 8/A503B	4 & 5/A901B	4 OR 7/A503B	001	
200D	1'3" - 0"x7' - 0"	HM	1 3/4"	A	PAINT		A	PAINT		HM	12/A503B	7 & 8/A901B	6/A901B	715	
200E	1'8" - 0"x10' - 0"	STEEL	1 3/4"	E	PAINT		D	PAINT		STEEL	5 OR 8/A503B	4 & 5/A901B	4 OR 7/A503B	001	
200F	1'8" - 0"x10' - 0"	STEEL	1 3/4"	E	PAINT		D	PAINT		STEEL	5 OR 8/A503B	4 & 5/A901B	4 OR 7/A503B	001	
200H	1'8" - 0"x10' - 0"	STEEL	1 3/4"	E	PAINT		D	PAINT		STEEL	5 OR 8/A503B	4 & 5/A901B	4 OR 7/A503B	001	
201	1'3" - 0"x7' - 0"	SC	1 3/4"	A	P-LAM	20 MIN.	A	PAINT	20 MIN.	HM	11/A901B	10/A901B	9/A901B	301	
202	1'3" - 0"x7' - 0"	SC	1 3/4"	A	P-LAM	20 MIN.	A	PAINT	20 MIN.	HM	11/A901B	10/A901B	9/A901B	301	

ROOM FINISH BATTING CAGE BUILDING

				Walls						
Room No.	Room Name	Floor	Base	North	South	East	West	Ceiling	Remarks
200	BATTING CAGES	EP-1/ TURF	-	-	-	-	-		PT7 + EPOXY ON ALL RESTROOMS EXTERIOR WALLS
201	MEN	EP-2	RB1	FRP-2/ PT2 + EPOXY	FRP-2/ PT2 + EPOXY	FRP-2/ PT5 + EPOXY	FRP-2/ PT2 + EPOXY	GYP	PAINT + EPOXY ABOVE 8' FF ON GYP. BOARD
202	WOMEN	EP-2	RB1	FRP-1/PT3 + EPOXY	FRP-1/PT3 + EPOXY	FRP-1/PT3 + EPOXY	FRP-1/PT6 + EPOXY	GYP	PAINT + EPOXY ABOVE 8' FF ON GYP. BOARD
Grand total: 3									

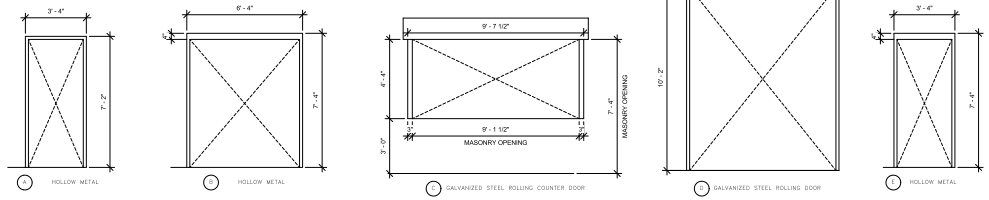
ROOM FINISH LEGEND

Mark	Material	Manufacturer	Product #	Color	General Area	Remarks
FLOORS						
EP-1	EPOXY FLOOR	PPG PAINTS	PPG1011-2	ELEMENTAL	CONCESSION, CONCESSION STORAGE, FOYER	PPG HPC HIGH GLASS EPOXY
EP-2	EPOXY FLOOR	EVERLAST EPOXY	EVERLAST FLOOR	SLATE	ALL RESTROOMS	PPG HPC HIGH GLASS EPOXY
SC	SEALED CONCRETE				MECHANICAL & JANITOR, STORAGE, CORRIDOR	DIAMOND POINT FINISH
VCT1	VINYL COMPOSITE TILE	ARMSTRONG	51941	POLAR WHITE	MEETING ROOMS	SIZE: 12 X 12 TILE
DOORS						
PT7	PAINT	PPG	PPG10-17	BLUE OPAL	AT ALL HOLLOW METAL DOORS	MATCH EXISTING EXTERIOR COLOR
ST1	WOOD STAIN	WILSONART	7976K-12	WHITE CYPRESS	DOOR FOR CONCESSION 100, STORAGE 101, FOYER 102, RESTROOM 103	CUSTOM MATCH EXISTING WOOD DOORS
WALLS						
FRP-1	FIBERGLASS REINFORCED PANEL			WHITE	CONCESSION, BATTING CAGE WOMEN RESTROOM #202	4' X 8' PANELS
FRP-2	FIBERGLASS REINFORCED PANEL			GRAY	BATTING CAGE MEN RESTROOM #201	4' X 8' PANELS
PT1	PAINT	PPG	1001-1	DELICATE WHITE	JANITOR, MECHANICAL	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT2	PAINT	PPG	PPG1242-3	VIVA LA BLEU	MEN RESTROOM	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT3	PAINT	PPG	PPG1232-3	SILENT RIPPLE	WOMEN RESTROOM	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT4	PAINT	PPG	PPG10-27	TRADEWINDS	CONCESSION 100, STORAGE 101, RESTROOM 103, FOYER 102, STORAGE 109	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT5	PAINT	PPG	PPG1242-7	SUDDENLY SAPPHIRE	MEN RESTROOM	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT6	PAINT	PPG	PPG1232-7	TORRID TURQUOISE	WOMEN RESTROOM	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT7	PAINT	PPG	PPG10-17	BLUE OPAL	BATTING CAGE RR EXTERIOR WALLS, MEETING ROOMS (EAST, WEST)	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
PT8	PAINT	PPG	PPG13-23	AMETHYST HAZE	MEETING ROOMS (NORTH/SOUTH)	PPG HPC HIGH GLASS EPOXY ON CONCESSION, STORAGE #101, FOYER AND ALL RESTROOMS WALLS
MILLWORK						
PLAM1	PLASTIC LAMINATE	WILSONART	7921-38	WALNUT		
BASE						
RB1	RUBBER BASE	ARMSTRONG	48SW	STONEWASH		STYLE: COVED ROLL , THROUGH OUT
CEILINGS						
ACOUST1	ACOUSTICAL TILE	ARMSTRONG	FINE FISSURED- 465	WHITE	THROUGHOUT	SIZE: 24 X 24 TILE
ACOUST2	ACOUSTICAL TILE	ARMSTRONG	CLEAN ROOM VL 868	WHITE	CONCESSION KITCHEN	SIZE: 24 X 24 TILE, VINYL COATED
GYP1	GYPSUM BOARD			PT1		
PT2	PAINT	PPG				

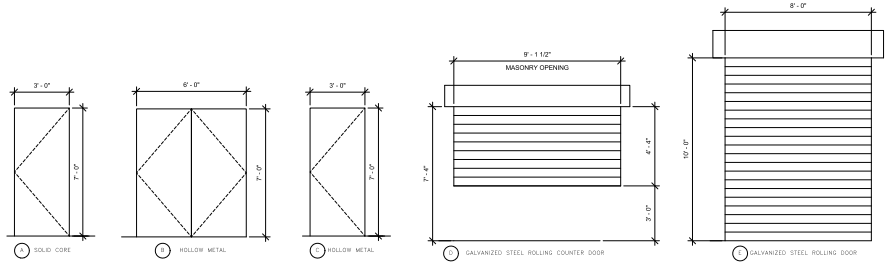
NOTE: ALL INTERIOR FINISHES SHALL COMPLY WITH CLASS A,B, OR C PER LOCATION 1

ALL INTERIOR FLOOR FINISHES SHALL COMPLY WITH CLASS II PER LOCATION 2

3 DOOR SCHEDULE AND ROOM SCHEDULE / LEGEND



2 FRAME TYPES
3/8" = 1'-0"



GRAPHIC SCALE: 3/8" = 1' - 0"

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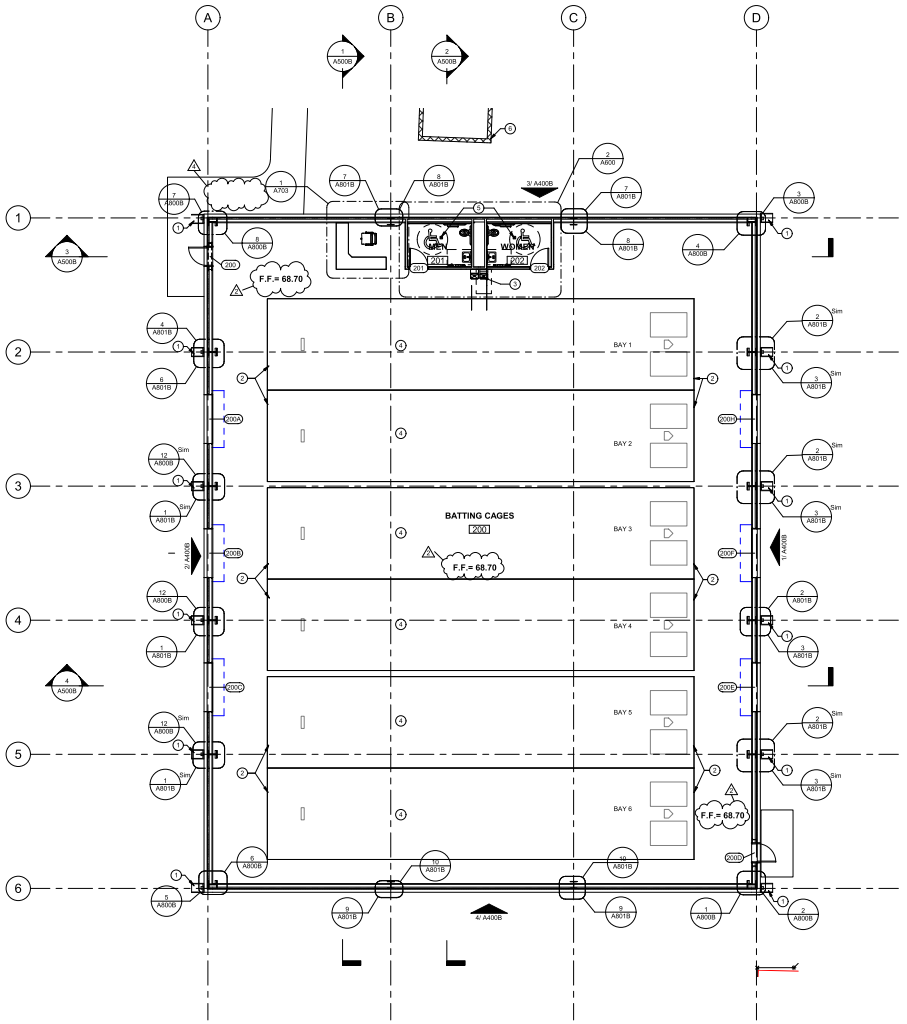

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BUILDING "D" BATTING CAGE FLOOR PLAN
1/8" = 1'-0"

1

1. PRECAST CONCRETE SPLASH BLOCK RE: SPECIFICATIONS
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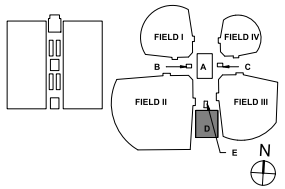

KEY PLAN

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PH: 832-448-2462
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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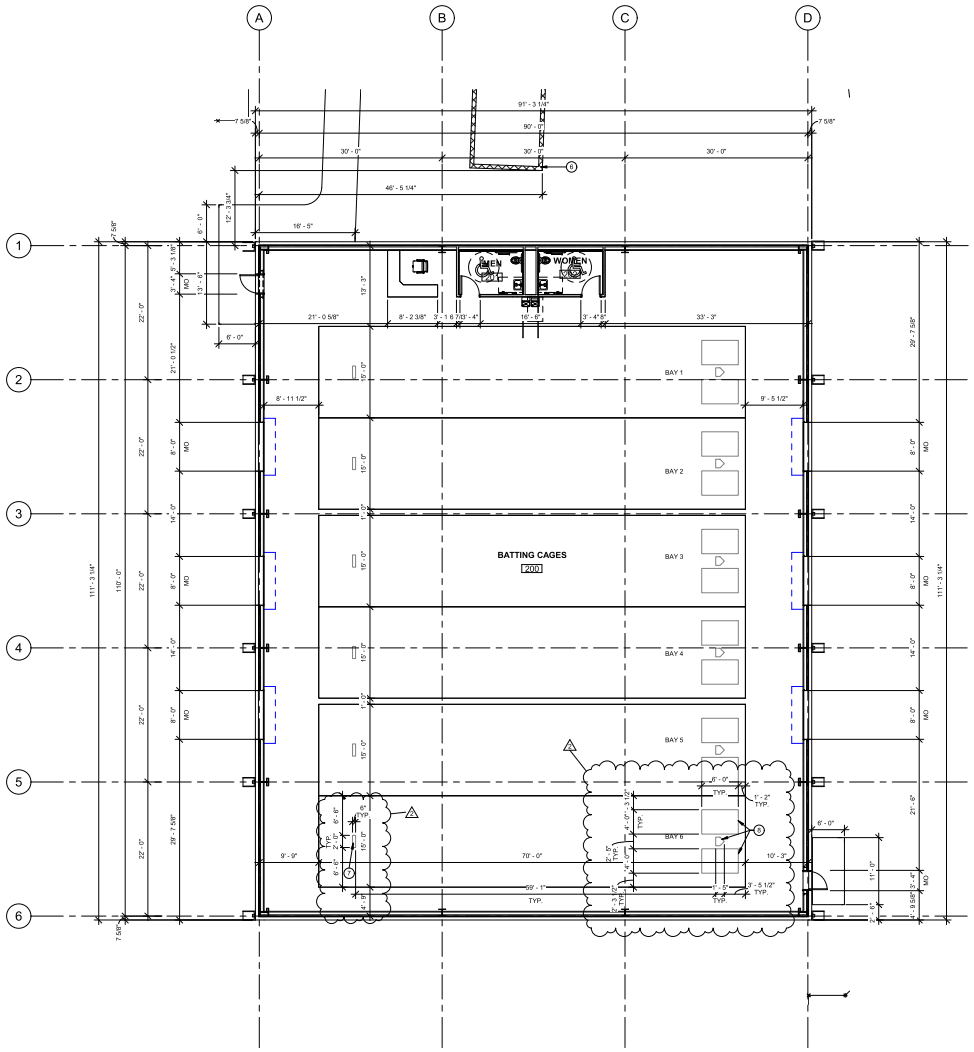
BATTING CAGE FLOOR PLAN

A200B-2



GRAPHIC SCALE
1/8" = 1'-0"
0' 8' 16' 24'

N

BUILDING "D" BATTING CAGE FLOOR PLAN
1/8" = 1'-0"

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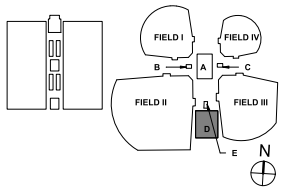

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

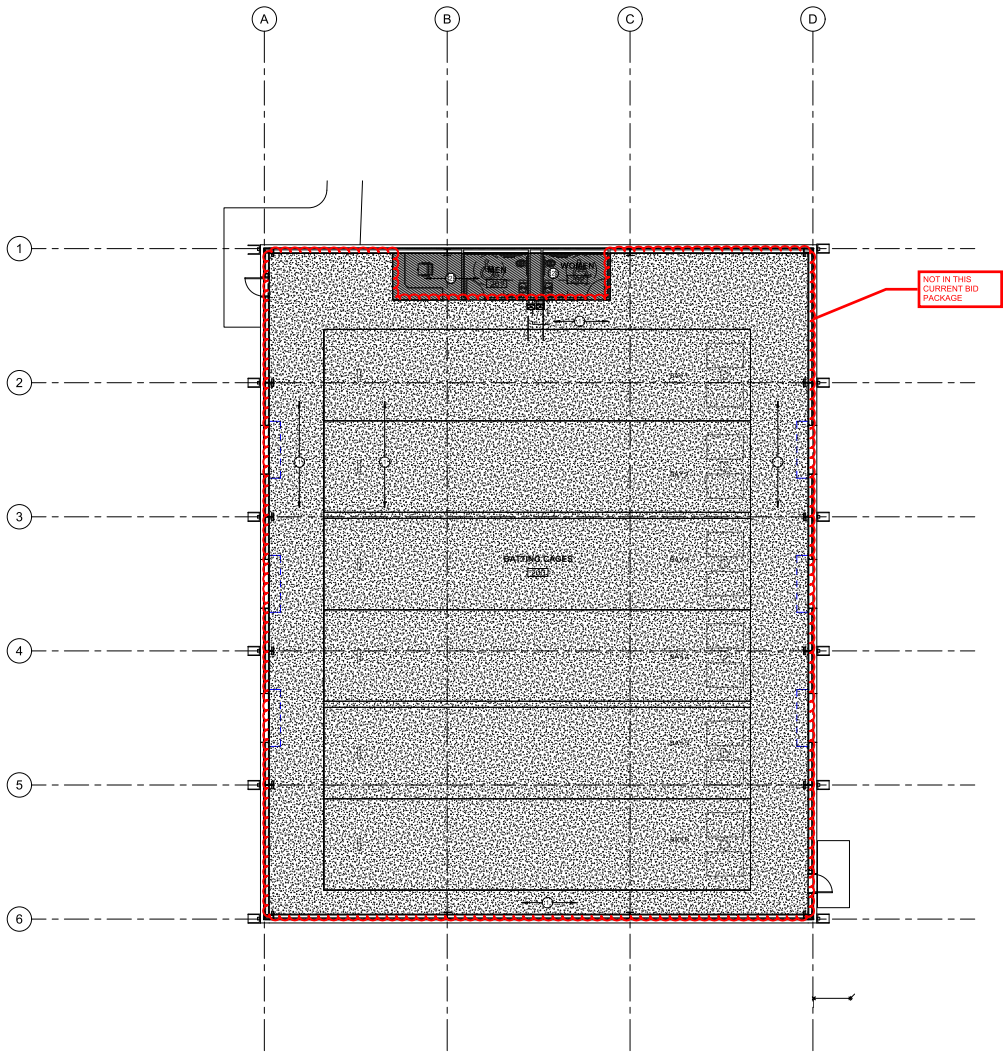
Drawing Date:	07/26/2021
Drawn:	IK,HM
Checked:	BM, CD
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
1 CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

BATTING CAGE DIMENSION CONTROL PLAN

A200B-3



BUILDING "D" BATTING CAGE FLOOR PLAN
1/8" = 1'-0"

1

KEY NOTES

1. SYNTHETIC TURF RE: SPECIFICATIONS
2. EPOXY FLOORING

GENERAL NOTES

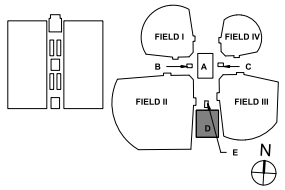
1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES AND APPLICATIONS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL DIMENSIONS AND OR EXISTING FIELD CONDITIONS PRIOR TO START.
5. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO THE ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.
6. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES WITH ARCHITECT PRIOR TO BIDDING.
7. THE GENERAL CONTRACTOR SHALL PROTECT ANY CONSTRUCTION OR FINISHES THAT IS TO REMAIN.
8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

LEGEND

SYNTHETIC TURF

EPOXY FLOORING

KEY PLAN



IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

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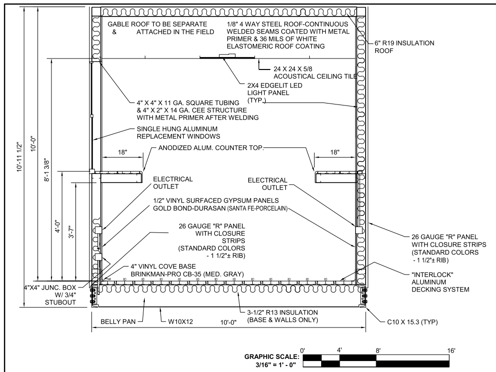
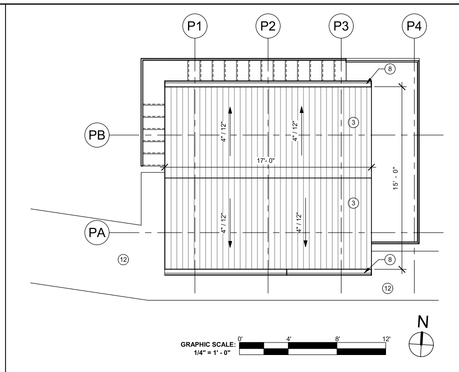
BATTING CAGE FLOOR PATTERN PLAN

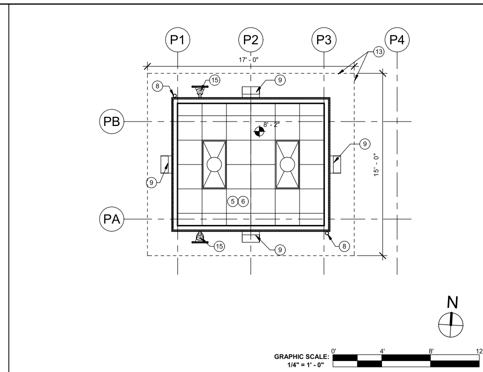
A200B-4



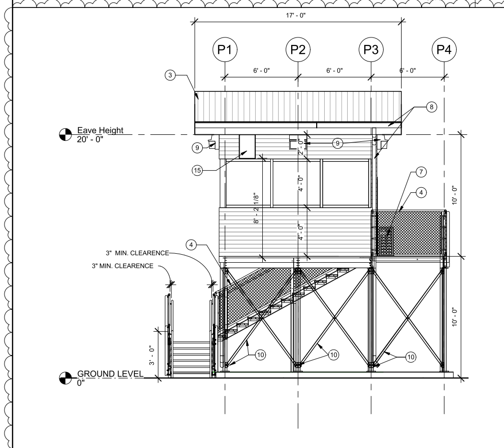
FINISH SCHEDULE PRESS BOX 10
3/16" = 1'-0"



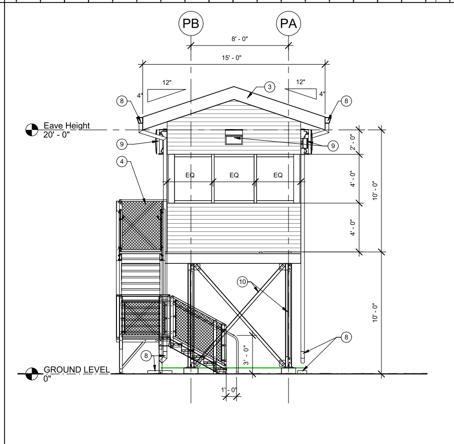
ROOF PLAN 8
1/4" = 1'-0"



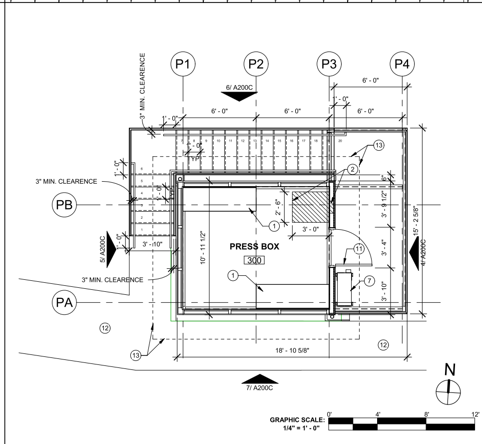
PRESS BOX RCP 3
1/4" = 1'-0"



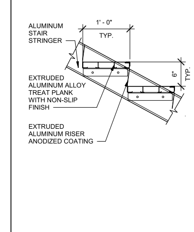
SOUTH ELEVATION 7
1/4" = 1'-0"



WEST ELEVATION 5
1/4" = 1'-0"



BUILDING "B" & "C" FLOOR PLAN 2
1/4" = 1'-0"



STAIR RUN DETAIL 11
1" = 1'-0"

PRESS BOX EXTERIOR COMPONENTS COLOR SELECTION SCHEDULE
PLEASE MARK COLOR SELECTIONS FOR EACH MATERIAL ITEM ON THIS SCHEDULE.

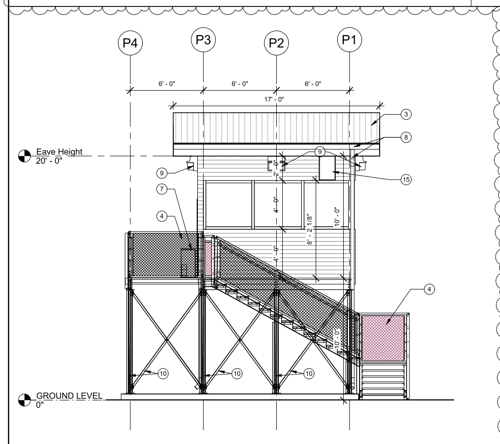
MATERIALS

WINDOW FRAMES	
WHITE	
BRONZE	
TAN	
SILVER	

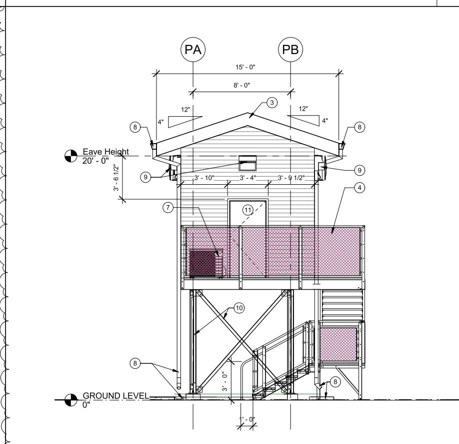
STANDARD COLORS	"R" PANEL AND CORNER TRIM	ROOF FASCIA TRIM	WINDOW TRIM	DOOR TRIM	DOOR EXTERIOR
HAWAIIAN BLUE					
CRIMSON RED					
FERN GREEN					
BURNISHED SLATE					
POLAR WHITE					
ASH GREY					
SADDLE TAN					
DESERT SAND					
KOKO BROWN					
SOLAR WHITE					
CHARCOAL GREY					
COBALT BLUE					
RUSTIC RED					
LIGHT STONE					
MEDIUM BRONZE					
SNOW WHITE					
SLATE GRAY					
ALMOND					
CLASSIC GREEN					
BROWNSTONE					
BRITE RED					
HARBOR BLUE					
BONE WHITE					
COAL BLACK					
ORANGE					

PLEASE NOTE ANY NON-STANDARD MATERIALS, FINISHES, FLOORING, OR FIXTURES:

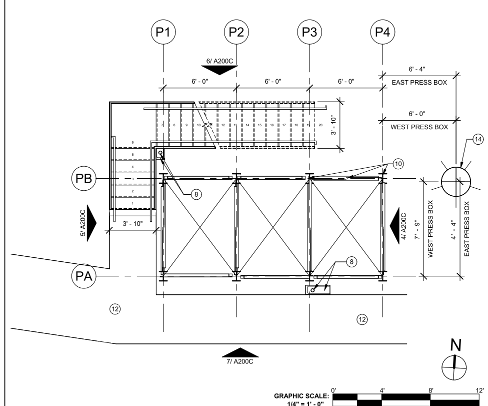
FINISH SCHEDULE PRESS BOX 9
3/16" = 1'-0"



NORTH ELEVATION 6
1/4" = 1'-0"



EAST ELEVATION 4
1/4" = 1'-0"

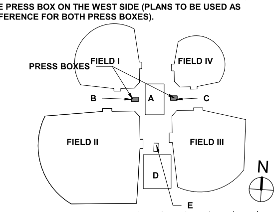


GROUND PLAN 1
1/4" = 1'-0"

KEY NOTES

1. 24" ANODIZED ALUMINUM COUNTERTOP
2. BREAKER PANEL WITH 30" X 36" CLEAR SPACE AS SHOWN
3. GABLE ROOF (SLOPED AS SHOWN) WITH TO BE SEPARATE AND ATTACHED IN THE FIELD
4. LANDING DECK, RAIL AND FENCE FIELD ATTACHED
5. 2'X2' GRID WITH ACOUSTICAL CEILING TILE AS SHOWN
6. RECESSED 2X4 LED LIGHT FIXTURE AS SHOWN. RE: MEP DRAWINGS & SPECIFICATIONS
7. AC UNIT AS SHOWN. RE: MEP DRAWINGS AND SPECIFICATIONS
8. GUTTER AND DOWNSPOUT WITH REQUIRED BRACKETS EQUALLY SPACED VERTICALLY TO THE PRESS BOX WALL AND STRUCTURAL COLUMNS. PROVIDE PRECAST SPLASH BLOCK ON THE GROUND LEVEL FOR EACH DOWNSPOUT.
9. WALL SURFACE MOUNTED LIGHT FIXTURE. RE: MEP DRAWINGS AND SPECIFICATIONS
10. PRESS BOX STRUCTURAL FRAMING. RE: STRUCTURAL DRAWINGS AND SPECIFICATION FOR FOUNDATION REQUIREMENTS
11. 3'X7' DOOR TO BE PROVIDED BY PRESS BOX MANUFACTURER, PROVIDE A DOORSTOP TO PROTECT THE AC UNIT
12. CONCRETE PAVED WALKWAY RE: CIVIL DRAWINGS
13. ROOF OVERHANG ABOVE
14. EXISTING SOLAR LIGHT POLE TO REMAIN.
15. NEW WALL MOUNTED AUDIO SPEAKER SYSTEM. PROVIDE BLOCKINGS TO MOUNT THE SPEAKER. EACH SPEAKER SYSTEM (NORTH OR SOUTH) SERVES ITS FACING BASEBALL/SOFTBALL FIELD. RE: MEP DRAWINGS & SPECIFICATIONS

NOTE: THE TWO PRESS BOXES ARE IDENTICAL. EXCEPT THAT THEIR ORIENTATIONS ARE DIFFERENT. ONE PRESS BOX IS THE SYMMETRY OF THE OTHER PRESS BOX. THE FOLLOWING PLANS ARE SHOWING THE DESIGN INTENT OF THE PRESS BOX ON THE WEST SIDE (PLANS TO BE USED AS REFERENCE FOR BOTH PRESS BOXES).



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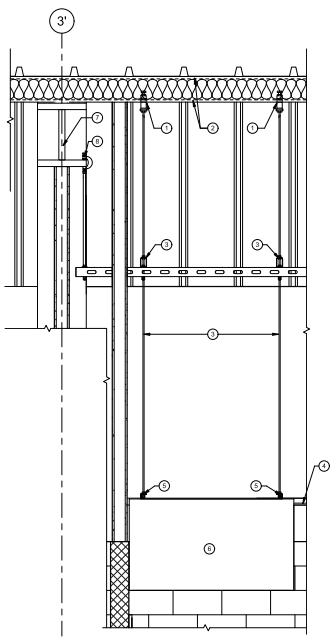
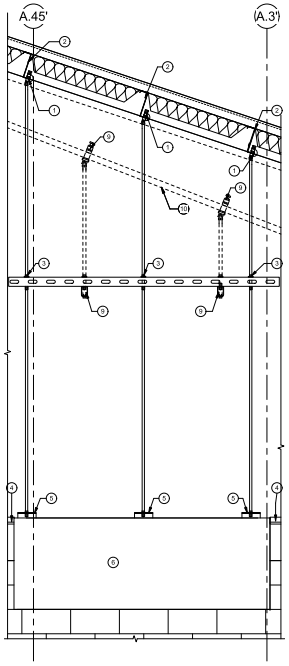
PRESS BOXES PLANS (TYPICAL)

A200C



HOOD ATTACHMENT DETAIL 3
3/4" = 1'-0"



HOOD ATTACHMENT DETAIL 2
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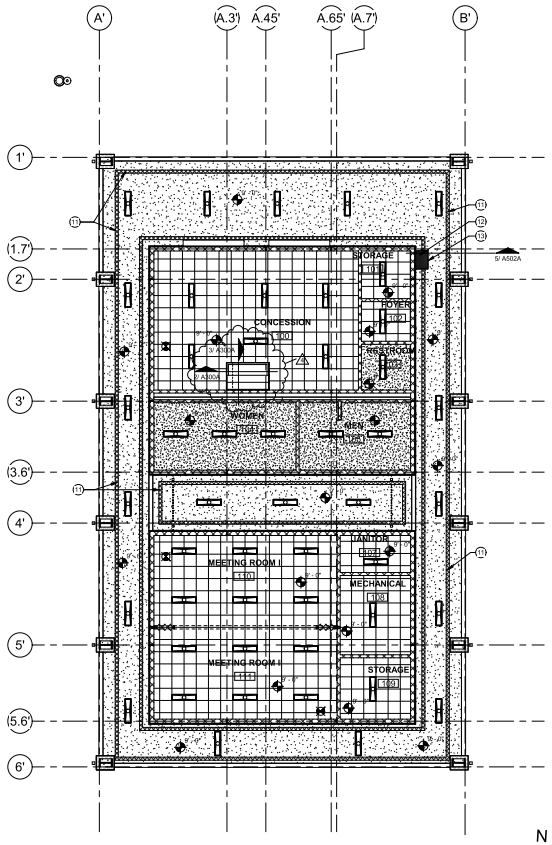


BUILDING "A" CONCESSION RCP
1/8" = 1'-0"

GRAPHIC SCALE: 0' 16' 32' 48'
1/16" = 1'-0"

N

DESCRIPTION
EQUIPMENT TAG SEE ACCESSORIES & EQUIPMENT SCHEDULE
SMOKE DETECTOR
FIRE SPRINKLER
SPEAKER
ILLUMINATED EXIT SIGN TWO SIDE READABLE
ILLUMINATED EXIT SIGN ONE SIDE READABLE
2' X 4' LAY-IN FIXTURE
RECESSED DOWN LIGHT
1' X 1' DIFFUSER
2' X 2' DIFFUSER
2' X 2' LAY-IN FIXTURE
CEILING HEIGHT
SECTION TAG DETAIL
2' X 2' LAY-IN CEILING AS SPECIFIED (ALL CEILING TILE SHALL BE SYMMETRICAL IN ROOM AS SHOWN)
DEMOLISHED 2' X 2' LAY-IN CEILING
GYPSUM CEILING
DIRECTORIAL CANS
PROVIDE SUPPLY AIR
PROVIDE RETURN AIR
2' X 2' LIGHT
EXHAUST/RELIEF AIR DECT SECTION
LINEAR LIGHTS
PENDANT CABLE LIGHT
HIGH BAY LIGHT
CIRCLE SUSPENDED LIGHT
GLOBE PENDANT LIGHT
BIG PENDANT CYLINDER
ALL CEILING TILE SHALL BE SYMETRICAL IN ROOM AS SHOWN

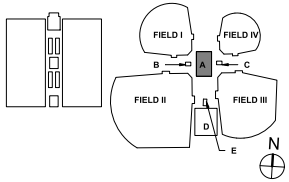
LEGEND

1. STRUCTURAL PURLIN CLAMP ATTACHED TO THE STRUCTURAL ROOF PURLIN. THREADED ROD SECURELY ATTACHED FROM PURLIN CLAMP TO UNISTRUT. RE: STRUCTURAL DRAWINGS FOR STRUCTURAL LOAD REQUIREMENT ON ROOF FRAMING.
2. PRE-ENGINEERED STRUCTURAL ROOF PURLIN.
3. THREADED ROD SECURELY ATTACHED FROM THE UNISTRUT TO THE KITCHEN HOOD HANGER. RE: STRUCTURAL DRAWINGS FOR STRUCTURAL LOAD REQUIREMENT ON ROOF FRAMING.
4. SCHEDULED RCP. RE: CEILING PLANS AND ROOM SCHEDULE
5. KITCHEN HOOD HANGER ANGLE.
6. KITCHEN HOOD RE: MEP DRAWINGS
7. PRE-ENGINEERED STRUCTURAL FRAMING. RE: STRUCTURAL DRAWINGS AND SPECIFICATION.
8. STRUCTURAL PURLIN CLAMP ATTACHED TO THE STRUCTURAL ROOF FRAMING. THREADED ROD SECURELY ATTACHED FROM PURLIN CLAMP TO UNISTRUT. UNISTRUT TO STRUCTURALLY SUPPORT THE HOOD LOAD REQUIREMENT.
9. STRUCTURAL PURLIN CLAMP ATTACHED TO THE STRUCTURAL ROOF PURLIN . THREADED ROD SECURELY ATTACHED FROM PURLIN CLAMP TO UNISTRUT BEHIND THE SCHEDULED CHASE WALL. UNISTRUT PROTRUDES SCHEDULED CHASE WALL OUT TO THE CONCESSION.
10. PRE-ENGINEERED STRUCTURAL FRAMING BEYOND THE SCHEDULED CHASE WALL. RE: STRUCTURAL DRAWINGS AND SPECIFICATION.
11. CONTINUOUS METAL SOFFIT VENT. MANUFACTURE AIR VENT MODEL # AS SHOWN. PAINT TO MATCH ADJACENT SURFACES.
12. TOP SIDE OF AC UNIT CAGE LEVELED WITH THE RCP LEVEL AS SHOWN.
13. RCP TO BE FRAMED AROUND THE AC UNIT (PROPERTY ARMOR MINI SPLIT WALL BRACKET/CAGE COMBO) CAGE OPENING DIMENSIONS. THE TOP OF THE AC UNIT CAGE OPENING TO BE LEVELED WITH THE RCP LEVEL.

KEY NOTES

1. PAINT STRUCTURE
2. PAINT ALL EXPOSED PIPING AND DUCTWORK (COORDINATE WITH ARCHITECT)
3. PROVIDE KICKERS @ 48" O.C.
4. CONTRACTOR TO PROVIDE CONTROL JOINTS ON STRIKE AND HINGE SIDE OF DOOR AT ALL GYP. BD. PARTITION WALLS.
5. GENERAL CONTRACTOR IS RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL EXISTING FIELD CONDITIONS PRIOR TO START OF WORK. REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.

GENERAL NOTES



KEY PLAN

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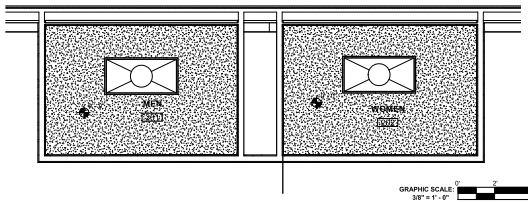
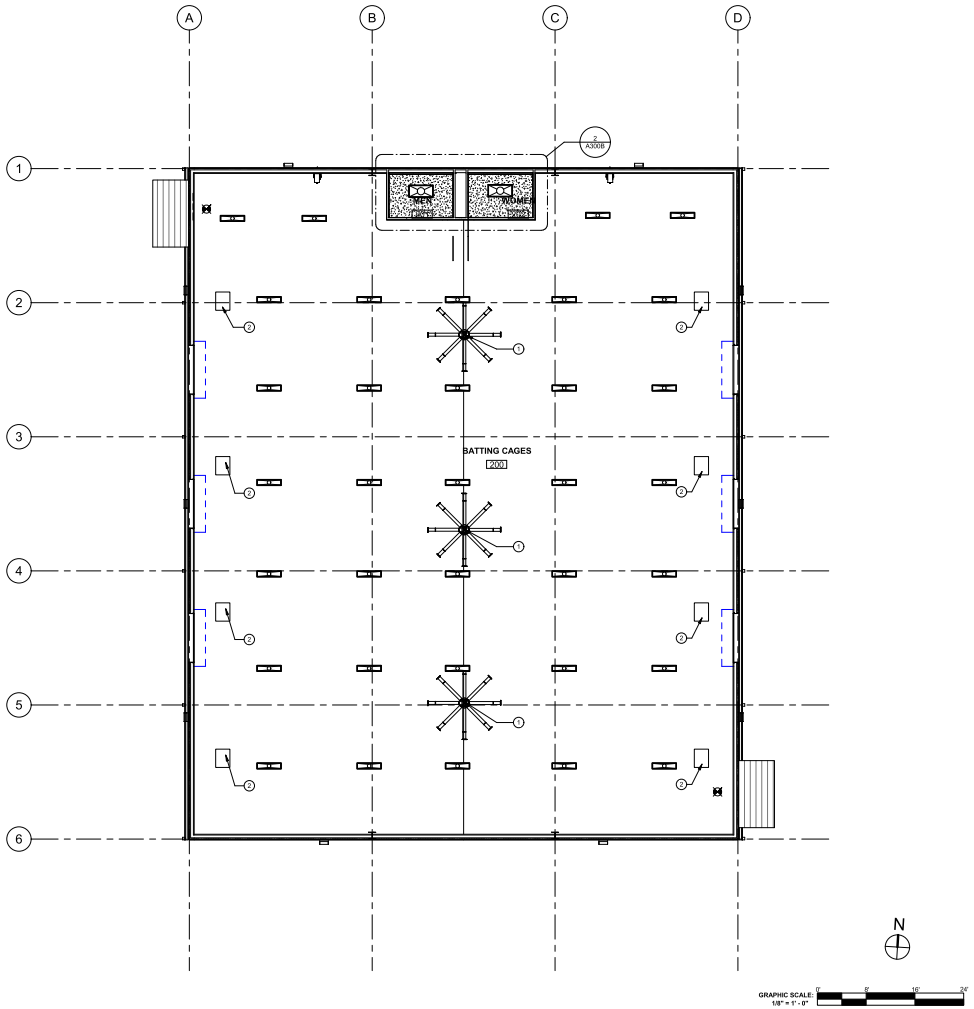
CONCESSION REFLECTIVE CEILING PLAN

A300A



BATTING CAGE RCP - ENLARGED 2

3/8" = 1'-0"



BUILDING "D" BATTING CAGE RCP 1

1/8" = 1'-0"

	DESCRIPTION
	EQUIPMENT TAG SEE ACCESSORIES & EQUIPMENT SCHEDULE
	SMOKE DETECTOR
	FIRE SPRINKLER
	SPEAKER
	ILLUMINATED EXIT SIGN TWO SIDE READABLE
	ILLUMINATED EXIT SIGN ONE SIDE READABLE
	2' X 4' LAY-IN FIXTURE
	RECESSED DOWN LIGHT
	1' X 1' DIFFUSER
	2' X 2' DIFFUSER
	2' X 2' LAY-IN FIXTURE
	CEILING HEIGHT
	SECTION TAG DETAIL
	2' X 2' LAY-IN CEILING AS SPECIFIED (ALL CEILING TILE SHALL BE SYMMETRICAL IN ROOM AS SHOWN)
	DEMOLISHED 2' X 2' LAY-IN CEILING
	GYPSUM CEILING
	DIRECTORIAL CANS
	PROVIDE SUPPLY AIR
	PROVIDE RETURN AIR
	2' X 2' LIGHT
	EXHAUST/RELIEF AIR DECT SECTION
	LINEAR LIGHTS
	PENDANT CABLE LIGHT
	HIGH BAY LIGHT
	CIRCLE SUSPENDED LIGHT
	GLOBE PENDANT LIGHT
	BIG PENDANT CYLINDER

ALL CEILING TILE SHALL BE SYMETRICAL IN ROOM AS SHOWN

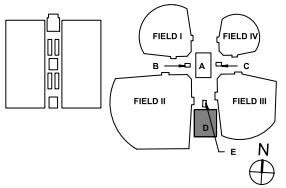
LEGEND

1. BIGASSFAN POWER FOIL X3.0 ATTACHED TO THE PRE-ENGINEERED BUILDING STRUCTURE. RE: SPECIFICATIONS
2. HEATING EQUIPMENT ATTACHED TO THE PRE-ENGINEERED BUILDING STRUCTURE. RE: MEP DRAWINGS AND SPECIFICATIONS

KEY NOTES

1. PAINT STRUCTURE
2. PAINT ALL EXPOSED PIPING AND DUCTWORK (COORDINATE WITH ARCHITECT)
3. PROVIDE KICKERS @ 48" O.C.
4. CONTRACTOR TO PROVIDE CONTROL JOINTS ON STRIKE AND HINGE SIDE OF DOOR AT ALL GYP. BD. PARTITION WALLS .
5. GENERAL CONTRACTOR IS RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL EXISTING FIELD CONDITIONS PRIOR TO START OF WORK. REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.

GENERAL NOTES



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STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

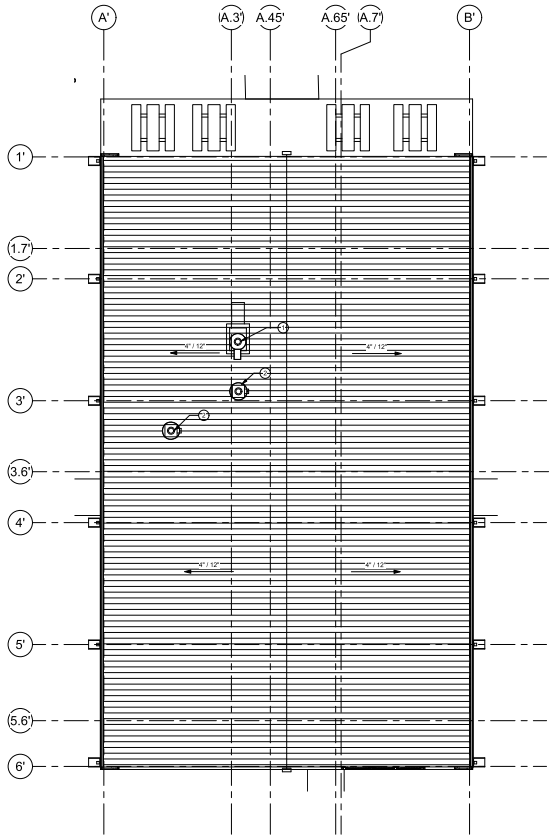
Drawing Date:	07/26/2021
Drawn:	IK
Checked:	BM, CD
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

BATTING CAGE REFLECTIVE CEILING PLAN

A300B



GRAPHIC SCALE
1/8" = 1'- 0"
0' 8' 16' 24'

N

BUILDING "A" CONCESSION BUILDING ROOF PLAN
1/8" = 1'-0"

1

OVERFLOW DRAIN
ROOF DRAIN
PLUMBING VENT
POWER VENT
CURBED VENT STACK
TURBINE VENT
CURBED TURBINE VENT
ROUND PENETRATION
ABANDONED PENETRATION
PIPING ON HANGERS
PIPING ON WOOD BLOCKINGS
PIPING ON SUPPORTS
PARAPET
CD CONDENSATION DRAIN LINE
E ELECTRICAL CONDUIT
G GAS LINE
PITCH PAN
DUCT PENETRATION
EQUIPMENT CURB
VENT / INTAKE
SCUPPER WITH COLLECTOR HEAD
EQUIPMENT ON SUPPORTS
EQUIPMENT ON PITCH PANS
SMOKE HATCH
SATELLITE DISH
ROOF-MOUNTED LADDER
CAGED LADDER
WALL-MOUNTED LADDER
WALL DRAIN
SUMPED DRAIN
HEAT EXHAUST
CURBED HEAT EXHAUST
MOISTURE VENT
GRAVITY VENT
MOISTURE RELIEF VENT
GOOSENECK PENETRATION
PIPE BOX
EXPANSION JOINT
ROOF-TO-WALL EXPANSION JOINT
METAL EDGE
DOWNSPOUT AND GUTTER
MS MECHANICAL SCREEN
W CHILL / HOT WATER
AT AIR TERMINAL
LP THROUGH-ROOF CONNECTION
CURBED DUCT PENETRATION
DUCT WITH DUCT SUPPORT
THRU-WALL SCRUPPER
THRU-EDGE SCRUPPER
EQUIPMENT ON SLEEPERS
EQUIPMENT ON CURBS
ROOF HATCH
SKYLIGHT
STRUCTURAL SKYLIGHT
STRUCTURAL SKYLIGHT
SPLASHBLOCK
SUMPED DRAIN PRIMARY & OVERFLOW SECONDARY
WALL THICKNESS INDICATOR
WALL HEIGHT INDICATOR
DOOR ACCESS
LIGHT
SHINGLE ROOF
ANTENNA
A2 AREA IDENTIFICATION
CORE LOCATION
LEAK LOCATION
XX INFRARED I.D.
EXISTING SLOPE
CHIMNEY
ROUND GOOSENECK
SQUARE GOOSENECK
RISE-WALL
SLOPE DIRECTION
RISE/VALLEY
GUY WIRE ANCHOR
TILE ROOF
METAL ROOF
COLUMN ROOF
SUSPECTED WET AREA
ANOMALY NUMBER
XX PHOTO LOCATION
WALKPAD

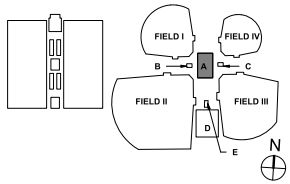
LEGEND

1. CONCESSION KITCHEN HOOD EXHAUST FAN. RE: MEP DRAWINGS AND SPECIFICATIONS
2. EXHAUST FAN. RE: MEP DRAWINGS AND SPECIFICATIONS

KEY NOTES

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES AND APPLICATIONS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL DIMENSIONS AND OR EXISTING FIELD CONDITIONS PRIOR TO START.
5. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO THE ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.
6. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES WITH ARCHITECT PRIOR TO BIDDING.
7. THE GENERAL CONTRACTOR SHALL PROTECT ANY CONSTRUCTION OR FINISHES THAT IS TO REMAIN.
8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES



KEY PLAN

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

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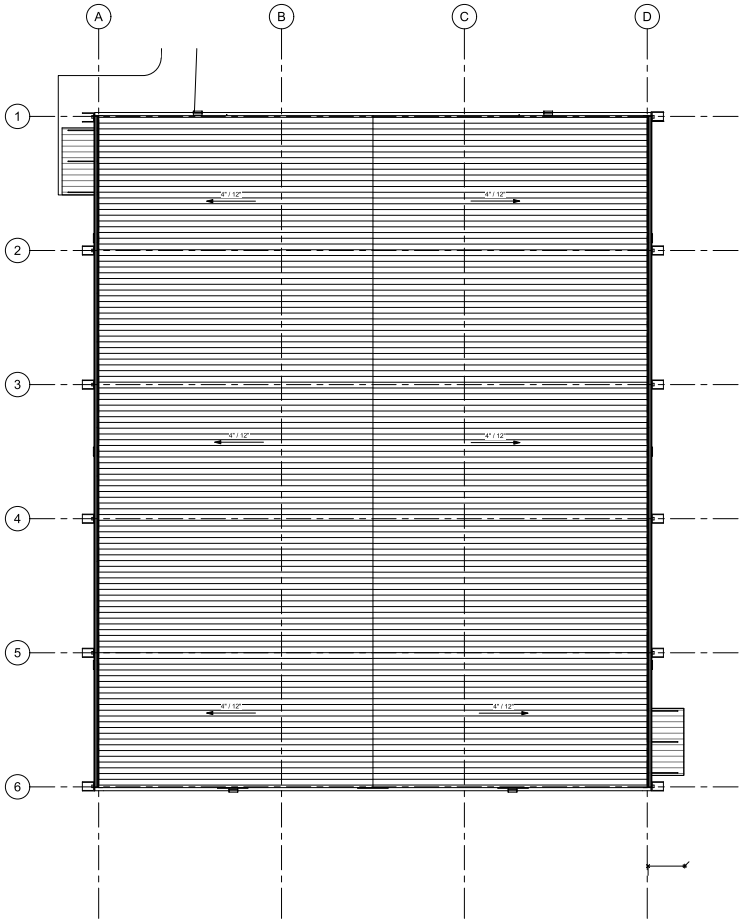
CONCESSION ROOF PLAN

A305A



GRAPHIC SCALE: 1/8" = 1'-0" (0', 8', 16', 24')

N

BUILDING "D" BATTING CAGE ROOF PLAN
1/8" = 1'-0"

1

LEGEND

- OVERFLOW DRAIN
- ROOF DRAIN
- PLUMBING VENT
- POWER VENT
- CURBED VENT STACK
- TURBINE VENT
- CURBED TURBINE VENT
- ROUND PENETRATION
- ABANDONED PENETRATION
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- PARAPET
- CONDENSATION DRAIN LINE
- ELECTRICAL CONDUIT
- GAS LINE
- PITCH PAN DUCT PENETRATION
- EQUIPMENT CURB
- VENT / INTAKE
- SCUPPER WITH COLLECTOR HEAD
- EQUIPMENT ON SUPPORTS
- EQUIPMENT ON PITCH PANS
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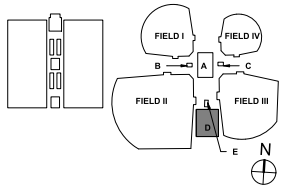
GENERAL NOTES



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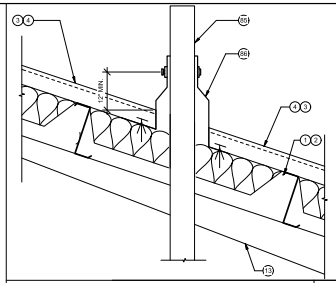
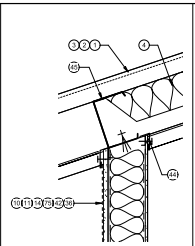
BATTING CAGE ROOF PLAN

A305B



VENT PIPE DETAIL 13
1 1/2" = 1'-0"



DETAIL 9
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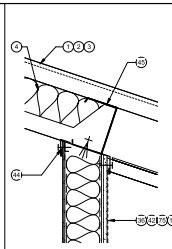
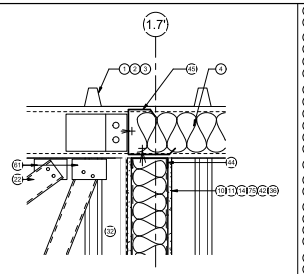


DETAIL 8
1 1/2" = 1'-0"



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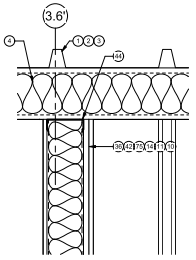
1 1/2" = 1'-0"



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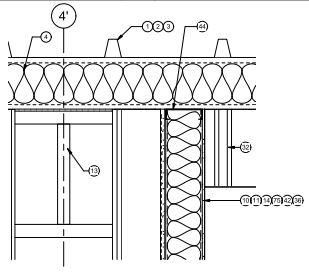

ROOF DETAIL 7
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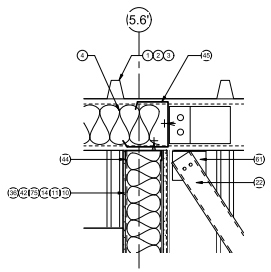
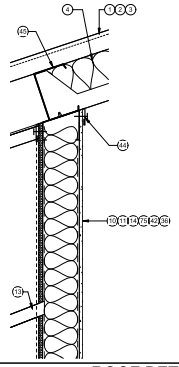
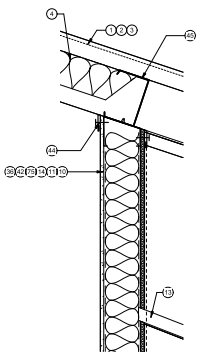


ROOF DETAIL 3
1 1/2" = 1'-0"



ROOF DETAIL 11
1 1/2" = 1'-0"



ROOF DETAIL 6
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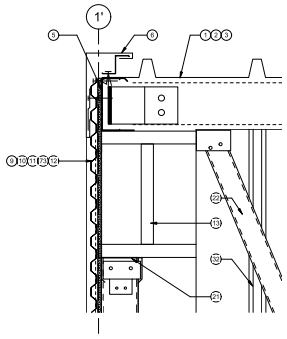
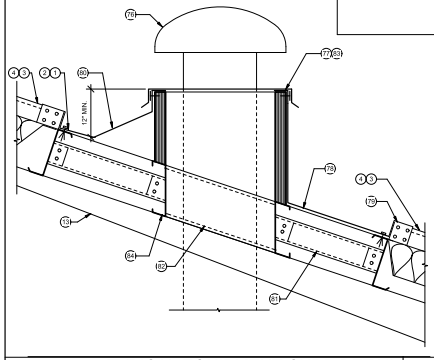
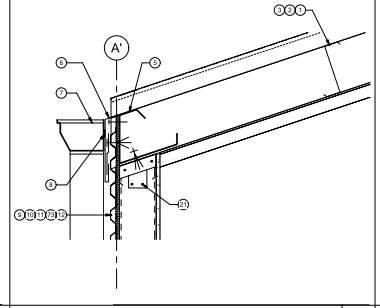


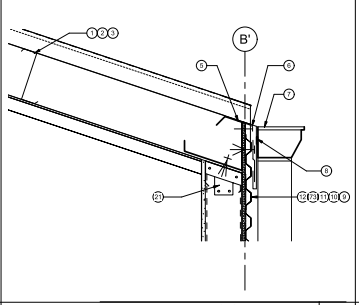
ROOF DETAIL 2
1 1/2" = 1'-0"



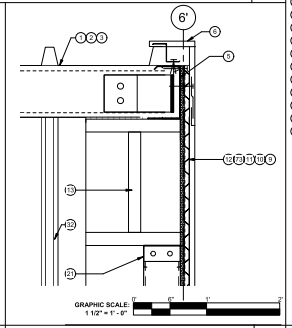
TYPICAL EQUIPMENT CURB DETAIL 14
1 1/2" = 1'-0"



ROOF DETAIL 10
1 1/2" = 1'-0"



ROOF DETAIL 5
1 1/2" = 1'-0"



ROOF DETAIL 1
1 1/2" = 1'-0"

1. THERMAL BREAK TAPE. RE: SPECIFICATIONS
2. METAL 8" -Z- PURLINS SPACED AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
3. STANDING SEAM METAL ROOFING. RE: SPECIFICATIONS
4. R-30 BATT ROOFING INSULATION
5. EAVE STRUT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE.
6. METAL EAVE FLASHING ANCHORED TO BUILDING FRAMING AND HOLD-DOWN CLEAT CONTINUOUS ALONG EAVE FRAMING TYPICAL
7. METAL GUTTER AND 5"X5" DOWNSPOUT
8. GUTTER CLIP ANCHOR AT 24" O.C.
9. HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
10. CONTINUOUS SELF-ADHERING MEMBRANE WATER PROOFING
11. CONTINUOUS 5/8" THICK FIBER CEMENT BOARD, TYPICAL
12. VERTICAL METAL 6" COLD ROLLED C-CHANNEL ANCHORED TO HORIZONTAL STRUCTURAL BEAM PREFORMED CLIP FLANGES AT 24" O.C. TYPICAL
13. PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM, PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR) RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
14. R-19 BATT WALL INSULATION, TYPICAL
15. LINER PANEL. CLOSURE TRIM AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
16. CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
17. ARCHITECTURE FINISH. RE: FINISH FLOOR PLAN AND SCHEDULE
18. DOWNSPOUT ANCHOR STRAPS EQUALLY SPACED
19. CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL
20. PRE-FINISHED SHEET METAL CLOSURE TRIM ANCHORED TO WALL FRAME. SIZE TO FIT
21. FLUSH MOUNTED 8" C-GIRT ANCHORED TO STRUCTURAL BUILDING FRAME
22. 3 5/8" METAL STUD BRACING AT 24" O.C. ANCHORED TO Z-PURLIN
23. INTERIOR METAL TRIM RETURN
24. CONTINUOUS METAL TRIM FLASHING
25. SEALANT AND BACKER ROD, RE: SPECIFICATIONS, AT BOTH SIDES OF DOOR FRAME
26. CONTINUOUS 1" MIN. AIR CAVITY
27. HORIZONTAL MASONRY FIXED TIE AT 16" O.C. TYPICAL
28. 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
29. SEALANT AND BACKER ROD AT BOTH SIDES OF WINDOW UNIT, RE: SPECIFICATIONS
30. SEALANT AND BACKER ROD AT BOTH SIDES OF OVERHEAD PUSH-UP DOOR FRAME, RE: SPECIFICATIONS
31. EXTEND WATERPROOF MEMBRANE ALL AROUND BUILDING FRAME, HEAD AND JAMB FACE SURFACE
32. INTERIOR FACE OF ROOFING/WALL PANELS BEYOND.
33. PRE-FINISH SHEET METAL SOFFIT PANEL TRIM MECHANICALLY ANCHORED TO BUILDING FRAMING
34. RAKE LINE FLASHING EXTERIOR RETURN TRIM
35. ACOUSTICAL LAY-IN CEILING, RE: FINISH SCHEDULE AND ARCHITECTURE SPECIFICATIONS
36. 5/8" GYPSUM BOARD. COLOR TO MATCH ROOM CMU WALL COLOR.
37. CONTINUOUS STRUCTURAL BEAM STRUCTURALLY CONNECTED ON BOTH ENDS BY THE PRE-ENGINEERED BUILDING FRAMING (ON GRID A.3',A.45',A.65',A.7') AND ON THE CENTER BY THE ADJACENT BEAMS (ON GRID A.3',A.45',A.65',A.7') RE: STRUCTURAL DRAWINGS.
38. METAL CORNER BEAD, TYPICAL
39. GROUT FILLED HOLLOW METAL DOOR FRAME WITH JAMB ANCHOR AND SCHEDULED DOOR
40. REINFORCED GROUT FILLED CONCRETE MASONRY LINTEL AND BOND BEAM
41. BOTTOM TRACK. ANCHOR BOLT WITH METAL STUD BLOCKING SPACED AS REQUIRED.
42. 6" METAL STUD (16 GAUGE) FRAMING AT 16" O.C.
43. 4' HIGH FRP PANEL ON ALL SIDES OF THE CONCESSION KITCHEN WALLS. RE: SPECIFICATIONS
44. CONTINUOUS METAL TOP SLIP TRACK ANCHORED TO ROOF FRAMING
45. CONTINUOUS 8" CLOSURE AND ANCHOR GIRT ATTACHED TO ROOF FRAMING, TYPICAL
46. FACTORY FORMED 6" COLD ROLLED HEAD BEAM TO SPAN BREEZEWAY
47. VERTICAL METAL WALL PANEL. CORNER TRIM PRE-FINISHED TO MATCH WALL PANEL PROVIDED BY WALL PANEL MANUFACTURER
48. 8X8X16 CONCRETE MASONRY UNIT EXTERIOR WALL STRUCTURE WITH LOOSE FILL INSULATION. RE: SPECIFICATIONS
49. COLD ROLLED HEAD BEAM STIFFENER PLATE FACTORY APPLIED, SPACED AS REQUIRED.
50. PRE-FINISHED METAL ROLLING COUNTER DOOR JAMB WITH ANCHOR CLEATS CLOSURE PANEL TO MATCH DOOR HOUSING FINISH.
51. SCHEDULED WALL BASE, RE: FINISH SCHEDULE AND SPECIFICATIONS
52. CLARK DIETRICH 093 ZINC CONTROL JOINT AT SOFFIT CEILING PANEL OR APPROVED EQUAL, TYPICAL
53. SUB-FLASHING, CONTINUOUS
54. CLOSURE TRIM TO MATCH WALL PANEL FINISH
55. ROLLING COUNTER DOOR HOOD, RE: ARCHITECTURE SPECIFICATIONS
56. INSULATED ROLLING PUSH-UP COUNTER DOOR CURTAIN. GALVANIZED STEEL FACTORY FINISHED WITH CLEAR ANODIZED EXTRUDED ALUMINUM BOTTOM BAR WITH WEATHER SEAL AND MANUFACTURER LOCK MECHANISMS KEYED TO INTERIOR
57. PRE-FINISHED METAL ROLLING COUNTER DOOR HEAD CLOSURE PANEL TO MATCH DOOR FINISH
58. REINFORCED GROUT FILLED CONCRETE MASONRY JAMB BLOCK, TYPICAL
59. GALVANIZED STEEL SERVING COUNTER TOP FACTORY FINISH MECHANICALLY ANCHORED TO WALL ASSEMBLY
60. CONTINUOUS SEALANT
61. ANCHOR PLATE SPACED AS REQUIRED TO SECURE BRACING
62. 6" METAL COLD ROLLED SOFFIT FRAMING AT 16" O.C. ANCHORED TO WALL FRAMING
63. EXTERIOR SOFFIT GYPSUM BOARD MECHANICALLY FASTENED TO FRAMING
64. CONTINUOUS METAL SOFFIT VENT, MANUFACTURER AIR VENT MODEL #SV301WH, COLOR TO BE SELECTED OR APPROVED EQUAL
65. TRANSVERSE COLD ROLLED FRAMING MEMBER AT BREEZEWAY SOFFIT AT 16" O.C.
66. HORIZONTAL SCHEDULED SLIDING WINDOW UNIT WITH JAMB AND HEAD ANCHOR, RE: ARCHITECTURE SPECIFICATIONS
67. CONTINUOUS METAL HOLD-DOWN CLEAT, TYPICAL
68. CAST STONE PIN ANCHOR BRACKET SPACE AS REQUIRED TO SECURE STONE CAP, TYPICAL
69. CONTINUOUS 1/4" EPOXY GROUT JOINT, TYPICAL
70. CONTINUOUS 1/4" BEVELED EDGE, TYPICAL
71. CAST STONE COLUMN CAP, TYPICAL
72. GROUT JOINT, TYPICAL
73. CONTINUOUS STRUCTURAL HANGER BEYOND CONNECTED ON THE TOP WITH THE PRE-ENGINEERED BUILDING STRUCTURE AND ON THE BOTTOM WITH A CONTINUOUS BEAM. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
74. CONTINUOUS STRUCTURAL BEAM BEYOND CONNECTED ON ONE SIDE BY A STRUCTURAL COLUMN BEYOND AND THE OTHER SIDE WITH A CONTINUOUS HORIZONTAL BEAM SUPPORTING THE PRE-ENGINEERED END WALL. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
75. STRUCTURAL COLUMN BEYOND. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
76. SCHEDULE ROOF TOP EQUIPMENT, REF. MEP
77. EQUIPMENT UNIT CAP FLASHING
78. ROOF CURB ATTACHMENT FAN AS SPECIFIED
79. METAL ROOF STANDING SEAM CLOSURE END PLATE, TYPICAL.
80. ROOF TOP EQUIPMENT CURB FLASHING CRICKET
81. COLD -ROLLED BRIDGING ANCHOR
82. ROOF FRAMING METAL C-SECTION BEYOND AT ROOF TOP EQUIPMENT OPENING
83. ROOF TOP EQUIPMENT INSULATED STEEL CURB, TYPICAL
84. ROOF FRAMING METAL C-SECTION
85. PIPE VENT THRU-ROOF. REF MEP
86. RUBBER PIPE FLASHING, REF SPECIFICATIONS

KEY NOTES

IDG+ ARCHITECTS

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

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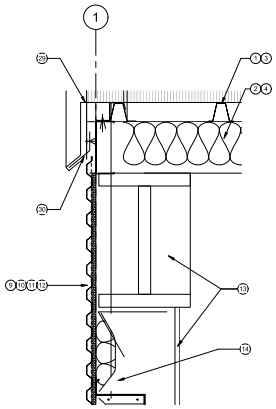
CONCESSION ROOF DETAILS

A306A



ROOF DETAIL 4
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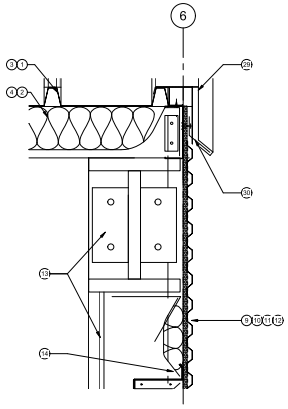

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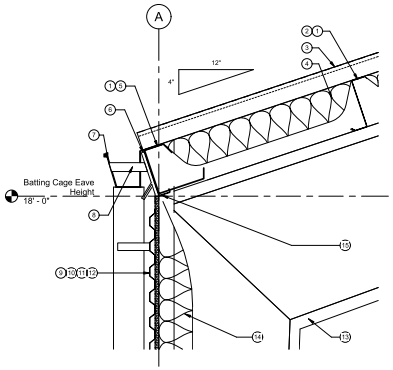

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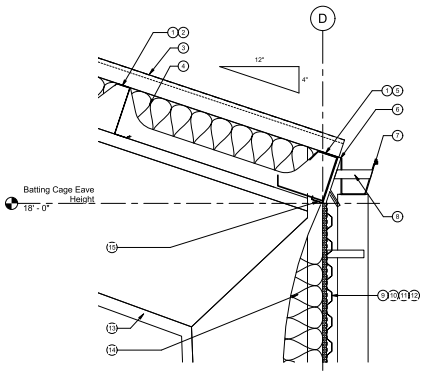

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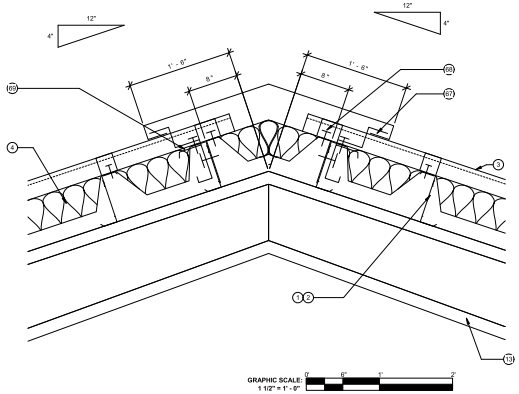

ROOF DETAIL 1
1 1/2" = 1'-0"

1 THERMAL BREAK TAPE. RE: SPECIFICATIONS
2 METAL 8"-Z- PURLING SPACED AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
3 STANDING SEAM METAL ROOFING. RE: SPECIFICATIONS
4 R-30 BATT ROOFING INSULATION
5 EAVE STRUT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE.
6 METAL EAVE FLASHING ANCHORED TO BUILDING FRAMING AND HOLD-DOWN CLEAT CONTINUOUS ALONG EAVE FRAMING TYPICAL
7 METAL GUTTER AND 5"X5" DOWNSPOUT
8 GUTTER CLIP ANCHOR AT 24" O.C.
9 HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
10 CONTINUOUS SELF-ADHERING MEMBRANE WATER PROOFING
11 CONTINUOUS 5/8" THICK FIBER CEMENT BOARD, TYPICAL
12 VERTICAL METAL 2 1/2" COLD ROLLED C-CHANNEL (16 GAUGE) ANCHORED TO HORIZONTAL GIRTS PREFORMED CLIP FLANGES AT 24" O.C., TYPICAL
13 PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM, PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR) RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
14 R-19 BATT WALL INSULATION, TYPICAL
15 INSULATION CLIP ANCHOR, CONTINUOUS
16 LINER PANEL. CLOSURE TRIM AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
17 VERTICAL METAL INTERIOR LINER PANEL AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURER
18 FLUSH MOUNTED 8"-Z-GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
19 HORIZONTAL ANCHOR GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
20 PRE-ENGINEERED BUILDING BASE GIRT
21 CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
22 ARCHITECTURE FINISH. RE: FINISH FLOOR PLAN AND SCHEDULE
23 DOWNSPOUT ANCHOR STRAP EQUALLY SPACED
24 CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL
25 HORIZONTAL 8"-C-GIRT TO ANCHOR METAL LINER PANEL, TYPICAL
26 ADJUSTABLE DOVE TAIL MASONRY TIES AT 16" O.C. TYPICAL
27 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
28 CONTINUOUS METAL TRIM FLASHING
29 CONTINUOUS METAL RAKE LINE FLASHING ANCHORED TO BUILDING FRAMING AND HOLD-DOWN CLIT CONTINUOUS ALONG RAKE FRAMING, TYPICAL
30 RAKE LINE STRUT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
31 VERTICAL JAMB FRAME AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
32 INTERIOR METAL TRIM RETURN
33 8"-C-SECTION HEAD GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
34 EXTERIOR DOOR AND FRAME, RE: SPECIFICATION AND DOOR SCHEDULE
35 CONTINUOUS METAL TRIM FLASHING
36 SEALANT AND BACKER ROD, RE: SPECIFICATIONS, AT BOTH SIDES OF DOOR FRAME
37 DOOR FRAME Z-CLIP ANCHORS FACTORY SET, MINIMUM 4 EACH JAMB EQUALLY SPACED
38 METAL FASTENERS AT EACH JAMB EQUALLY SPACED
39 EXTEND WATERPROOF MEMBRANE ALL AROUND BUILDING FRAME HEAD, JAMB, SILL FACE SURFACE
40 CONTINUOUS 1" MIN. AIR CAVITY
41 HORIZONTAL MASONRY FIXED TIE AT 16" O.C. TYPICAL
42 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
43 CONCRETE PAVED SURFACE, RE: CIVIL DRAWINGS
44 DOOR THRESHOLD, RE: SPECIFICATIONS SET-IN WATERPROOF MASTIC
45 SCHEDULED WALL LOUVER WITH INSECT SCREEN, RE: MEP & ARCHITECTURE SPECIFICATIONS
46 SEALANT AND BACKER ROD AT BOTH SIDES OF LOUVER VENT UNIT, RE: SPECIFICATIONS
47 VENT LOUVER FRAME CLIP ANCHOR FACTORY SET PRIOR TO INSTALLATION
48 8" C-SECTION SILL GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
49 SPECIFIED EXTERIOR WINDOW UNIT WITH 1" INSULATED GLASS
50 SEALANT AND BACKER ROD AT BOTH SIDES OF WINDOW UNIT, RE: SPECIFICATIONS
51 WINDOW FRAME JAMB ANCHORED AS RECOMMENDED BY MANUFACTURE
52 PRE-FINISHED HEAVY-DUTY METAL CLOSURE FRAME ANCHORED TO METAL BUILDING FRAMING SYSTEM
53 SCHEDULED HOLLOW METAL DOOR FRAME
54 CONTINUOUS 5/8" THICK ON 3 5/8" METAL STUD FRAME GYPSUM BOARD, RE: ARCHITECTURE FINISH SCHEDULE
55 OVERHEAD PUSH-UP DOOR VERTICAL TRACK
56 SEALANT AND BACKER ROD AT BOTH SIDES OF OVERHEAD PUSH-UP DOOR FRAME, RE: SPECIFICATIONS
57 HORIZONTAL ANCHOR GIRT TO SUPPORT OVERHEAD PUSH-UP DOOR TRACK
58 CONTINUOUS CLOSURE TRIM
59 SCHEDULED DOOR, RE: DOOR SCHEDULE, SPECIFICATIONS, DOOR HARDWARE
60 OVERHEAD DOOR AND TRACK ASSEMBLY, RE: SPECIFICATIONS, DOOR SCHEDULE.
61 OVERHEAD PUSH-UP DOOR JAMB ANCHOR FACTORY WELDED TO FRAME PRIOR TO INSTALLATION
62 EXTEND WATERPROOF MEMBRANE ALL AROUND BUILDING FRAME, HEAD AND JAMB FACE SURFACE
63 CONCRETE FLOOR AND ARCHITECTURE FINISH, RE: STRUCTURE DRAWINGS AND ARCHITECTURE FLOOR PLAN AND SCHEDULE
64 CONCRETE PAVED SURFACE, RE:CIVIL DRAWINGS
65 CONTINUOUS INTERIOR LINER PANEL METAL BASE TRIM ANCHORED TO FLOOR AND LINER PANEL
66 METAL RIDGE CAP FLASHING, RE: SPECIFICATIONS
67 OUTSIDE Z-CLOSURE AND RIDGE CAP HOLD-DOWN ANCHOR CLIT (TYPICAL)
68 STANDING SEAM METAL ROOF PANEL ANCHOR CLIP
69 SECONDARY PURLIN FRAMING SECTION TO SUPPORT METAL RIDGE CAP FLASHING TYPICAL
70 EXTERIOR METAL TRIM RETURN
71 5/8" GYPSUM BOARD ON 2 1/2" METAL STUD FRAME @ 16" O.C. AS FULL HEIGHT SHOWN IN SECTIONS. INSTALL 4'X8' FRP PANEL ON ALL INTERIOR WALLS SIDES OF THE RESTROOMS. RE FINISH SCHEDULE. ROOM FINISH SCHEDULE.

KEY NOTES

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12. PROVIDE KICKERS AT 48" O.C.
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14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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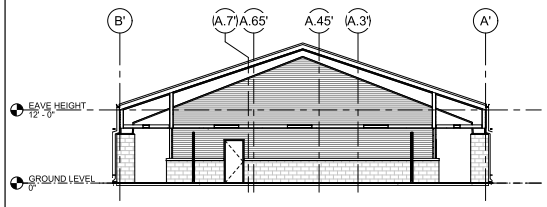
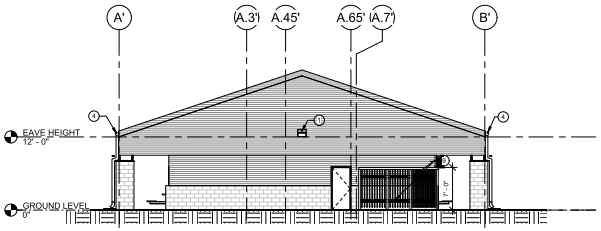
BATTING CAGE ROOF DETAIL

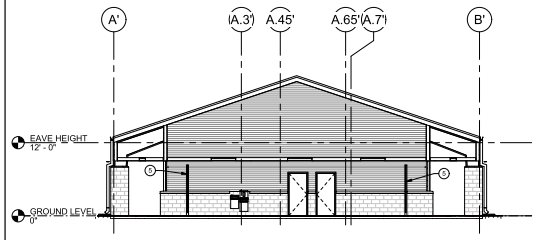
A306B



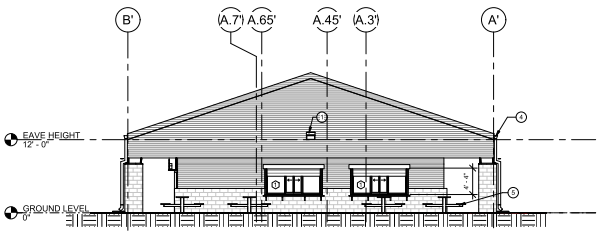
BREEZEWAY SOUTH ELEVATION/SECTION 8
1/8" = 1'-0"



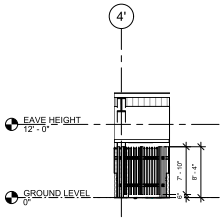
CONCESSION BUILDING SOUTH ELEV. 4
1/8" = 1'-0"



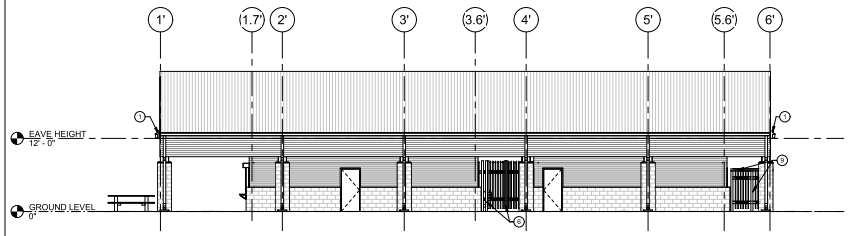
BREEZEWAY NORTH ELEVATION/SECTION 7
1/8" = 1'-0"



CONCESSION BUILDING NORTH ELEV. 3
1/8" = 1'-0"



BREEZEWAY WEST ELEV. 6
1/8" = 1'-0"



CONCESSION BUILDING WEST ELEV. 2
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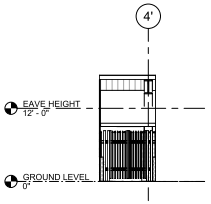

BREEZEWAY EAST ELEV. 5
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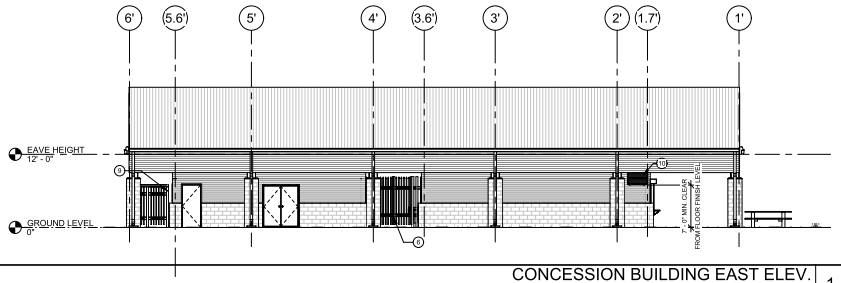

CONCESSION BUILDING EAST ELEV. 1
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1. EXTERIOR WALL PACK LIGHT RE. MEP
2. EXTERIOR WALL LOUVER RE. ARCHITECTRUAL & MEP DRAWINGS AND SPECIFICATIONS
3. OVERHEAD CANOPY
4. GUTTER WITH 5"X5" DOWNSPOUT AND PRECAST CONCRETE SPLASHBLOCK. RE: DRAWINGS AND SPECIFICATIONS
5. EXISTING BENCH AS SHOWN TO REMAIN
6. INSTALL 8' - 4" TALL ORNAMENTAL FENCE IN THE ENTIRE LENGTH OF THE CORRIDOR WIDTH WITH 0' - 0" OPENING GATE. PROVIDE A RECEPTACLES FOR THE CANE BOLT WHEN GATES ARE FULLY OPENED
7. MALL MOUNTED EXHAUST FAN. RE: ARCHITECTURAL & MEP DRAWINGS AND SPECIFICATIONS
8. PROVIDE A SMALL VENT LOUVER REQUIRED FOR THE SIDEWALL FAN EXHAUST TO PROTECT IT. PROVIDE REQUIRED FRAME SIMILAR TO DETAIL 2/A503B
9. INSTALL NEW 7' - 0" TALL COMPLETE ORNAMENTAL FENCE ENCLOSURE (ALL 4 SIDES & TOP SIDE) AS SHOWN. EACH PERIMETER FENCE POST TO BE ATTACHED TO THE FOUNDATION SLAB WITH HEAVY DUTY ANCHOR PLATE AND BOLTS. PROVIDE 4' - 0" GATE AS SHOWN. PROVIDE NEW WEATHERPROOF AND HEAVY DUTY CHAIN & LOCK SYSTEM WITH KEYS.
10 AC UNIT TO BE MOUNTED WITH A MINIMUM OF 7'-0" CLEARANCE FROM THE FLOOR FINISH LEVEL TO THE BOTTOM OF AC UNIT CAGE (PROPERTY ARMOR MINI SPLIT WALL BRACKET/CAGE COMBO).

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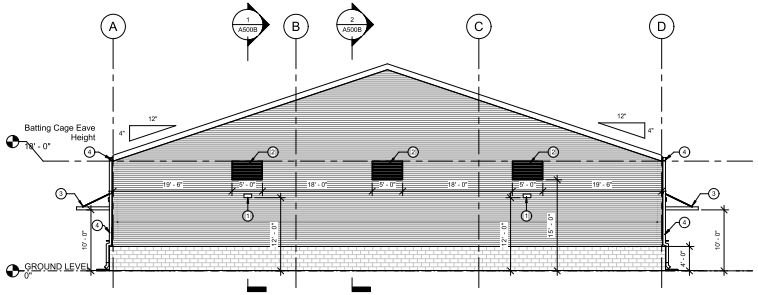
2 CITY OF HOUSTON COMMENTS	04/11/2022
ISSUE FOR BID	09/07/2022

CONCESSION EXTERIOR ELEVATIONS

A400A



BATTING CAGE BLDG SOUTH ELEV. 4
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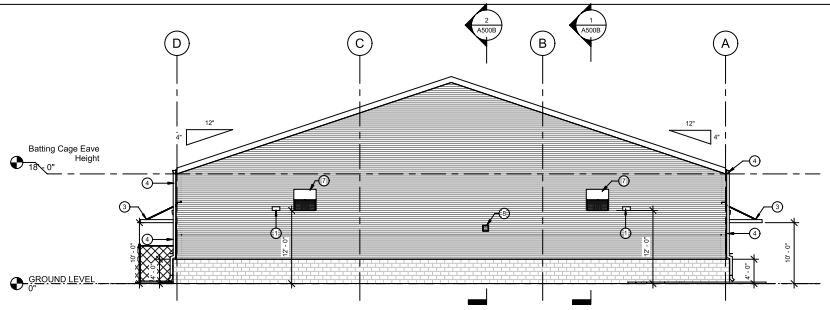

BATTING CAGE BLDG NORTH ELEV. 3
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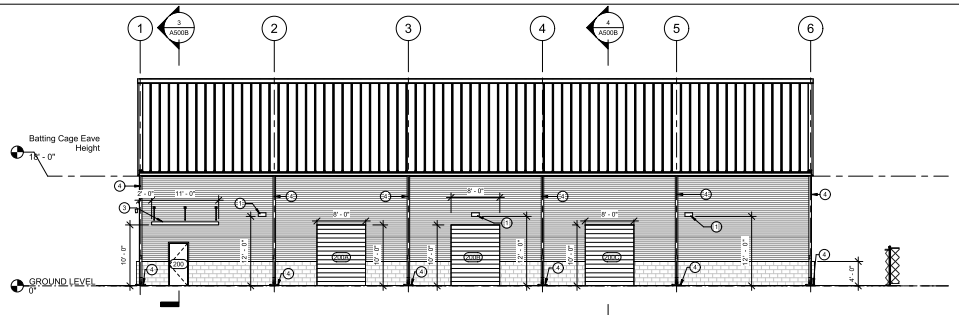
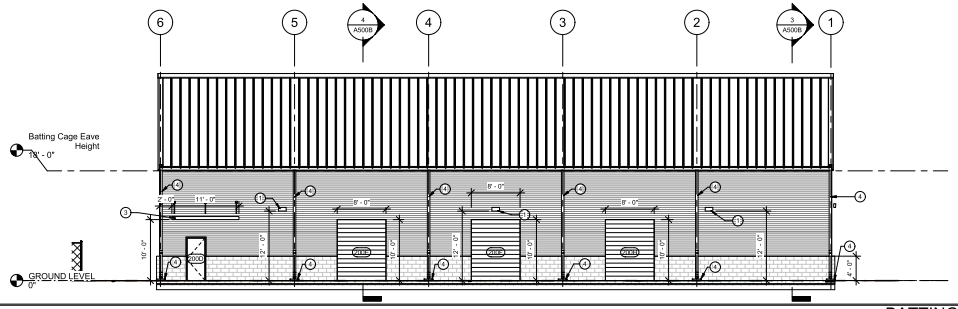


BATTING CAGE BLDG WEST ELEV. 2
1/8" = 1'-0"



GRAPHIC SCALE: 1/8" = 1' - 0"

BATTING CAGE BLDG EAST ELEV. 1
1/8" = 1'-0"

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8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

KEY NOTES

1. EXTERIOR WALL PACK LIGHT RE. MEP
2. EXTERIOR WALL LOUVER RE. ARCHITECTRUAL & MEP DRAWINGS AND SPECIFICATIONS
3. OVERHEAD CANOPY
4. GUTTER WITH 5"X6" DOWNSPOUT AND PRECAST CONCRETE SPLASHBLOCK. RE: DRAWINGS AND SPECIFICATIONS
5. EXISTING BENCH AS SHOWN TO REMAIN
6. INSTALL 8' -4" TALL ORNAMENTAL FENCE IN THE ENTIRE LENGTH OF THE CORRIDOR WIDTH WITH 6' - 0" OPENING GATE. PROVIDE A RECEPTACLES FOR THE CANE BOLT WHEN GATES ARE FULLY OPENED
7. MALL MOUNTED EXHAUST FAN. RE: ARCHITECTURAL & MEP DRAWINGS AND SPECIFICATIONS
8. PROVIDE A SMALL VENT LOUVER REQUIRED FOR THE SIDEWALL FAN EXHAUST TO PROTECT IT. PROVIDE REQUIRED FRAME SIMILAR TO DETAIL 2/A5/03B
9. INSTALL NEW 7' - 0" TALL COMPLETE ORNAMENTAL FENCE ENCLOSURE (ALL 4 SIDES & TOP SIDE) AS SHOWN. EACH PERIMETER FENCE POST TO BE ATTACHED TO THE FOUNDATION SLAB WITH HEAVY DUTY ANCHOR PLATE AND BOLTS. PROVIDE 4' - 0" GATE AS SHOWN. PROVIDE NEW WEATHERPROOF AND HEAVY DUTY CHAIN & LOCK SYSTEM WITH KEYS.
10. AC UNIT TO BE MOUNTED WITH A MINIMUM OF 7'-0" CLEARANCE FROM THE FLOOR FINISH LEVEL TO THE BOTTOM OF AC UNIT CAGE (PROPERTY ARMOR MINI SPLIT WALL BRACKET/CAGE COMBO).

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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Revisions:

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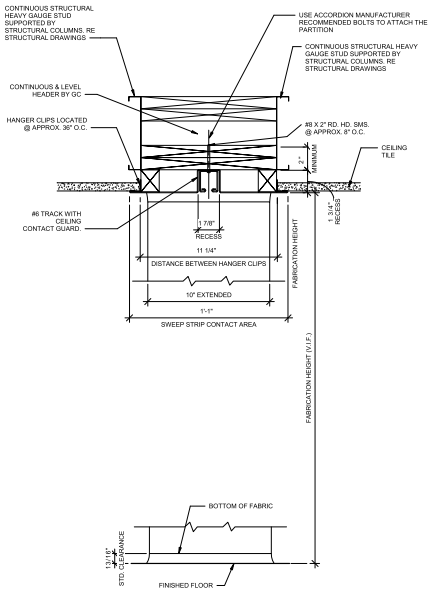
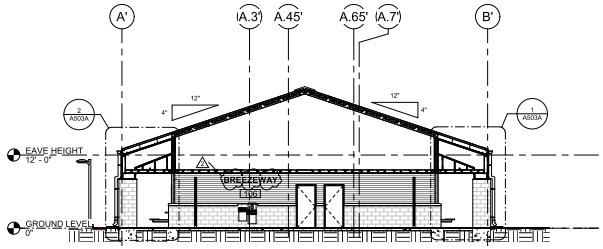
BATTING CAGE EXTERIOR ELEVATIONS

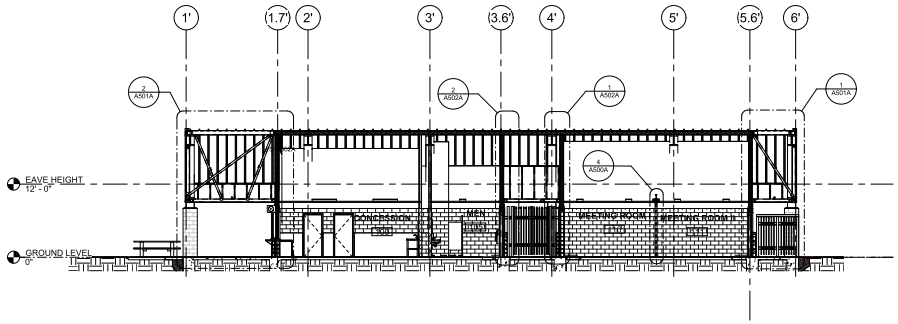
A400B



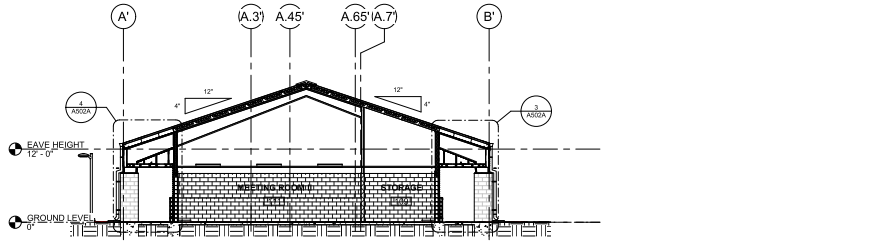
ACCORDION PARTITION HEAD AND SILL 4
1 1/2" = 1'-0"



CONCESSION BUILDING SECTION 3
1/8" = 1'-0"



CONCESSION BUILDING SECTION 2
1/8" = 1'-0"



CONCESSION BUILDING SECTION 1
1/8" = 1'-0"

GRAPHIC SCALE: 1/8" = 1' - 0" (0', 8', 16', 24')

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2 CITY OF HOUSTON COMMENTS	04/11/2022
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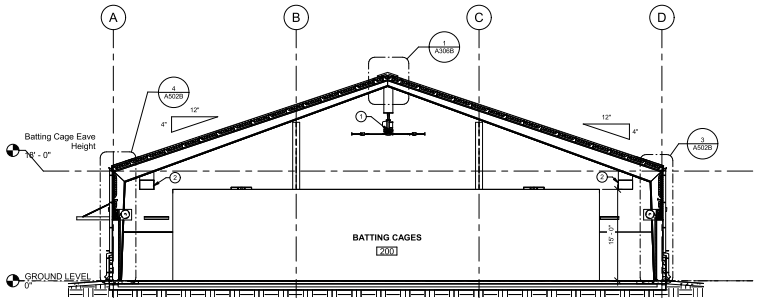
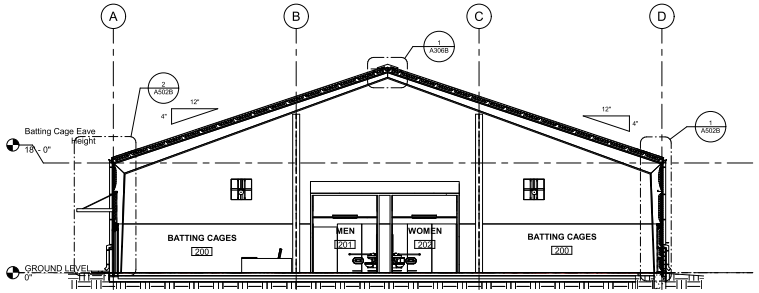
CONCESSION BUILDING SECTIONS

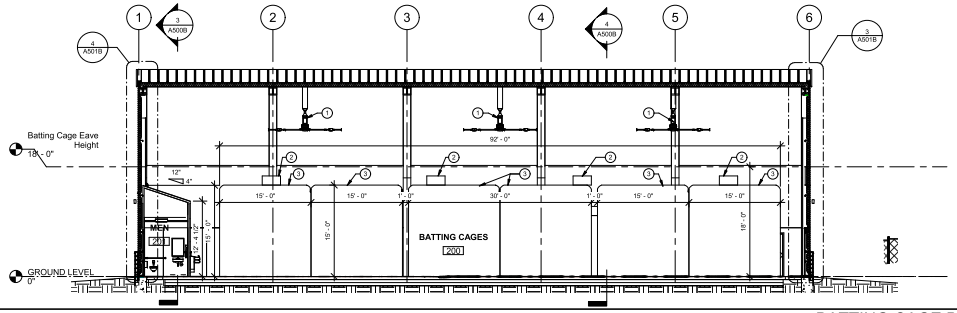
A500A



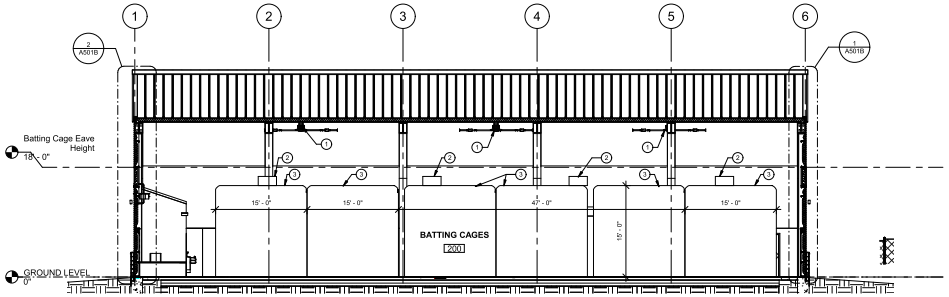
BATTING CAGE BUILDING SECTION 4
1/8" = 1'-0" 4



BATTING CAGE BUILDING SECTION 3
1/8" = 1'-0" 3



BATTING CAGE BUILDING SECTION 2
1/8" = 1'-0" 2



BATTING CAGE BUILDING SECTION 1
1/8" = 1'-0" 1

1. BIGASSFAN POWER FOIL X3.0 ATTACHED TO THE PRE-ENGINEERED BUILDING STRUCTURE. RE: SPECIFICATIONS
2. HEATING EQUIPMENT ATTACHED TO THE PRE-ENGINEERED BUILDING STRUCTURE. RE: MEP DRAWINGS AND SPECIFICATIONS
3. BATTING CAGE HANDS FREE SELF RETRATABLE SYSTEM. RE: SPECIFICATIONS

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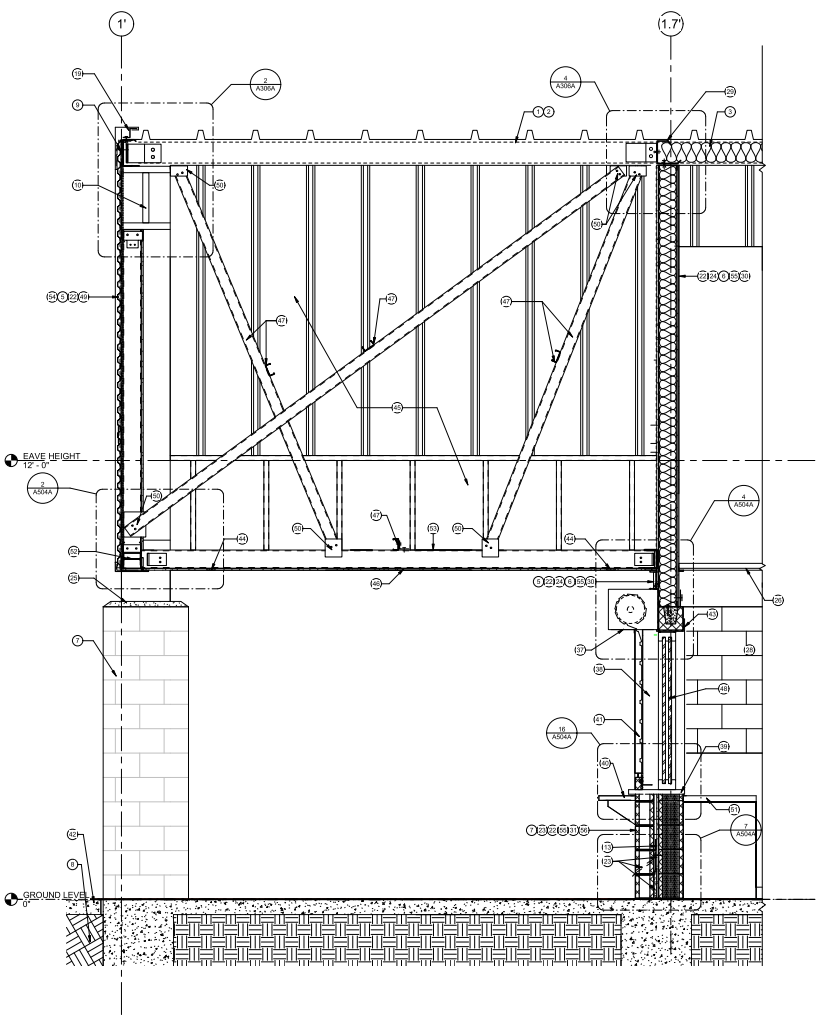
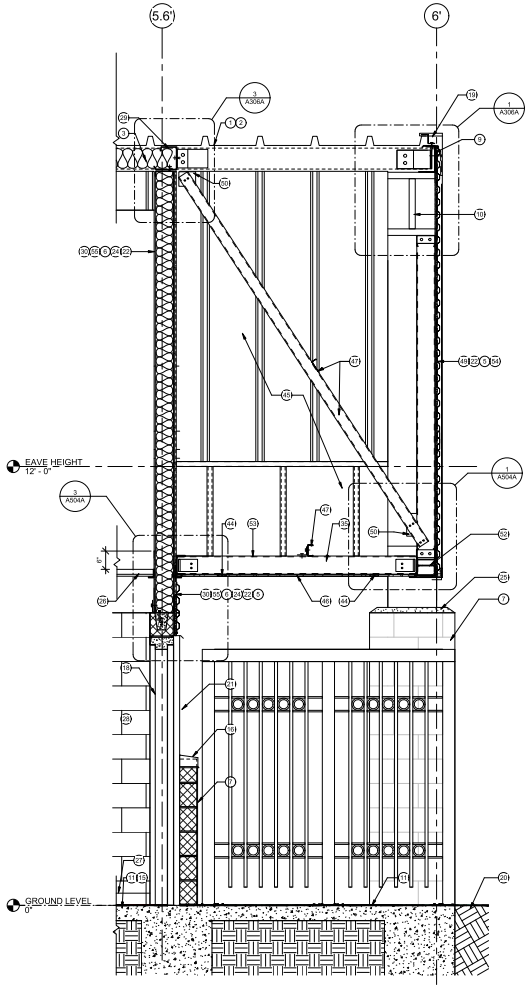
BATTING CAGE BUILDING SECTIONS

A500B



WALL SECTION 2
3/4" = 1'-0"



WALL SECTION 1
3/4" = 1'-0"

GRAPHIC SCALE:
3/4" = 1' - 0"

1. METAL 8"- Z-PURLIN SPACED AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
2. STANDING SEAM METAL ROOFING. RE: SPECIFICATIONS
3. R-30 BATT ROOFING INSULATION
4. METAL EAVE FLASHING, RE: METAL BUILDING SPECIFICATIONS
5. HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
6. R-19 BATT WALL INSULATION, TYPICAL
7. 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
8. SUB-GRADE, RE: CIVIL DRAWINGS
9. EAVE STRUT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
10. PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM. PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR).RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
11. CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
12. METAL GUTTER AND 5"X5" DOWNSPOUT, TYPICAL
13. ADJUSTABLE DOVE TAIL MASONRY TIES AT 16" O.C. TYPICAL.
14. DOWNSPOUT ANCHOR STRAP EQUALLY SPACED
15. ARCHITECTURE FINISH, RE: FINISH FLOOR PLAN AND SCHEDULE
16. CONTINUOUS METAL TRIM FLASHING
17. GUTTER CLIP ANCHORED @ 24 O.C.
18. EXTERIOR DOOR AND FRAME, RE: SPECIFICATIONS AND DOOR SCHEDULE
19. CONTINUOUS RAKE LINE METAL CLOSURE FLASHING TRIM PRE-FINISHED TO MATCH METAL STANDING SEAM METAL ROOFING
20. FINISH GRADE RE: CIVIL DRAWINGS
21. INTERIOR AND/OR EXTERIOR METAL TRIM RETURN
22. CONTINUOUS SELF ADHERING MEMBRANE WATER PROOFING OVER 5/8" FIBER CEMENT BOARD,TYPICAL
23. CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL
24. 8" METAL STUDS (16 GAUGE) AT 16" O.C. ANCHORED TO BUILDING FRAMING ABOVE AND MASONRY WALL BELOW
25. PRECAST STONE CAP ANCHORED TO MASONRY BLOCK
26. ACOUSTICAL LAY-IN CEILING, RE: FINISH SCHEDULE AND ARCHITECTURE SPECIFICATIONS
27. SCHEDULED WALL BASE, RE: FINISH SCHEDULE
28. 5/8" GYPSUM BOARD WALL BEYOND, RE: FINISH SCHEDULE
29. CONTINUOUS 8" CLOSURE AND ANCHOR GIRT ATTACHED TO ROOF FRAMING, TYPICAL
30. 5/8" GYPSUM WALL BOARD ON METAL STUD FROM TOP OF CMU WALL UNTILL UNDERSIDE OF DECK TYPICAL. FINISH COLOR TO MATCH CMU WALL PAINT COLOR.
31. 8" X 8" X 16" CONCRETE MASONRY UNIT EXTERIOR WALL STRUCTURE WITH LOOSE FILL INSULATION. RE: SPECIFICATIONS
32. REINFORCED CONCRETE SPLASH BLOCK 3" X 1 1/2" X 36", TYPICAL AT EACH DOWNSPOUT
33. ORNAMENTAL FENCE AND GATE AS SHOWN. FINISH PAINT TO BE SELECTED BY ARCHITECT
34. RE: STRUCTURAL DRAWINGS FOR REQUIRED FENCE FOOTING
35. 6" METAL SOFFIT FRAMING AT 16" O.C. WITH 3 5/8" CONTINUOUS HORIZONTAL BRACING
36. VERTICAL METAL WALL PANEL CORNER TRIM
37. ROLLING COUNTER DOOR HOUSING, RE: ARCHITECTURE SPECIFICATIONS
38. PRE-FINISHED METAL ROLLING COUNTER DOOR JAMB CLOSURE PANEL TO MATCH DOOR HOUSING FINISH
39. GALVANIZED STEEL SERVING COUNTER TOP FACTORY FINISH MECHANICALLY ANCHORED INTO WALL ASSEMBLY
40. ADA GALVANIZED STEEL SERVING COUNTER TOP LENGTH TO MATCH MAIN COUNTER TOP FACTORY FINISH MECHANICALLY ANCHORED TO WALL ASSEMBLY
41. INSULATED ROLLING PUSH-UP DOOR CURTAIN, GALVANIZED STEEL FACTORY FINISHED WITH CLEAR ANODIZED EXTRUDED ALUMINUM BOTTOM BAR WITH WEATHER SEAL AND MANUFACTURER LOCK MECHANISMS
42. EXTERIOR CONCRETE PAVED AREA, RE: STRUCTURE PLANS
43. PRE-FINISHED METAL ROLLING COUNTER DOOR HEAD CLOSURE PANEL TO MATCH DOOR HOOD HOUSING FINISH
44. CONTINUOUS METAL SOFFIT VENT, MANUFACTURE AIR VENT MODEL # SV301WH, COLOR TO BE SELECTED BY ARCHITECT
45. INTERIOR FACE OF ROOFING AND WALL PANELS (SOFFIT WALL) BEYOND
46. EXTERIOR SOFFIT GYPSUM BOARD MECHANICALLY FASTENED TO FRAMING
47. 3 5/8" METAL STUD BRACING @ 24" O.C. ANCHORED TO Z-GIRTS/ANCHOR GIRT AND METAL SOFFIT FRAMING BELOW WITH 3 5/8" CONTINUOUS BRIDGING
48. SCHEDULED WINDOW UNIT, RE: WINDOW SCHEDULE
49. CONTINUOUS 5/8" FIBER CEMENT BOARD ANCHORED OVER 6" (16 GAUGE) METAL STUD FRAMED @ 24 O.C. AND ATTACHED TO PRE-ENGINEERED BUILDING STRUCTURE
50. ANCHOR PLATE SPACED AS REQUIRED TO SECURE BRACING
51. BUILT IN COUNTERTOP AND MILLWORK. RE: MILLWORK
52. CONTINUOUS STRUCTURAL BEAM CONNECTED ON BOTH ENDS WITH THE PRE-ENGINEERED BUILDING COLUMNS. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
53. CONTINUOUS STRUCTURAL BEAM BEYOND CONNECTED ON ONE SIDE BY A STRUCTURAL COLUMN BEYOND AND THE OTHER SIDE WITH A CONTINUOUS HORIZONTAL BEAM SUPPORTING THE PRE-ENGINEERED END WALL. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
54. CONTINUOUS STRUCTURAL HANGER BEYOND CONNECTED ON THE TOP WITH THE PRE-ENGINEERED BUILDING STRUCTURE AND ON THE BOTTOM WITH A CONTINUOUS BEAM. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
55. STRUCTURAL COLUMN BEYOND. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
56. FRP PANEL . RE: SPECIFICATIONS
57. AC UNIT TO BE MOUNTED WITH A MINIMUM OF 7'-0" CLEARANCE FROM THE FLOOR FINISH LEVEL TO THE BOTTOM OF AC UNIT CAGE (PROPERTY ARMOR MINI SPLIT WALL BRACKET/CAGE COMBO). PROVIDE BLOCKINGS AS NECESSARY FOR THE UNIT BRACKETS ATTACHMENT TO THE ADJACENT WALL ASSEMBLY.
58. RCP TO BE FRAMED AROUND THE AC UNIT (PROPERTY ARMOR MINI SPLIT WALL BRACKET/CAGE COMBO) CAGE OPENING DIMENSIONS. THE TOP OF THE AC UNIT CAGE OPENING TO BE LEVELED WITH THE RCP LEVEL.

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75% CD	09/09/2021
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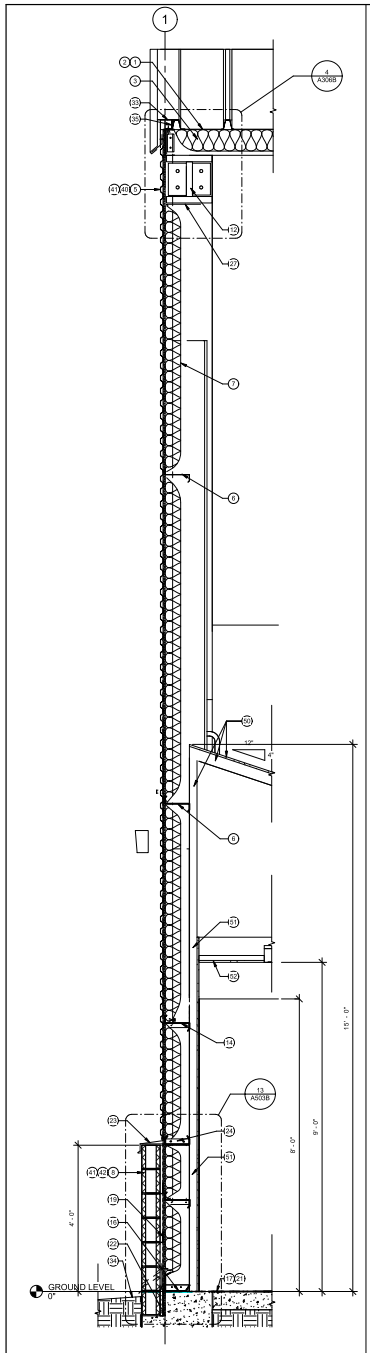
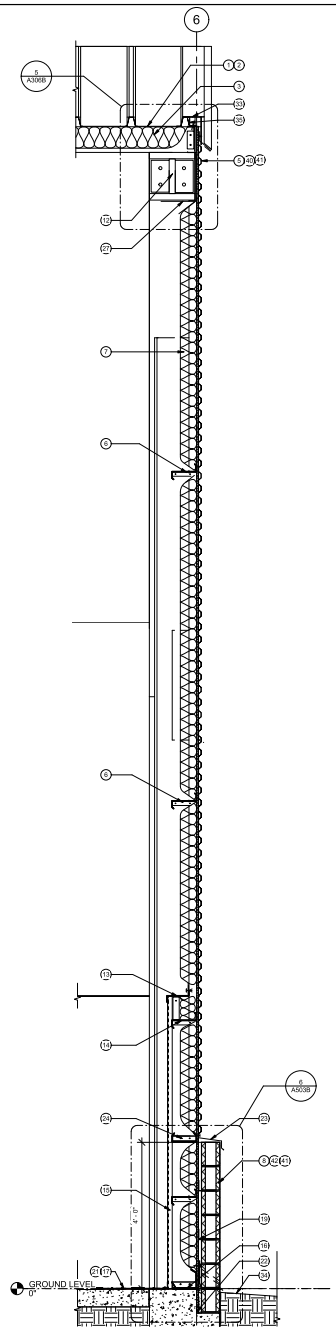
CONCESSION WALL SECTIONS

A501A



WALL SECTION 4
3/4" = 1'-0"



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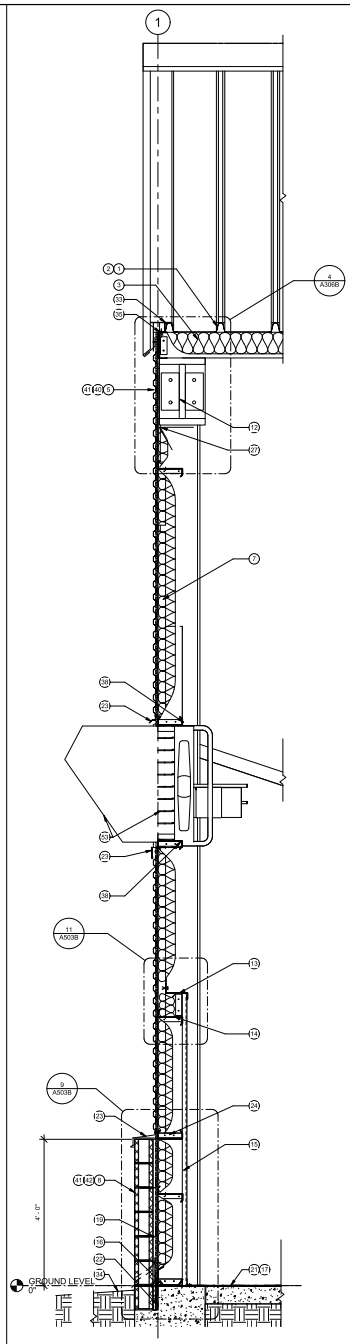

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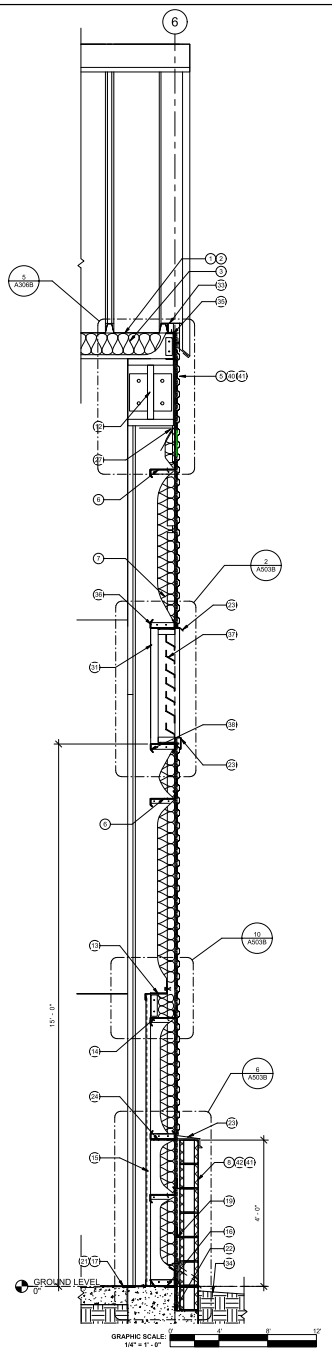

WALL SECTION 1
3/4" = 1'-0"

1. METAL 8"- Z-PURLIN SPACED AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
2. STANDING SEAM METAL ROOFING, RE: SPECIFICATIONS
3. R-30 BATT ROOFING INSULATION
4. METAL EAVE FLASHING, RE: METAL BUILDING SPECIFICATIONS
5. HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
6. FLUSH MOUNTED 8" - Z-GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
7. R-19 BATT WALL INSULATION, TYPICAL
8. 8" X 8" X 16" SPLIT FACE MASONRY BLOCK
9. CONCRETE PAVED SURFACE, RE: CIVIL DRAWINGS
10. SUB-GRADE, RE: CIVIL DRAWINGS
11. EAVE STRUT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
12. PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM, PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR) RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
13. LINER PANEL CLOSURE TRIM AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURER
14. HORIZONTAL ANCHOR GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
15. VERTICAL METAL INTERIOR LINER PANEL AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURER
16. PRE-ENGINEERED BUILDING BASE GIRT
17. CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
18. METAL GUTTER AND 8"X5" DOWNSPOUT, TYPICAL
19. ADJUSTABLE DOVE TAIL MASONRY TIES AT 16" O.C. TYPICAL
20. DOWNSPOUT ANCHOR STRAP EQUALLY SPACED
21. ARCHITECTURE FINISH, RE: FINISH FLOOR PLAN AND SCHEDULE
22. MASONRY LEDGE, RE: STRUCTURAL DRAWINGS
23. CONTINUOUS METAL TRIM FLASHING
24. HORIZONTAL 8" C-GIRT TO ANCHOR METAL LINER PANEL, TYPICAL
25. GUTTER CLIP ANCHORED @ 24 O.C.
26. PRE-FINISHED HEAVY-DUTY METAL CLOSURE FRAME ANCHORED TO METAL BUILDING FRAMING SYSTEM
27. INSULATION CLIP ANCHOR, CONTINUOUS
28. COLD ROLLED OVERHEAD PUSH-UP DOOR TRACK BRACING AS REQUIRED BY DOOR MANUFACTURER
29. OVERHEAD PUSH-UP DOOR BRACKET AND HORIZONTAL DOOR TRACK AS REQUIRED BY DOOR MANUFACTURE. RE: SPECIFICATIONS
30. OVERHEAD PUSH-UP DOOR VERTICAL TRACK
31. VERTICAL JAMB FRAME AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
32. EXTERIOR DOOR AND FRAME, RE: SPECIFICATIONS AND DOOR SCHEDULE
33. CONTINUOUS RAKE LINE METAL CLOSURE FLASHING TRIM PRE-FINISHED TO MATCH METAL STANDING SEAM METAL ROOFING
34. FINISH GRADE RE: CIVIL DRAWINGS
35. RAKE LINE STRUT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
36. 8" C- SECTION HEAD FRAME AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
37. SCHEDULED WALL LOUVER WITH INSECT SCREEN RE: MEP AND ARCHITECTURE SPECIFICATIONS
38. 8" C- SECTION SILL FRAME AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
39. INTERIOR METAL TRIM RETURN
40. CONTINUOUS 5/8" FIBER CEMENT BOARD ANCHORED OVER 2 1/2" COLD METAL (16 GAUGE) VERTICAL C-CHANNELS AT 24" O.C., TYPICAL
41. CONTINUOUS SELF ADHERING MEMBRANE WATER PROOFING OVER 5/8" FIBER CEMENT BOARD,TYPICAL
42. CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL
43. SPECIFIED EXTERIOR WINDOW UNIT WITH 1" INSULATED GLASS
44. 8" C-SECTION HEAD GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
45. 8" C-SECTION SILL GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
46. DRAINAGE OUTLET AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
47. CANOPY BRACE AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
48. JAMB FRAME AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE TO BE ATTACHED TO HORIZONTAL STRUCTURAL MEMBER TO FRAME THE CANOPY
49. CANOPY STRUCTURAL ATTACHMENT TO THE JAMB FRAME AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
50. RESTROOMS TOP CLOSING SYSTEM : 5/8" GYPSUM BOARD ON 3 5/8" METAL STUD FRAME @ 16" O.C. SLOPED (4"/12") AS SHOWN IN SECTIONS. RESTROOM SYSTEM TO BE FRAMED TO 2 1/2" METAL STUD FRAME WALL SYSTEM.
51. 5/8" GYPSUM BOARD ON 2 1/2" METAL STUD FRAME @ 16" O.C. AS FULL HEIGHT SHOWN IN SECTIONS. INSTALL #30 FRP PANEL ON ALL INTERIOR WALLS SIDES OF THE RESTROOMS. RE FINISH SCHEDULE: ROOM FINISH SCHEDULE.
52. SCHEDULED 2'X2' GRID CEILING RE: ROOM FINISH SCHEDULE.
53. MALL MOUNTED EXHAUST FAN. RE: ARCHITECTURAL & MEP DRAWINGS AND SPECIFICATIONS

KEY NOTES

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES AND APPLICATIONS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL DIMENSIONS AND OR EXISTING FIELD CONDITIONS PRIOR TO START.
5. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO THE ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.
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8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL, GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
11. PROVIDE KICKERS AT 48" O.C.
12. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
13. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
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Project No: 6001-02

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MEP ENGINEER

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

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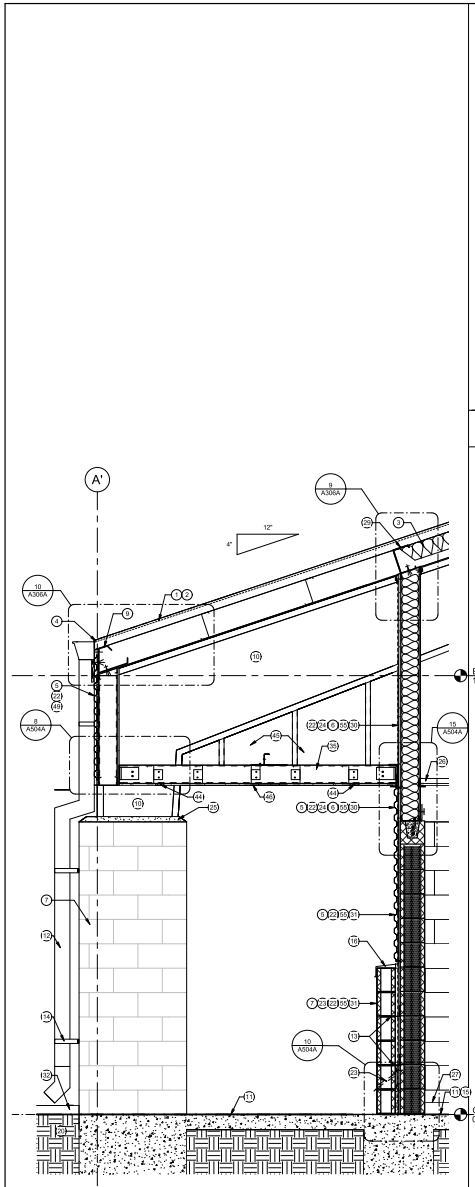
BATTING CAGE WALL SECTIONS

A501B



WALL SECTION 4
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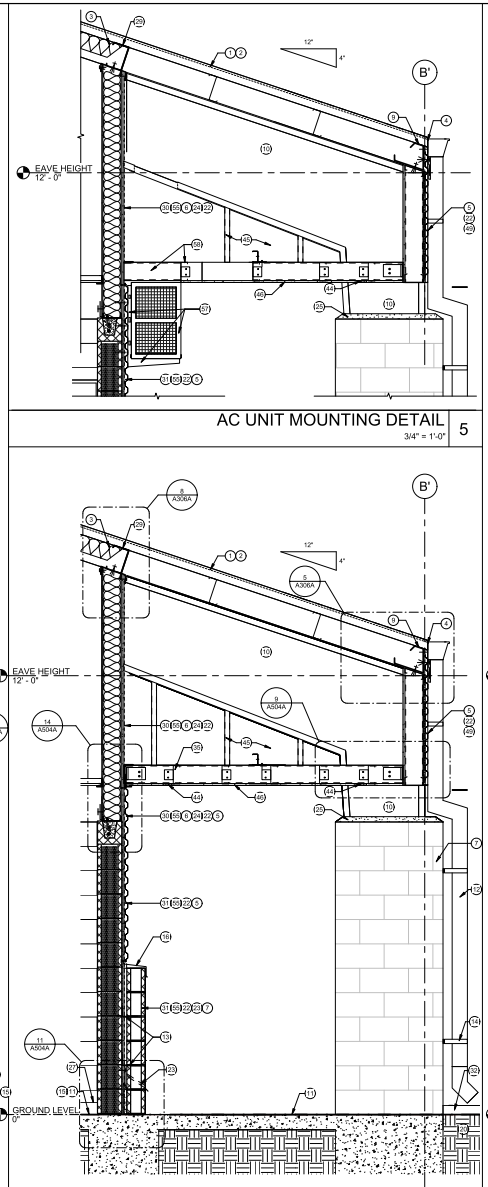

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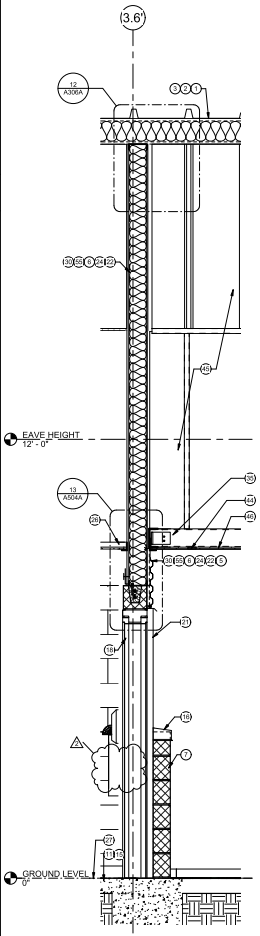

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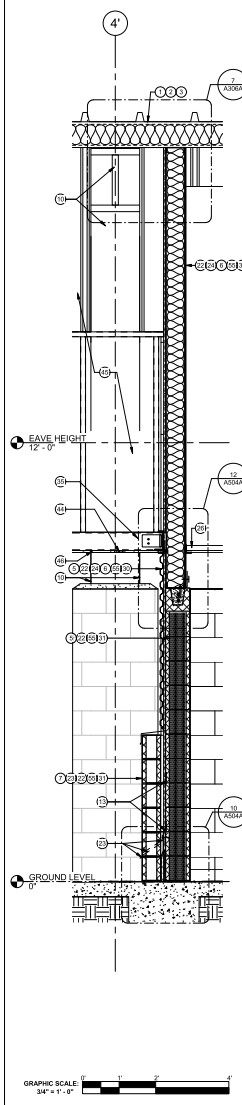

WALL SECTION 1
3/4" = 1'-0"

AC UNIT MOUNTING DETAIL 5
3/4" = 1'-0"

1. METAL 8"- Z-PURLIN SPACED AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
2. STANDING SEAM METAL ROOFING. RE: SPECIFICATIONS
3. R-30 BATT ROOFING INSULATION
4. METAL EAVE FLASHING, RE: METAL BUILDING SPECIFICATIONS
5. HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
6. R-19 BATT WALL INSULATION, TYPICAL
7. 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
8. SUB-GRADE, RE: CIVIL DRAWINGS
9. EAVE STRUT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
10. PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM. PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR) RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
11. CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
12. METAL GUTTER AND 5"X5" DOWNSPOUT, TYPICAL
13. ADJUSTABLE DOVE TAIL MASONRY TIES AT 16" O.C. TYPICAL
14. DOWNSPOUT ANCHOR STRAP EQUALLY SPACED
15. ARCHITECTURE FINISH, RE: FINISH FLOOR PLAN AND SCHEDULE
16. CONTINUOUS METAL TRIM FLASHING
17. GUTTER CLIP ANCHORED @ 24 O.C.
18. EXTERIOR DOOR AND FRAME, RE: SPECIFICATIONS AND DOOR SCHEDULE
19. CONTINUOUS RAKE LINE METAL CLOSURE FLASHING TRIM PRE-FINISHED TO MATCH METAL STANDING SEAM METAL ROOFING
20. FINISH GRADE RE: CIVIL DRAWINGS
21. INTERIOR AND/OR EXTERIOR METAL TRIM RETURN
22. CONTINUOUS SELF ADHERING MEMBRANE WATER PROOFING OVER 5/8" FIBER CEMENT BOARD,TYPICAL
23. CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL
24. 8" METAL STUDS (16 GAUGE) AT 16" O.C. ANCHORED TO BUILDING FRAMING ABOVE AND MASONRY WALL BELOW
25. PRECAST STONE CAP ANCHORED TO MASONRY BLOCK
26. ACOUSTICAL LAY-IN CEILING, RE: FINISH SCHEDULE AND ARCHITECTURE SPECIFICATIONS
27. SCHEDULED WALL BASE, RE: FINISH SCHEDULE
28. 5/8" GYPSUM BOARD WALL BEYOND, RE: FINISH SCHEDULE
29. CONTINUOUS 8" CLOSURE AND ANCHOR GIRT ATTACHED TO ROOF FRAMING, TYPICAL
30. 5/8" GYPSUM WALL BOARD ON METAL STUD FROM TOP OF CMU WALL UNTILL UNDERSIDE OF DECK TYPICAL. FINISH COLOR TO MATCH CMU WALL PAINT COLOR.
31. 8" X 8" X 16" CONCRETE MASONRY UNIT EXTERIOR WALL STRUCTURE WITH LOOSE FILL INSULATION. RE: SPECIFICATIONS
32. REINFORCED CONCRETE SPLASH BLOCK 3" X 1 1/2" X 36", TYPICAL AT EACH DOWNSPOUT
33. ORNAMENTAL FENCE AND GATE AS SHOWN. FINISH PAINT TO BE SELECTED BY ARCHITECT
34. RE: STRUCTURAL DRAWINGS FOR REQUIRED FENCE FOOTING
35. 6" METAL SOFFIT FRAMING AT 16" O.C. WITH 3 5/8" CONTINUOUS HORIZONTAL BRACING
36. VERTICAL METAL WALL PANEL CORNER TRIM
37. ROLLING COUNTER DOOR HOUSING, RE: ARCHITECTURE SPECIFICATIONS
38. PRE-FINISHED METAL ROLLING COUNTER DOOR JAMB CLOSURE PANEL TO MATCH DOOR HOUSING FINISH
39. GALVANIZED STEEL SERVING COUNTER TOP FACTORY FINISH MECHANICALLY ANCHORED INTO WALL ASSEMBLY
40. ADA GALVANIZED STEEL SERVING COUNTER TOP LENGTH TO MATCH MAIN COUNTER TOP FACTORY FINISH MECHANICALLY ANCHORED TO WALL ASSEMBLY
41. INSULATED ROLLING PUSH-UP DOOR CURTAIN, GALVANIZED STEEL FACTORY FINISHED WITH CLEAR ANODIZED EXTRUDED ALUMINUM BOTTOM BAR WITH WEATHER SEAL AND MANUFACTURER LOCK MECHANISMS
42. EXTERIOR CONCRETE PAVED AREA, RE: STRUCTURE PLANS
43. PRE-FINISHED METAL ROLLING COUNTER DOOR HEAD CLOSURE PANEL TO MATCH DOOR HOOD HOUSING FINISH
44. CONTINUOUS METAL SOFFIT VENT, MANUFACTURE AIR VENT MODEL # SV301WH, COLOR TO BE SELECTED BY ARCHITECT
45. INTERIOR FACE OF ROOFING AND WALL PANELS (SOFFIT WALL) BEYOND
46. EXTERIOR SOFFIT GYPSUM BOARD MECHANICALLY FASTENED TO FRAMING
47. 3 5/8" METAL STUD BRACING @ 24" O.C. ANCHORED TO Z-GIRTS/ANCHOR GIRT AND METAL SOFFIT FRAMING BELOW WITH 3 5/8" CONTINUOUS BRIDGING
48. SCHEDULED WINDOW UNIT, RE: WINDOW SCHEDULE
49. CONTINUOUS 5/8" FIBER CEMENT BOARD ANCHORED OVER 6" (16 GAUGE) METAL STUD FRAMED @ 24 O.C. AND ATTACHED TO PRE-ENGINEERED BUILDING STRUCTURE
50. ANCHOR PLATE SPACED AS REQUIRED TO SECURE BRACING
51. BUILT IN COUNTERTOP AND MILLWORK. RE: MILLWORK
52. CONTINUOUS STRUCTURAL BEAM CONNECTED ON BOTH ENDS WITH THE PRE-ENGINEERED BUILDING COLUMNS RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
53. CONTINUOUS STRUCTURAL BEAM BEYOND CONNECTED ON ONE SIDE BY A STRUCTURAL COLUMN BEYOND AND THE OTHER SIDE WITH A CONTINUOUS HORIZONTAL BEAM SUPPORTING THE PRE-ENGINEERED END WALL. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
54. CONTINUOUS STRUCTURAL HANGER BEYOND CONNECTED ON THE TOP WITH THE PRE-ENGINEERED BUILDING STRUCTURE AND ON THE BOTTOM WITH A CONTINUOUS BEAM. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
55. STRUCTURAL COLUMN BEYOND. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
56. FRP PANEL. RE: SPECIFICATIONS
57. AC UNIT TO BE MOUNTED WITH A MINIMUM OF 7'-0" CLEARANCE FROM THE FLOOR FINISH LEVEL TO THE BOTTOM OF AC UNIT CAGE (PROPERTY ARMOR MINI SPLIT WALL BRACKET/CAGE COMBO). PROVIDE BLOCKINGS AS NECESSARY FOR THE UNIT BRACKETS ATTACHMENT TO THE ADJACENT WALL ASSEMBLY.
58. RCP TO BE FRAMED AROUND THE AC UNIT (PROPERTY ARMOR MINI SPLIT WALL BRACKET/CAGE COMBO) CAGE OPENING DIMENSIONS. THE TOP OF THE AC UNIT CAGE OPENING TO BE LEVELLED WITH THE RCP LEVEL.

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Project No: 6001-02

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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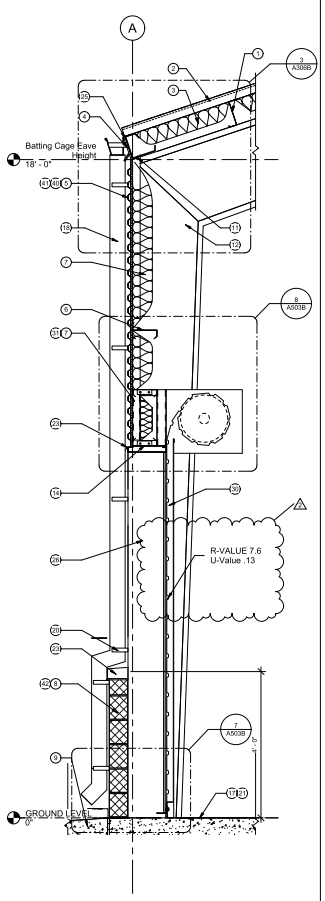

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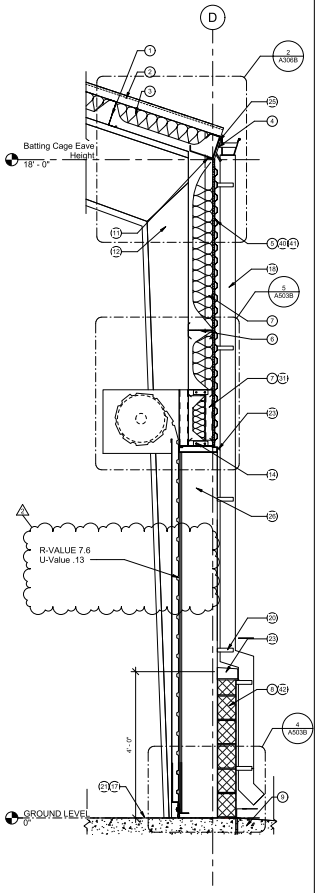

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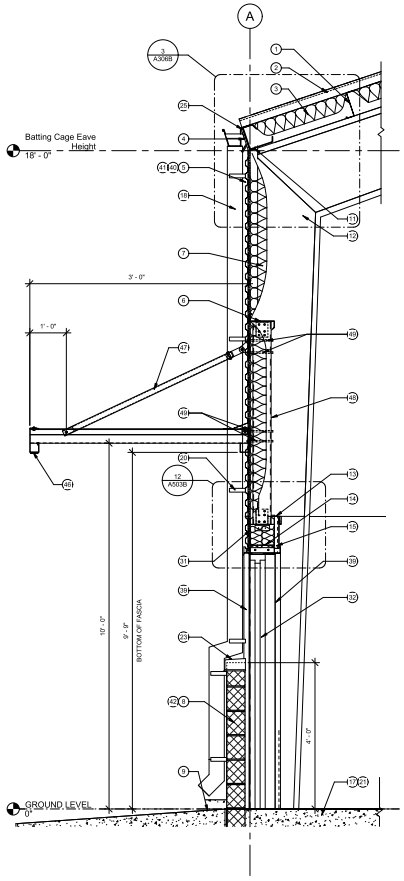

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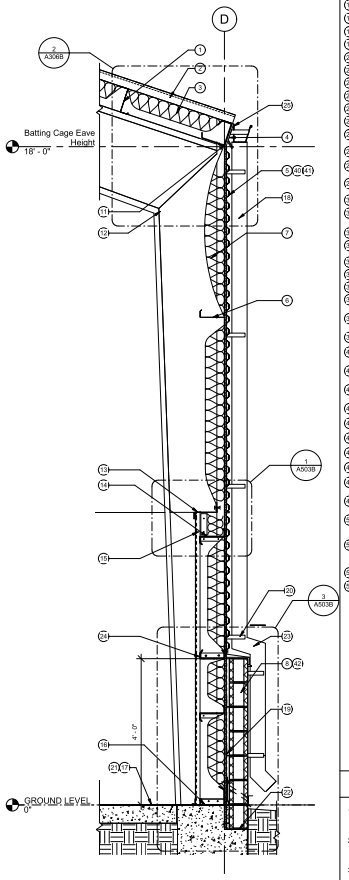

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3/4" = 1'-0"

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7. R-19 BATT WALL INSULATION, TYPICAL
8. 8" X 8" X 16" SPLIT FACE MASONRY BLOCK
9. CONCRETE PAVED SURFACE, RE: CIVIL DRAWINGS
10. SUB-GRADE, RE: CIVIL DRAWINGS
11. EAVE STRUT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
12. PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM, PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR).RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
13. LINER PANEL CLOSURE TRIM AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURER
14. HORIZONTAL ANCHOR GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
15. VERTICAL METAL INTERIOR LINER PANEL AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURER
16. PRE-ENGINEERED BUILDING BASE GIRT
17. CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
18. METAL GUTTER AND 5"X5" DOWNSPOUT, TYPICAL
19. ADJUSTABLE DOVE TAIL MASONRY TIES AT 16" O.C. TYPICAL.
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24. HORIZONTAL 8" C-GIRT TO ANCHOR METAL LINER PANEL, TYPICAL
25. GUTTER CLIP ANCHORED @ 24 O.C.
26. PRE-FINISHED HEAVY-DUTY METAL CLOSURE FRAME ANCHORED TO METAL BUILDING FRAMING SYSTEM
27. INSULATION CLIP ANCHOR, CONTINUOUS
28. COLD ROLLED OVERHEAD PUSH-UP DOOR TRACK BRACING AS REQUIRED BY DOOR MANUFACTURER
29. OVERHEAD PUSH-UP DOOR BRACKET AND HORIZONTAL DOOR TRACK AS REQUIRED BY DOOR MANUFACTURE. RE: SPECIFICATIONS
30. OVERHEAD PUSH-UP DOOR VERTICAL TRACK
31. VERTICAL JAMB FRAME AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
32. EXTERIOR DOOR AND FRAME. RE: SPECIFICATIONS AND DOOR SCHEDULE
33. CONTINUOUS RAKE LINE METAL CLOSURE FLASHING TRIM PRE-FINISHED TO MATCH METAL STANDING SEAM METAL ROOFING
34. FINISH GRADE RE: CIVIL DRAWINGS
35. RAKE LINE STRUT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
36. 8" C- SECTION HEAD FRAME AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
37. SCHEDULED WALL LOUVER WITH INSECT SCREEN RE: MEP AND ARCHITECTURE SPECIFICATIONS
38. 8" C- SECTION SILL FRAME AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
39. INTERIOR METAL TRIM RETURN
40. CONTINUOUS 5/8" FIBER CEMENT BOARD ANCHORED OVER 2 1/2" COLD METAL (16 GAUGE VERTICAL C-CHANNELS AT 24" O.C., TYPICAL.
41. CONTINUOUS SELF ADHERING MEMBRANE WATER PROOFING OVER 5/8" FIBER CEMENT BOARD,TYPICAL
42. CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL
43. SPECIFIED EXTERIOR WINDOW UNIT WITH 1" INSULATED GLASS
44. 8" C-SECTION HEAD GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
45. 8" C-SECTION SILL GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
46. DRAINAGE OUTLET AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
47. CANOPY BRACE AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
48. JAMB FRAME AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE TO BE ATTACHED TO HORIZONTAL STRUCTURAL MEMBER TO FRAME THE CANOPY
49. CANOPY STRUCTURAL ATTACHMENT TO THE JAMB FRAME AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
50. RESTROOMS TOP CLOSING SYSTEM : 5/8" GYPSUM BOARD ON 3 5/8" METAL STUD FRAME @ 16" O.C. SLOPED (4"/12") AS SHOWN IN SECTIONS. RESTROOM SYSTEM TO BE FRAMED TO 2 1/2" METAL STUD FRAME WALL SYSTEM.
51. 5/8" GYPSUM BOARD ON 2 1/2" METAL STUD FRAME @ 16" O.C. AS FULL HEIGHT SHOWN IN SECTIONS. INSTALL 4'X8' FRP PANEL ON ALL INTERIOR WALLS SIDES OF THE RESTROOMS. RE FINISH SCHEDULE: ROOM FINISH SCHEDULE.
52. SCHEDULED 2'X2' GRID CEILING RE: ROOM FINISH SCHEDULE.
53. MALL MOUNTED EXHAUST FAN. RE: ARCHITECTURAL & MEP DRAWINGS AND SPECIFICATIONS

KEY NOTES

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
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8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
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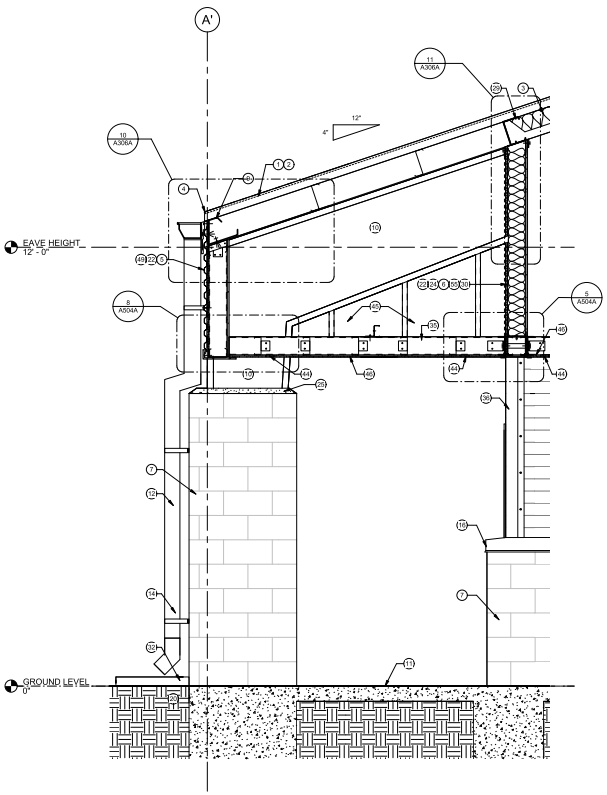
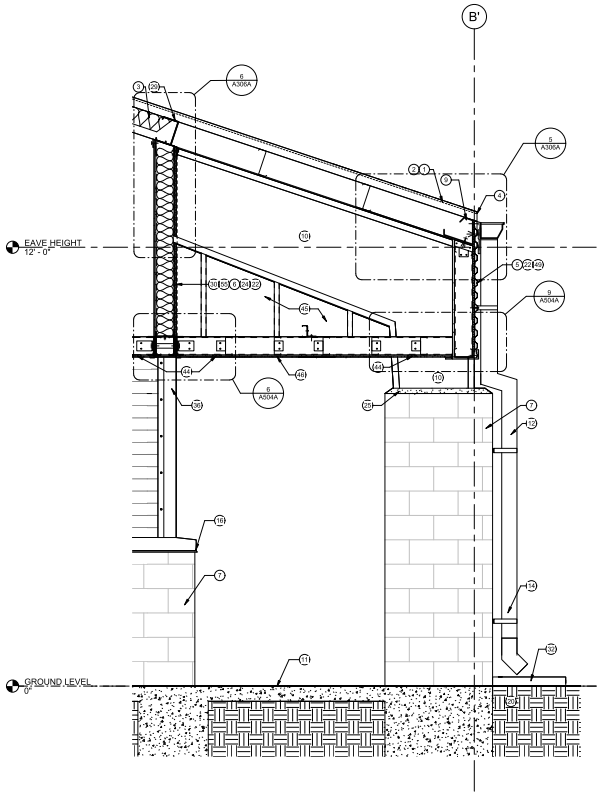
ISSUE FOR PERMIT	12/22/2021
1 CITY OF HOUSTON COMMENTS	01/18/2022
2 CITY OF HOUSTON COMMENTS	04/11/2022
ISSUE FOR BID	09/07/2022

BATTING CAGE WALL SECTIONS

A502B



WALL SECTION
3/4" = 1'-0"
2



WALL SECTION
3/4" = 1'-0"
1

1. METAL 8"- Z-PURLIN SPACED AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
2. STANDING SEAM METAL ROOFING. RE: SPECIFICATIONS
3. R-30 BATT ROOFING INSULATION
4. METAL EAVE FLASHING, RE: METAL BUILDING SPECIFICATIONS
5. HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
6. R-19 BATT WALL INSULATION, TYPICAL
7. 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
8. SUB-GRADE, RE: CIVIL DRAWINGS
9. EAVE STRUT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
10. PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM. PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR).RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
11. CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
12. METAL GUTTER AND 5"X5" DOWNSPOUT, TYPICAL
13. ADJUSTABLE DOVE TAIL MASONRY TIES AT 16" O.C. TYPICAL.
14. DOWNSPOUT ANCHOR STRAP EQUALLY SPACED
15. ARCHITECTURE FINISH, RE: FINISH FLOOR PLAN AND SCHEDULE
16. CONTINUOUS METAL TRIM FLASHING
17. GUTTER CLIP ANCHORED @ 24 O.C.
18. EXTERIOR DOOR AND FRAME, RE: SPECIFICATIONS AND DOOR SCHEDULE
19. CONTINUOUS RAKE-LINE METAL CLOSURE FLASHING TRIM PRE-FINISHED TO MATCH METAL STANDING SEAM METAL ROOFING
20. FINISH GRADE RE: CIVIL DRAWINGS
21. INTERIOR AND/OR EXTERIOR METAL TRIM RETURN
22. CONTINUOUS SELF ADHERING MEMBRANE WATER PROOFING OVER 5/8" FIBER CEMENT BOARD,TYPICAL
23. CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL
24. 8" METAL STUDS (16 GAUGE) AT 16" O.C. ANCHORED TO BUILDING FRAMING ABOVE AND MASONRY WALL BELOW
25. PRECAST STONE CAP ANCHORED TO MASONRY BLOCK
26. ACOUSTICAL LAY-IN CEILING, RE: FINISH SCHEDULE AND ARCHITECTURE SPECIFICATIONS
27. SCHEDULED WALL BASE, RE: FINISH SCHEDULE
28. 5/8" GYPSUM BOARD WALL BEYOND, RE: FINISH SCHEDULE
29. CONTINUOUS 8" CLOSURE AND ANCHOR GIRT ATTACHED TO ROOF FRAMING, TYPICAL
30. 5/8" GYPSUM WALL BOARD ON METAL STUD FROM TOP OF CMU WALL UNTILL UNDERSIDE OF DECK TYPICAL. FINISH COLOR TO MATCH CMU WALL PAINT COLOR.
31. 8" X 8" X 16" CONCRETE MASONRY UNIT EXTERIOR WALL STRUCTURE WITH LOOSE FILL INSULATION. RE: SPECIFICATIONS
32. REINFORCED CONCRETE SPLASH BLOCK 3" X 1 1/2" X 36", TYPICAL AT EACH DOWNSPOUT
33. ORNAMENTAL FENCE AND GATE AS SHOWN. FINISH PAINT TO BE SELECTED BY ARCHITECT
34. RE: STRUCTURAL DRAWINGS FOR REQUIRED FENCE FOOTING
35. 6" METAL SOFFIT FRAMING AT 16" O.C. WITH 3 5/8" CONTINUOUS HORIZONTAL BRACING
36. VERTICAL METAL WALL PANEL CORNER TRIM
37. ROLLING COUNTER DOOR HOUSING, RE: ARCHITECTURE SPECIFICATIONS
38. PRE-FINISHED METAL ROLLING COUNTER DOOR JAMB CLOSURE PANEL TO MATCH DOOR HOUSING FINISH
39. GALVANIZED STEEL SERVING COUNTER TOP FACTORY FINISH MECHANICALLY ANCHORED INTO WALL ASSEMBLY
40. ADA GALVANIZED STEEL SERVING COUNTER TOP LENGTH TO MATCH MAIN COUNTER TOP FACTORY FINISH MECHANICALLY ANCHORED TO WALL ASSEMBLY
41. INSULATED ROLLING PUSH-UP DOOR CURTAIN, GALVANIZED STEEL FACTORY FINISHED WITH CLEAR ANODIZED EXTRUDED ALUMINUM BOTTOM BAR WITH WEATHER SEAL AND MANUFACTURER LOCK MECHANISMS
42. EXTERIOR CONCRETE PAVED AREA, RE: STRUCTURE PLANS
43. PRE-FINISHED METAL ROLLING COUNTER DOOR HEAD CLOSURE PANEL TO MATCH DOOR HOOD HOUSING FINISH
44. CONTINUOUS METAL SOFFIT VENT. MANUFACTURE AIR VENT MODEL # SV301WH, COLOR TO BE SELECTED BY ARCHITECT
45. INTERIOR FACE OF ROOFING AND WALL PANELS (SOFFIT WALL) BEYOND
46. EXTERIOR SOFFIT GYPSUM BOARD MECHANICALLY FASTENED TO FRAMING
47. 3 5/8" METAL STUD BRACING @ 24" O.C. ANCHORED TO Z-GIRTS/ANCHOR GIRT AND METAL SOFFIT FRAMING BELOW WITH 3 5/8" CONTINUOUS BRIDGING
48. SCHEDULED WINDOW UNIT, RE: WINDOW SCHEDULE
49. CONTINUOUS 5/8" FIBER CEMENT BOARD ANCHORED OVER 6" (16 GAUGE) METAL STUD FRAMED @ 24 O.C. AND ATTACHED TO PRE-ENGINEERED BUILDING STRUCTURE
50. ANCHOR PLATE SPACED AS REQUIRED TO SECURE BRACING
51. BUILT IN COUNTERTOP AND MILLWORK. RE: MILLWORK
52. CONTINUOUS STRUCTURAL BEAM CONNECTED ON BOTH ENDS WITH THE PRE-ENGINEERED BUILDING COLUMNS RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
53. CONTINUOUS STRUCTURAL BEAM BEYOND CONNECTED ON ONE SIDE BY A STRUCTURAL COLUMN BEYOND AND THE OTHER SIDE WITH A CONTINUOS HORIZONTAL BEAM SUPPORTING THE PRE-ENGINEERED END WALL. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
54. CONTINUOUS STRUCTURAL HANGER BEYOND CONNECTED ON THE TOP WITH THE PRE-ENGINEERED BUILDING STRUCTURE AND ON THE BOTTOM WITH A CONTINUOUS BEAM. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
55. STRUCTURAL COLUMN BEYOND. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
56. FRP PANEL. RE: SPECIFICATIONS
57. AC UNIT TO BE MOUNTED WITH A MINIMUM OF 7'-0" CLEARANCE FROM THE FLOOR FINISH LEVEL TO THE BOTTOM OF AC UNIT CAGE (PROPERTY ARMOR MINI SPLIT WALL BRACKET/CAGE COMBO). PROVIDE BLOCKINGS AS NECESSARY FOR THE UNIT BRACKETS ATTACHMENT TO THE ADJACENT WALL ASSEMBLY.
58. RCP TO BE FRAMED AROUND THE AC UNIT (PROPERTY ARMOR MINI SPLIT WALL BRACKET/CAGE COMBO) CAGE OPENING DIMENSIONS. THE TOP OF THE AC UNIT CAGE OPENING TO BE LEVELLED WITH THE RCP LEVEL.

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Project No: 6001-02

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
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Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
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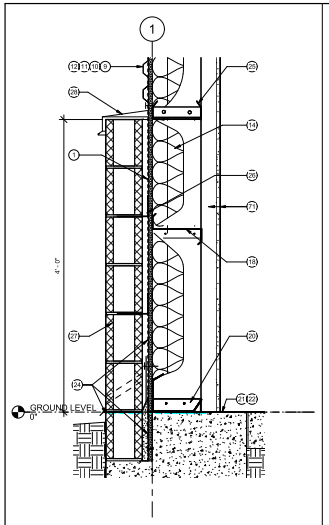
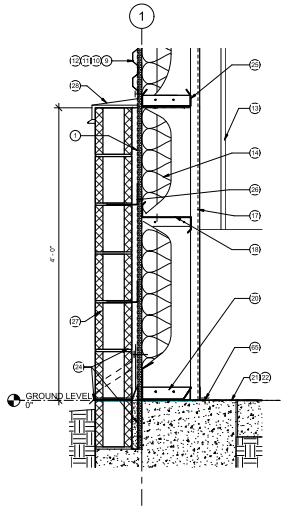
ISSUE FOR BID	09/07/2022

CONCESSION WALL SECTIONS

A503A



DETAIL 13
1 1/2" = 1'-0"



DETAIL 9
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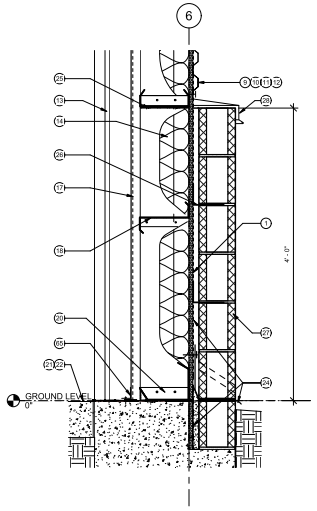

DETAIL 6
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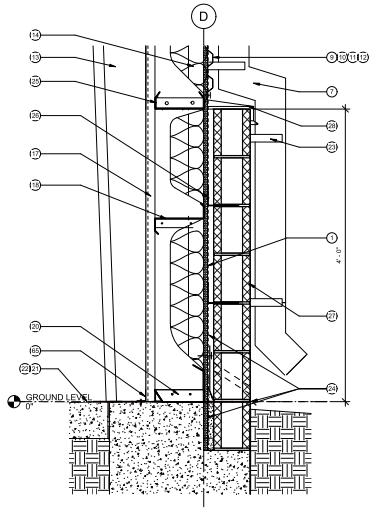
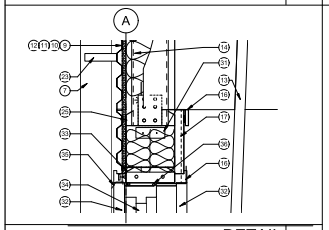


DETAIL 3
1 1/2" = 1'-0"

1. THERMAL BREAK TAPE, RE: SPECIFICATIONS
2. METAL 8" -Z- PURLING SPACED AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
3. STANDING SEAM METAL ROOFING. RE: SPECIFICATIONS
4. R-30 BATT ROOFING INSULATION
5. EAVE STRUT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE.
6. METAL EAVE FLASHING ANCHORED TO BUILDING FRAMING AND HOLD-DOWN CLEAT CONTINUOUS ALONG EAVE FRAMING TYPICAL
7. METAL GUTTER AND 8"X5" DOWNSPOUT
8. GUTTER CLIP ANCHOR AT 24" O.C.
9. HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
10. CONTINUOUS SELF-ADHERING MEMBRANE WATER PROOFING
11. CONTINUOUS 5/8" THICK FIBER CEMENT BOARD, TYPICAL
12. VERTICAL METAL 2 1/2" COLD ROLLED C-CHANNEL (16 GAUGE) ANCHORED TO HORIZONTAL GIRTS PREFORMED CLIP FLANGES AT 24" O.C., TYPICAL
13. PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM, PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR) RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
14. R-19 BATT WALL INSULATION, TYPICAL
15. INSULATION CLIP ANCHOR, CONTINUOUS
16. LINER PANEL CLOSURE TRIM AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
17. VERTICAL METAL INTERIOR LINER PANEL AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURER
18. FLUSH MOUNTED 8"-Z-GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
19. HORIZONTAL ANCHOR GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
20. PRE-ENGINEERED BUILDING BASE GIRT
21. CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
22. ARCHITECTURE FINISH. RE: FINISH FLOOR PLAN AND SCHEDULE
23. DOWNSPOUT ANCHOR STRAP EQUALLY SPACED
24. CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL
25. HORIZONTAL 8"-C-GIRT TO ANCHOR METAL LINER PANEL, TYPICAL
26. ADJUSTABLE DOVE TAIL MASONRY TIES AT 16" O.C. TYPICAL
27. 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
28. CONTINUOUS METAL TRIM FLASHING
29. CONTINUOUS METAL RAKE LINE FLASHING ANCHORED TO BUILDING FRAMING AND HOLD-DOWN CLEAT CONTINUOUS ALONG RAKE FRAMING, TYPICAL
30. RAKE LINE STRUT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
31. VERTICAL JAMB FRAME AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
32. INTERIOR METAL TRIM RETURN
33. 8" C-SECTION HEAD GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
34. EXTERIOR DOOR AND FRAME, RE: SPECIFICATION AND DOOR SCHEDULE
35. CONTINUOUS METAL TRIM FLASHING
36. SEALANT AND BACKER ROD, RE: SPECIFICATIONS, AT BOTH SIDES OF DOOR FRAME
37. DOOR FRAME Z-CLIP ANCHORS FACTORY SET, MINIMUM 4 EACH JAMB EQUALLY SPACED
38. METAL FASTENERS AT EACH JAMB EQUALLY SPACED
39. EXTEND WATERPROOF MEMBRANE ALL AROUND BUILDING FRAME HEAD, JAMB, SILL FACE SURFACE
40. CONTINUOUS 1" MIN. AIR CAVITY
41. HORIZONTAL MASONRY FIXED TIE AT 16" O.C. TYPICAL
42. 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
43. CONCRETE PAVED SURFACE, RE: CIVIL DRAWINGS
44. DOOR THRESHOLD, RE: SPECIFICATIONS SET-IN WATERPROOF MASTIC
45. SCHEDULED WALL LOUVER WITH INSECT SCREEN, RE: MEP & ARCHITECTURE SPECIFICATIONS
46. SEALANT AND BACKER ROD AT BOTH SIDES OF LOUVER VENT UNIT, RE: SPECIFICATIONS
47. VENT LOUVER FRAME CLIP ANCHOR FACTORY SET PRIOR TO INSTALLATION
48. 8" C-SECTION SILL GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
49. SPECIFIED EXTERIOR WINDOW UNIT WITH 1" INSULATED GLASS
50. SEALANT AND BACKER ROD AT BOTH SIDES OF WINDOW UNIT, RE: SPECIFICATIONS
51. WINDOW FRAME JAMB ANCHORED AS RECOMMENDED BY MANUFACTURE
52. PRE-FINISHED HEAVY-DUTY METAL CLOSURE FRAME ANCHORED TO METAL BUILDING FRAMING SYSTEM
53. SCHEDULED HOLLOW METAL DOOR FRAME
54. CONTINUOUS 5/8" THICK ON 3 5/8" METAL STUD FRAME GYPSUM BOARD, RE: ARCHITECTURE FINISH SCHEDULE
55. OVERHEAD PUSH-UP DOOR VERTICAL TRACK
56. SEALANT AND BACKER ROD AT BOTH SIDES OF OVERHEAD PUSH-UP DOOR FRAME, RE: SPECIFICATIONS
57. HORIZONTAL ANCHOR GIRT TO SUPPORT OVERHEAD PUSH-UP DOOR TRACK
58. CONTINUOUS CLOSURE TRIM
59. SCHEDULED DOOR, RE: DOOR SCHEDULE, SPECIFICATIONS, DOOR HARDWARE
60. OVERHEAD DOOR AND TRACK ASSEMBLY, RE: SPECIFICATIONS, DOOR SCHEDULE.
61. OVERHEAD PUSH-UP DOOR JAMB ANCHOR FACTORY WELDED TO FRAME PRIOR TO INSTALLATION
62. EXTEND WATERPROOF MEMBRANE ALL AROUND BUILDING FRAME, HEAD AND JAMB FACE SURFACE
63. CONCRETE FLOOR AND ARCHITECTURE FINISH, RE: STRUCTURE DRAWINGS AND ARCHITECTURE FLOOR PLAN AND SCHEDULE
64. CONCRETE PAVED SURFACE, RE:CIVIL DRAWINGS
65. CONTINUOUS INTERIOR LINER PANEL METAL BASE TRIM ANCHORED TO FLOOR AND LINER PANEL
66. METAL RIDGE CAP FLASHING, RE: SPECIFICATIONS
67. OUTSIDE Z-CLOSURE AND RIDGE CAP HOLD-DOWN ANCHOR CLIT (TYPICAL)
68. STANDING SEAM METAL ROOF PANEL ANCHOR CLIP
69. SECONDARY PURLIN FRAMING SECTION TO SUPPORT METAL RIDGE CAP FLASHING TYPICAL
70. EXTERIOR METAL TRIM RETURN
71. 5/8" GYPSUM BOARD ON 2 1/2" METAL STUD FRAME @ 16" O.C. AS FULL HEIGHT SHOWN IN SECTIONS. INSTALL 4'X8' FRP PANEL ON ALL INTERIOR WALLS SIDES OF THE RESTROOMS. RE FINISH SCHEDULE: ROOM FINISH SCHEDULE.



DETAIL 12
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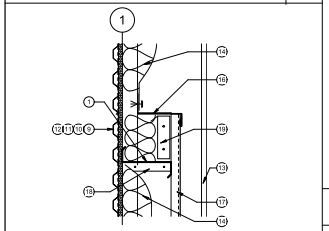

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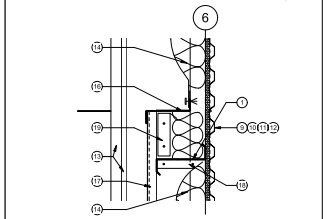

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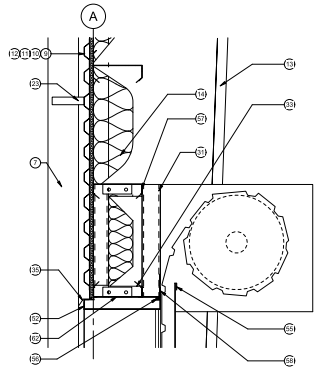

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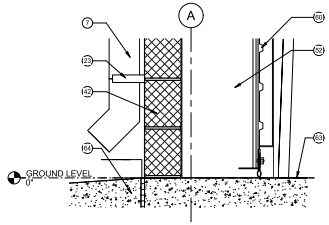

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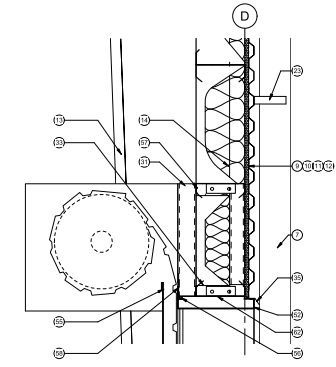

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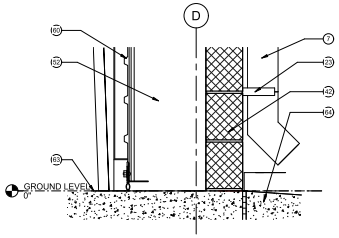

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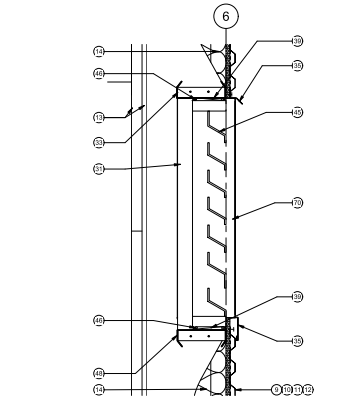

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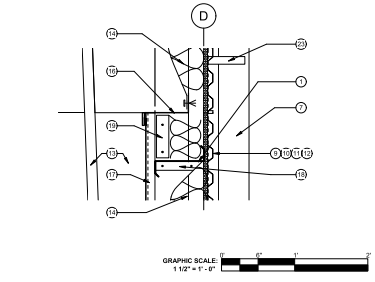

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

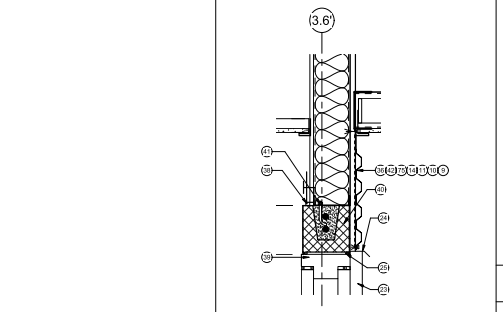
Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

BATTING CAGE EXTERIOR WALL DETAILS

A503B



DETAIL 13
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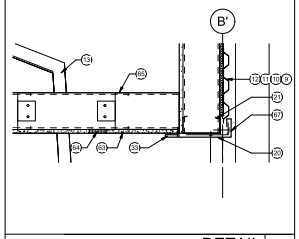

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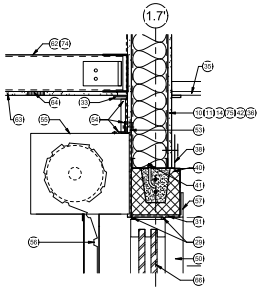

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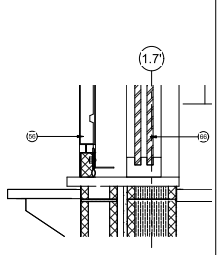

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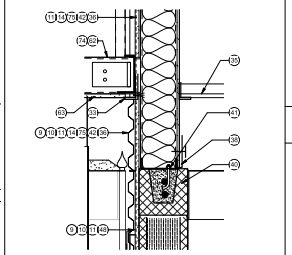

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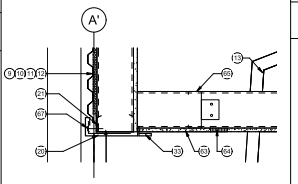

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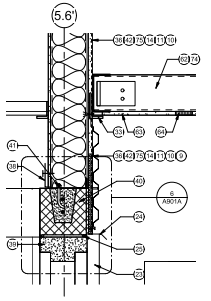

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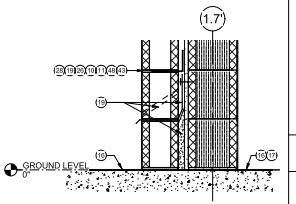

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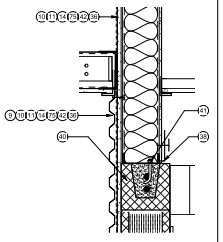

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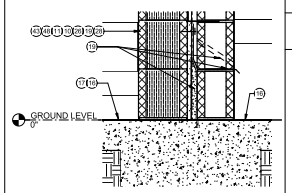

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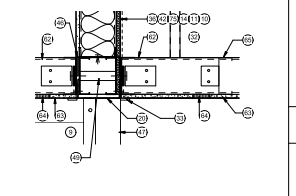

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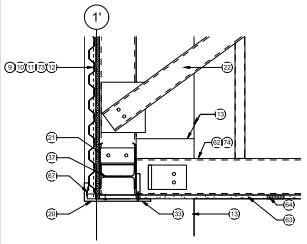

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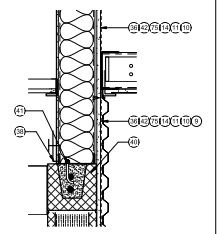

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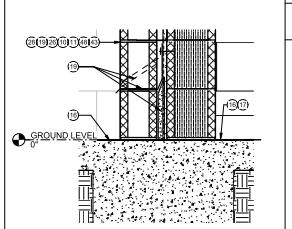

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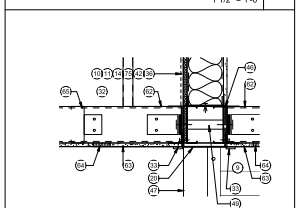

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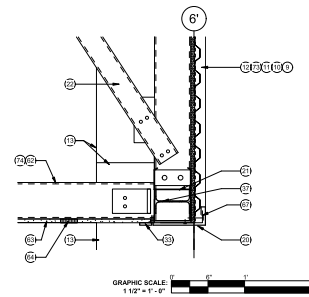

DETAIL 1
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1. THERMAL BREAK TAPE, RE: SPECIFICATIONS
2. METAL 8" -Z- PURLING SPACED AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
3. STANDING SEAM METAL ROOFING. RE: SPECIFICATIONS
4. R-30 BATT ROOFING INSULATION
5. EAVE STRUT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE.
6. METAL EAVE FLASHING ANCHORED TO BUILDING FRAMING AND HOLD-DOWN CLEAT CONTINUOUS ALONG EAVE FRAMING TYPICAL
7. METAL GUTTER AND 5"X5" DOWNSPOUT
8. GUTTER CLIP ANCHOR AT 24" O.C.
9. HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
10. CONTINUOUS SELF-ADHERING MEMBRANE WATER PROOFING
11. CONTINUOUS 5/8" THICK FIBER CEMENT BOARD, TYPICAL
12. VERTICAL METAL 6" COLD ROLLED C-CHANNEL ANCHORED TO HORIZONTAL STRUCTURAL BEAM PREFORMED CLIP FLANGES AT 24" O.C., TYPICAL
13. PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM, PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR) RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
14. R-19 BATT WALL INSULATION, TYPICAL
15. LINER PANEL CLOSURE TRIM AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
16. CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
17. ARCHITECTURE FINISH. RE: FINISH FLOOR PLAN AND SCHEDULE
18. DOWNSPOUT ANCHOR STRAPS EQUALLY SPACED
19. CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL
20. PRE-FINISHED SHEET METAL CLOSURE TRIM ANCHORED TO WALL FRAME, SIZE TO FIT
21. FLUSH MOUNTED 8" C-GIRT ANCHORED TO STRUCTURAL BUILDING FRAME
22. 3 5/8" METAL STUD BRACING AT 24" O.C. ANCHORED TO Z-PURLIN
23. INTERIOR METAL TRIM RETURN
24. CONTINUOUS METAL TRIM FLASHING
25. SEALANT AND BACKER ROD, RE: SPECIFICATIONS, AT BOTH SIDES OF DOOR FRAME
26. CONTINUOUS 1" MIN. AIR CAVITY
27. HORIZONTAL MASONRY FIXED TIE AT 16" O.C. TYPICAL
28. 8" X 8" X 16" SPLIT FACE MASONRY BLOCK
29. SEALANT AND BACKER ROD AT BOTH SIDES OF WINDOW UNIT, RE: SPECIFICATIONS
30. SEALANT AND BACKER ROD AT BOTH SIDES OF OVERHEAD PUSH-UP DOOR FRAME, RE: SPECIFICATIONS
31. EXTEND WATERPROOF MEMBRANE ALL AROUND BUILDING FRAME, HEAD AND JAMB FACE SURFACE
32. INTERIOR FACE OF ROOFING/WALL PANELS BEYOND.
33. PRE-FINISH SHEET METAL SOFFIT PANEL TRIM MECHANICALLY ANCHORED TO BUILDING FRAMING
34. RAKE LINE FLASHING EXTERIOR RETURN TRIM
35. ACOUSTICAL LAY-IN CEILING, RE: FINISH SCHEDULE AND ARCHITECTURE SPECIFICATIONS
36. 5/8" GYPSUM BOARD. COLOR TO MATCH ROOM CMU WALL COLOR.
37. CONTINUOUS STRUCTURAL BEAM STRUCTURALLY CONNECTED ON BOTH ENDS BY THE PRE-ENGINEERED BUILDING COLUMNS (ON GRID A' & B') AND ON THE CENTER BY THE ADJACENT BEAMS (ON GRID A.3',A.45',A.65',A.7') RE: STRUCTURAL DRAWINGS.
38. METAL CORNER BEAD, TYPICAL
39. GROUT FILLED HOLLOW METAL DOOR FRAME WITH JAMB ANCHOR AND SCHEDULED DOOR
40. REINFORCED GROUT FILLED CONCRETE MASONRY LINTEL AND BOND BEAM
41. BOTTOM TRACK ANCHOR BOLT WITH METAL STUD BLOCKING SPACED AS REQUIRED.
42. 8" METAL STUD (16 GAUGE) FRAMING AT 16" O.C.
43. 4' HIGH FRP PANEL ON ALL SIDES OF THE CONCESSION KITCHEN WALLS. RE: SPECIFICATIONS
44. CONTINUOUS METAL TOP SLIP TRACK ANCHORED TO ROOF FRAMING
45. CONTINUOUS 8" CLOSURE AND ANCHOR GIRT ATTACHED TO ROOF FRAMING, TYPICAL
46. FACTORY FORMED 6" COLD ROLLED HEAD BEAM TO SPAN BREEZEWAY
47. VERTICAL METAL WALL PANEL CORNER TRIM PRE-FINISHED TO MATCH WALL PANEL PROVIDED BY WALL PANEL MANUFACTURER
48. 8X8X16 CONCRETE MASONRY UNIT EXTERIOR WALL STRUCTURE WITH LOOSE FILL INSULATION, RE: SPECIFICATIONS
49. COLD ROLLED HEAD BEAM STIFFENER PLATE FACTORY APPLIED, SPACED AS REQUIRED.
50. PRE-FINISHED METAL ROLLING COUNTER DOOR JAMB WITH ANCHOR CLEATS CLOSURE PANEL TO MATCH DOOR HOUSING FINISH
51. SCHEDULED WALL BASE, RE: FINISH SCHEDULE AND SPECIFICATIONS
52. CLARK DIETRICH 093 ZINC CONTROL JOINT AT SOFFIT CEILING PANEL OR APPROVED EQUAL, TYPICAL
53. SUB-FLASHING, CONTINUOUS
54. CLOSURE TRIM TO MATCH WALL PANEL FINISH
55. ROLLING COUNTER DOOR HOOD, RE: ARCHITECTURE SPECIFICATIONS
56. INSULATED ROLLING PUSH-UP COUNTER DOOR CURTAIN, GALVANIZED STEEL FACTORY FINISHED WITH CLEAR ANODIZED EXTRUDED ALUMINUM BOTTOM BAR WITH WEATHER SEAL AND MANUFACTURER LOCK MECHANISMS KEYED TO INTERIOR
57. PRE-FINISHED METAL ROLLING COUNTER DOOR HEAD CLOSURE PANEL TO MATCH DOOR FINISH
58. REINFORCED GROUT FILLED CONCRETE MASONRY JAMB BLOCK, TYPICAL
59. GALVANIZED STEEL SERVING COUNTER TOP FACTORY FINISH MECHANICALLY ANCHORED TO WALL ASSEMBLY
60. CONTINUOUS SEALANT
61. ANCHOR PLATE SPACED AS REQUIRED TO SECURE BRACING
62. 8" METAL COLD ROLLED SOFFIT FRAMING AT 16" O.C. ANCHORED TO WALL FRAMING
63. EXTERIOR SOFFIT GYPSUM BOARD MECHANICALLY FASTENED TO FRAMING
64. CONTINUOUS METAL SOFFIT VENT, MANUFACTURER AIR VENT MODEL #SV301WH, COLOR TO BE SELECTED OR APPROVED EQUAL
65. TRANSVERSE COLD ROLLED FRAMING MEMBER AT BREEZEWAY SOFFIT AT 16" O.C.
66. HORIZONTAL SCHEDULED SLIDING WINDOW UNIT WITH JAMB AND HEAD ANCHOR, RE: ARCHITECTURE SPECIFICATIONS
67. CONTINUOUS METAL HOLD-DOWN CLEAT, TYPICAL
68. CAST STONE PIN ANCHOR BRACKET SPACE AS REQUIRED TO SECURE STONE CAP, TYPICAL
69. CONTINUOUS 1/4" EPOXY GROUT JOINT, TYPICAL
70. CONTINUOUS 1/4" BEVELED EDGE, TYPICAL
71. CAST STONE COLUMN CAP, TYPICAL
72. GROUT JOINT, TYPICAL
73. CONTINUOUS STRUCTURAL HANGER BEYOND CONNECTED ON THE TOP WITH THE PRE-ENGINEERED BUILDING STRUCTURE AND ON THE BOTTOM WITH A CONTINUOUS BEAM. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
74. CONTINUOUS STRUCTURAL BEAM BEYOND CONNECTED ON ONE SIDE BY A STRUCTURAL COLUMN BEYOND AND THE OTHER SIDE WITH A CONTINUOUS HORIZONTAL BEAM SUPPORTING THE PRE-ENGINEERED END WALL. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
75. STRUCTURAL COLUMN BEYOND. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
76. DOOR THRESHOLD, RE: SPECIFICATIONS SET-IN WATERPROOF MASTIC

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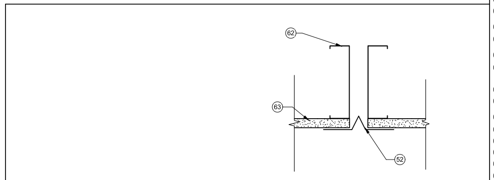
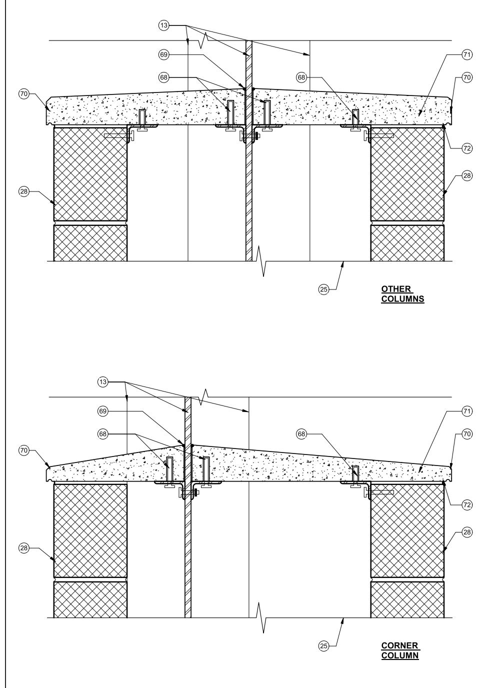
CONCESSION EXTERIOR WALL DETAILS

A504A



TYPICAL CONTROL JOINT @ CEILING 2
3" = 1'-0"



CAST STONE CAP @ COLUMN TYPICAL 1
3" = 1'-0"

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(3) STANDING SEAM METAL ROOFING. RE: SPECIFICATIONS
(4) R-30 BATT ROOFING INSULATION
(5) EAVE STRUT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE.
(6) METAL EAVE FLASHING ANCHORED TO BUILDING FRAMING AND HOLD-DOWN CLEAT CONTINUOUS ALONG EAVE FRAMING TYPICAL
(7) METAL GUTTER AND 5"X5" DOWNSPOUT
(8) GUTTER CLIP ANCHOR AT 24" O.C.
(9) HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
(10) CONTINUOUS SELF-ADHERING MEMBRANE WATER PROOFING
(11) CONTINUOUS 5/8" THICK FIBER CEMENT BOARD, TYPICAL
(12) VERTICAL METAL 6" COLD ROLLED C-CHANNEL ANCHORED TO HORIZONTAL STRUCTURAL BEAM PREFORMED CLIP FLANGES AT 24" O.C., TYPICAL
(13) PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM, PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR).RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
(14) R-19 BATT WALL INSULATION, TYPICAL
(15) LINER PANEL CLOSURE TRIM AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
(16) CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
(17) ARCHITECTURE FINISH. RE: FINISH FLOOR PLAN AND SCHEDULE
(18) DOWNSPOUT ANCHOR STRAPS EQUALLY SPACED
(19) CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL.
(20) PRE-FINISHED SHEET METAL CLOSURE TRIM ANCHORED TO WALL FRAME, SIZE TO FIT
(21) FLUSH MOUNTED 8" C-GIRT ANCHORED TO STRUCTURAL BUILDING FRAME
(22) 3 5/8" METAL STUD BRACING AT 24" O.C. ANCHORED TO Z-PURLIN
(23) INTERIOR METAL TRIM RETURN
(24) CONTINUOUS METAL TRIM FLASHING
(25) SEALANT AND BACKER ROD, RE: SPECIFICATIONS, AT BOTH SIDES OF DOOR FRAME
(26) CONTINUOUS 1" MIN. AIR CAVITY
(27) HORIZONTAL MASONRY FIXED TIE AT 16" O.C. TYPICAL
(28) 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
(29) SEALANT AND BACKER ROD AT BOTH SIDES OF WINDOW UNIT, RE: SPECIFICATIONS
(30) SEALANT AND BACKER ROD AT BOTH SIDES OF OVERHEAD PUSH-UP DOOR FRAME, RE: SPECIFICATIONS
(31) EXTEND WATERPROOF MEMBRANE ALL AROUND BUILDING FRAME, HEAD AND JAMB FACE SURFACE
(32) INTERIOR FACE OF ROOFING/WALL PANELS BEYOND.
(33) PRE-FINISH SHEET METAL SOFFIT PANEL TRIM MECHANICALLY ANCHORED TO BUILDING FRAMING
(34) RAKE LINE FLASHING EXTERIOR RETURN TRIM
(35) ACOUSTICAL LAY-IN CEILING, RE: FINISH SCHEDULE AND ARCHITECTURE SPECIFICATIONS
(36) 5/8" GYPSUM BOARD. COLOR TO MATCH ROOM CMU WALL COLOR.
(37) CONTINUOUS STRUCTURAL BEAM STRUCTURALLY CONNECTED ON BOTH ENDS BY THE PRE-ENGINEERED BUILDING COLUMNS (ON GRID A' & B') AND ON THE CENTER BY THE ADJACENT BEAMS (ON GRID A.3',A.45',A.65',A.7') RE: STRUCTURAL DRAWINGS.
(38) METAL CORNER BEAD, TYPICAL
(39) GROUT FILLED HOLLOW METAL DOOR FRAME WITH JAMB ANCHOR AND SCHEDULED DOOR.
(40) REINFORCED GROUT FILLED CONCRETE MASONRY LINTEL AND BOND BEAM
(41) BOTTOM TRACK ANCHOR BOLT WITH METAL STUD BLOCKING SPACED AS REQUIRED.
(42) 6" METAL STUD (16 GAUGE) FRAMING AT 16" O.C.
(43) 4' HIGH FRP PANEL ON ALL SIDES OF THE CONCESSION KITCHEN WALLS. RE: SPECIFICATIONS
(44) CONTINUOUS METAL TOP SLIP TRACK ANCHORED TO ROOF FRAMING
(45) CONTINUOUS 8" CLOSURE AND ANCHOR GIRT ATTACHED TO ROOF FRAMING, TYPICAL
(46) FACTORY FORMED 6" COLD ROLLED HEAD BEAM TO SPAN BREEZEWAY
(47) VERTICAL METAL WALL PANEL CORNER TRIM PRE-FINISHED TO MATCH WALL PANEL PROVIDED BY WALL PANEL MANUFACTURER
(48) 8X8X16 CONCRETE MASONRY UNIT EXTERIOR WALL STRUCTURE WITH LOOSE FILL INSULATION. RE: SPECIFICATIONS
(49) COLD ROLLED HEAD BEAM STIFFENER PLATE FACTORY APPLIED, SPACED AS REQUIRED.
(50) PRE-FINISHED METAL ROLLING COUNTER DOOR JAMB WITH ANCHOR CLEATS CLOSURE PANEL TO MATCH DOOR HOUSING FINISH.
(51) SCHEDULED WALL BASE, RE: FINISH SCHEDULE AND SPECIFICATIONS
(52) CLARK DIETRICH 093 ZINC CONTROL JOINT AT SOFFIT CEILING PANEL OR APPROVED EQUAL, TYPICAL
(53) SUB-FLASHING, CONTINUOUS
(54) CLOSURE TRIM TO MATCH WALL PANEL FINISH
(55) ROLLING COUNTER DOOR HOOD, RE: ARCHITECTURE SPECIFICATIONS
(56) INSULATED ROLLING PUSH-UP COUNTER DOOR CURTAIN, GALVANIZED STEEL FACTORY FINISHED WITH CLEAR ANODIZED EXTRUDED ALUMINUM BOTTOM BAR WITH WEATHER SEAL AND MANUFACTURER LOCK MECHANISMS KEYED TO INTERIOR
(57) PRE-FINISHED METAL ROLLING COUNTER DOOR HEAD CLOSURE PANEL TO MATCH DOOR FINISH
(58) REINFORCED GROUT FILLED CONCRETE MASONRY JAMB BLOCK, TYPICAL
(59) GALVANIZED STEEL SERVING COUNTER TOP FACTORY FINISH MECHANICALLY ANCHORED TO WALL ASSEMBLY
(60) CONTINUOUS SEALANT
(61) ANCHOR PLATE SPACED AS REQUIRED TO SECURE BRACING
(62) 6" METAL COLD ROLLED SOFFIT FRAMING AT 16" O.C. ANCHORED TO WALL FRAMING
(63) EXTERIOR SOFFIT GYPSUM BOARD MECHANICALLY FASTENED TO FRAMING
(64) CONTINUOUS METAL SOFFIT VENT, MANUFACTURER AIR VENT MODEL #SV301WH, COLOR TO BE SELECTED OR APPROVED EQUAL
(65) TRANSVERSE COLD ROLLED FRAMING MEMBER AT BREEZEWAY SOFFIT AT 16" O.C.
(66) HORIZONTAL SCHEDULED SLIDING WINDOW UNIT WITH JAMB AND HEAD ANCHOR, RE: ARCHITECTURE SPECIFICATIONS
(67) CONTINUOUS METAL HOLD-DOWN CLEAT, TYPICAL
(68) CAST STONE PIN ANCHOR BRACKET SPACE AS REQUIRED TO SECURE STONE CAP, TYPICAL
(69) CONTINUOUS 1/4" EPOXY GROUT JOINT, TYPICAL
(70) CONTINUOUS 1/4" BEVELED EDGE, TYPICAL
(71) CAST STONE COLUMN CAP, TYPICAL
(72) GROUT JOINT, TYPICAL
(73) CONTINUOUS STRUCTURAL HANGER BEYOND CONNECTED ON THE TOP WITH THE PRE-ENGINEERED BUILDING STRUCTURE AND ON THE BOTTOM WITH A CONTINUOUS BEAM. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
(74) CONTINUOUS STRUCTURAL BEAM BEYOND CONNECTED ON ONE SIDE BY A STRUCTURAL COLUMN BEYOND AND THE OTHER SIDE WITH A CONTINUOUS HORIZONTAL BEAM SUPPORTING THE PRE-ENGINEERED END WALL. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
(75) STRUCTURAL COLUMN BEYOND. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
(76) DOOR THRESHOLD, RE: SPECIFICATIONS SET-IN WATERPROOF MASTIC

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12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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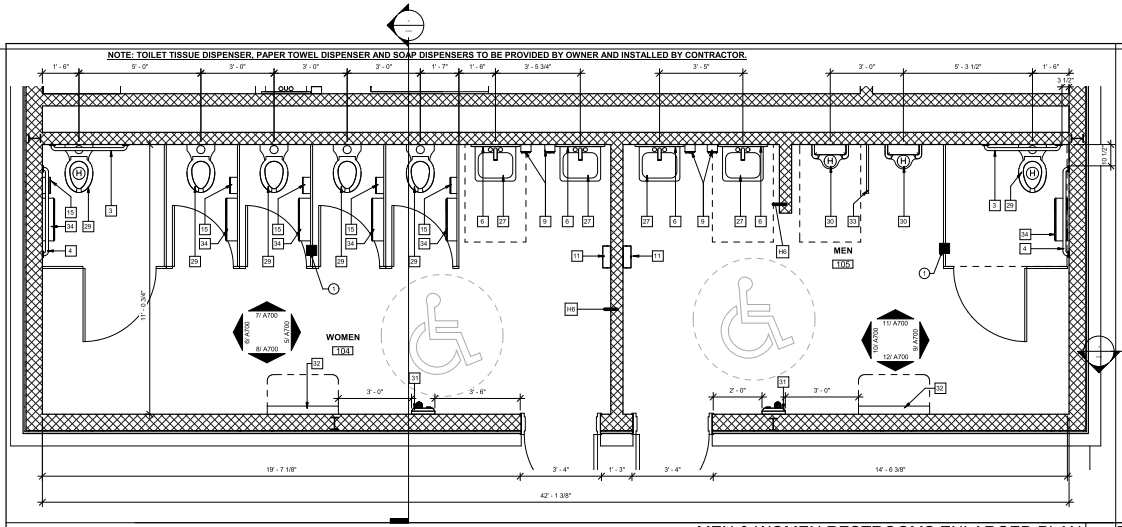
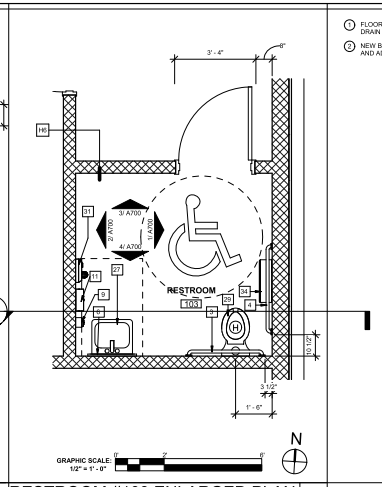
ISSUE FOR BID	09/07/2022

MISC. DETAILS

A505A



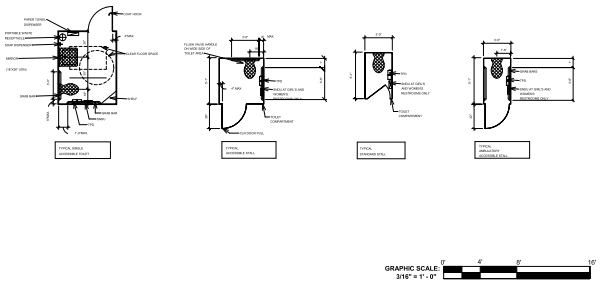
MEN & WOMEN RESTROOMS ENLARGED PLAN
1/2" = 1'-0" 5



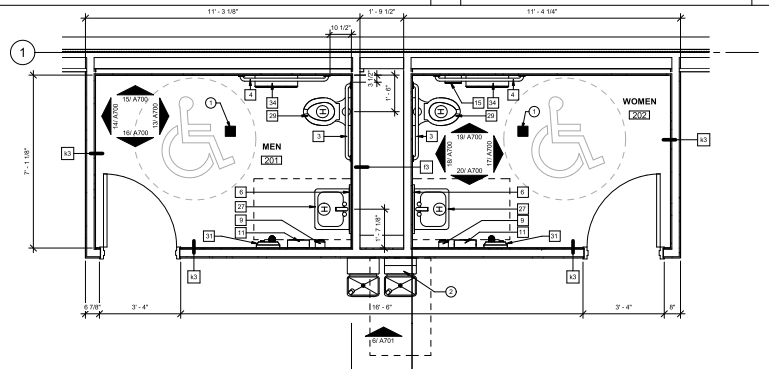
RESTROOM #103 ENLARGED PLAN
1/2" = 1'-0" 3

KEY NOTES

1. FLOOR DRAIN. PROVIDE ADEQUATE PLANNING SLOPE (1/4" PER FOOT) TO THE FLOOR DRAIN RE: MEP DRAWINGS AND SPECIFICATIONS
2. NEW BI-LEVEL WATER DRINKING FOUNTAIN WITH WATER BOTTLE REFILLING STATION AND ADA CANE DETECTION APRON



ACCESSIBLE WATER CLOSET NOTES
3/16" = 1'-0" 4



BATTING CAGE BUILDING - ENLARGED RESTROOMS
1/2" = 1'-0" 2

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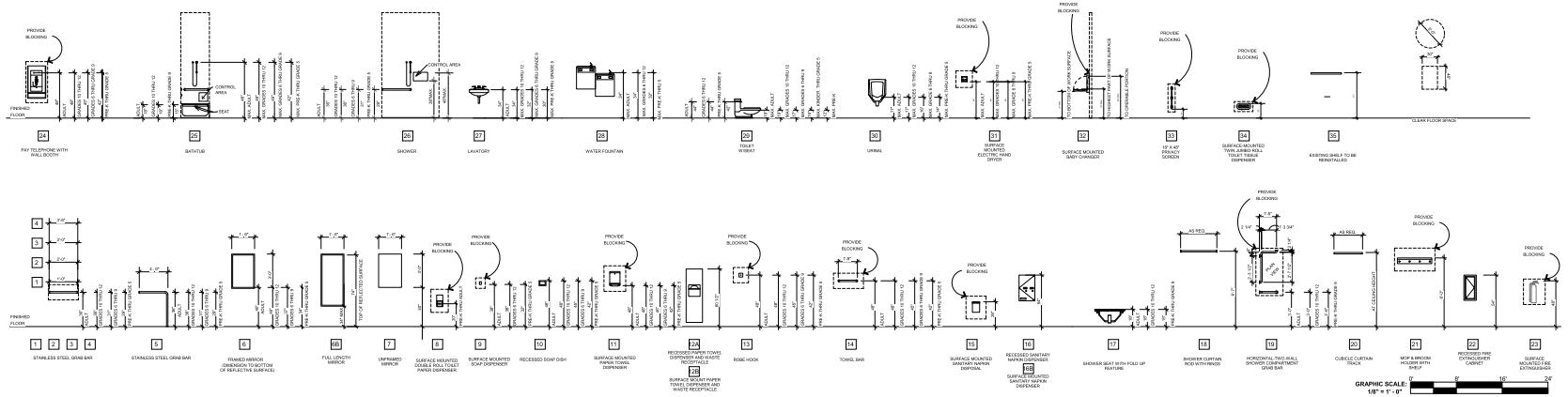

MOUNTING HEIGHTS
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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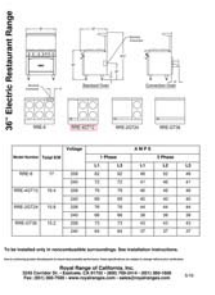
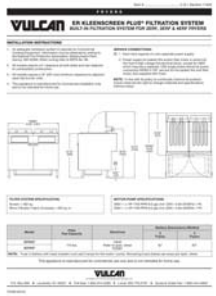
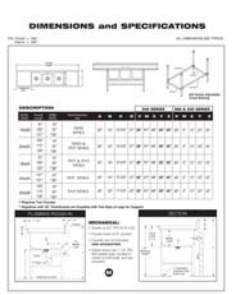
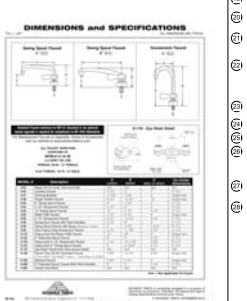
RESTROOMS ENLARGED PLANS

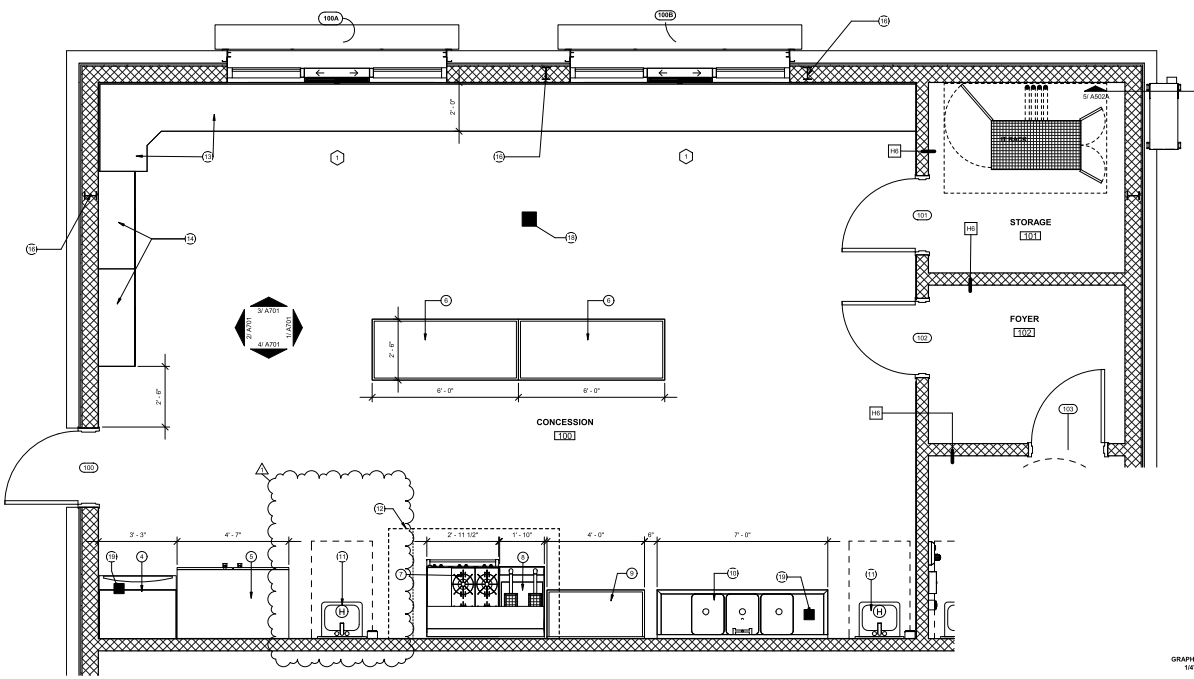
A600











1. EXISTING BENCH TO BE RELOCATED AS SHOWN WITH BENCH LEGS PROPERLY EMBEDDED WITH FOOTING REQUIREMENT.
2. SLAB EDGE. RE: STRUCTURAL & CIVIL DRAWINGS AND SPECIFICATIONS
3. MOP SINK. RE: MEP
4. ICE MACHINE RE: ARCHITECTURAL SPECIFICATIONS AND MEP DRAWINGS AND SPECIFICATIONS
5. HEAVY DUTY STAINLESS INTERIOR/EXTERIOR DUAL REFRIGERATOR-FREEZER. RE: ARCHITECTURAL SPECIFICATIONS AND DRAWINGS AND SPECIFICATIONS
6. KITCHEN GRADE STAINLESS STEEL WORK TABLE WITH WHEELS AND LOCK WITHOUT SPLASHBACK. RE: SPECIFICATIONS
7. 30" RANGE (OVEN, 4 BURNER & 2 GRIDDLE). RE: ARCHITECTURAL SPECIFICATIONS & MEP DRAWINGS AND SPECIFICATIONS
8. FRYER. RE: ARCHITECTURAL SPECIFICATIONS & MEP DRAWINGS AND SPECIFICATIONS
9. KITCHEN GRADE STAINLESS STEEL WORK TABLE WITH SPLASHBACK. RE: SPECIFICATIONS
10. 3 COMPARTMENT SINK WITH 18" DRAINBOARD ON EACH SIDE. RE: SPECIFICATIONS
11. HAND SINK WITH MIRROR (#6) AND SOAP DISPENSER (#9) (RE: #6 & #9 1/4600 MOUNTING HEIGHTS) AS SHOWN IN THE ELEVATIONS RE: MEP DRAWINGS & SPECIFICATIONS
12. KITCHEN HOOD WITH INTEGRATED GREASE TRAP AND FIRE EXTINGUISHER. RE: MEP DRAWINGS AND SPECIFICATIONS
13. KITCHEN GRADE STAINLESS STEEL COUNTER WITH SHELVES BELOW. RE: DRAWINGS AND SPECIFICATIONS
14. LOCKABLE BUILT-IN MILLWORK. EACH CABINET TO HAVE AN LOCK AND A KEY. PROVIDE A MASTER KEYS OPENING ALL 4 THE CABINETS FOR THE OWNER USAGE. RE: DRAWINGS AND SPECIFICATIONS
15. 5"X5" DOWNSPOUT AND PRECAST CONCRETE SPLASH BLOCK. RE: SPECIFICATIONS
16. STRUCTURAL COLUMN. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
17. PROVIDE 1/4" PER FOOT SLOPE ON THE SLAB TO DIRECT MISCELLANEOUS WATER AWAY THE EXTERIOR PERIMETER WALLS
18. FLOOR DRAIN; PROVIDE ADEQUATE DRAINING SLOPE (1/4" PER FOOT) TO THE FLOOR DRAIN RE: MEP DRAWINGS AND SPECIFICATIONS
19. FLOOR SINK; PROVIDE ADEQUATE DRAINING SLOPE (1/4" PER FOOT) TO THE FLOOR DRAIN RE: MEP DRAWINGS AND SPECIFICATIONS
20. NEW BI-LEVEL WATER DRINKING FOUNTAIN WITH WATER BOTTLE REFILLING STATION AND ADA CANE DETECTION APRON. RE: MEP DRAWINGS AND SPECIFICATIONS
21. INSTALL 8' -4" TALL ORNAMENTAL FENCE IN THE ENTIRE LENGTH OF THE CORRIDOR WIDTH WITH 6' - 0" OPENING GATE. PROVIDE A RECEPTACLES FOR THE CANE BOLT WHEN GATES ARE FULLY OPENED
22. INSTALL MODERN FOLD ACCOORN PARTITION AS SHOWN ON FLOOR PLAN FROM FINISHED LEVEL TO THE SCHEDULED CEILING. THE ACCORDION PARTITION IS SUSPENDED TO THE CEILING BY TWO HEAVY GAUGE STUDS SUPPORTED BY TWO COLUMNS AS SHOWN ON STRUCTURAL DRAWINGS FOR THE COLUMNS AND BEAM). RE: SPECIFICATIONS.
23. PROVIDE A MOP AND BROOM RACK ON THE MOP SINK WALL SIDE. RE: SPECIFICATIONS
24. EXISTING SOLAR LIGHT POLE TO REMAIN AND PROTECTED DURING NEW CONSTRUCTION.
25. IT EQUIPMENT & RACK PROVIDED BY OWNER
26. INSTALL NEW 7' - 0" TALL COMPLETE ORNAMENTAL FENCE ENCLOSURE (ALL 4 SIDES & TOP SIDE) AS SHOWN. EACH PERIMETER FENCE POST TO BE ATTACHED TO THE FOUNDATION SLAB WITH HEAVY DUTY ANCHOR PLATE AND BOLTS. PROVIDE 4' -0" GATE AS SHOWN. PROVIDE NEW WEATHERPROOF AND HEAVY DUTY CHAIN & LOCK SYSTEM WITH KEYS.
27. TOP SIDE FENCE POSTS & PICKETS ABOVE SHOWN IN DASHED LINES. ORNEMENTAL TOP SIDE FENCE POSTS TO BE WELDED TO THE PERIMETER FENCE POST AS SHOWN.
28. CONDENSING UNIT RE: MEP DRAWINGS AND SPECIFICATIONS

KEY NOTES

☐ REFER TO MOUNTING HEIGHTS ON 1 / A600

LEGEND

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CONCESSION KITCHEN ENLARGED 1/2" = 1'-0" | 1

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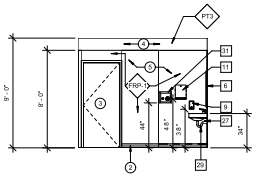
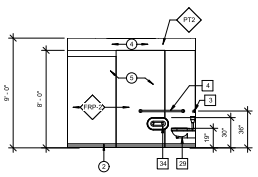
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

CONCESSION KITCHEN ENLARGED PLAN

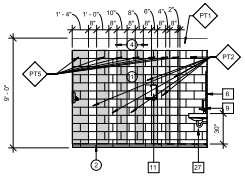
A601



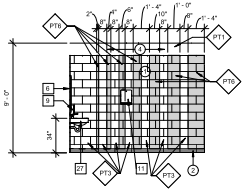
BATTING CAGE 202 WOMEN SOUTH 20
1/4" = 1'-0"



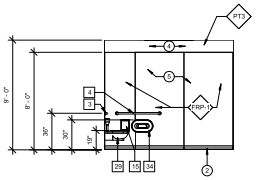
BATTING CAGE 201 MEN NORTH 15
1/4" = 1'-0"



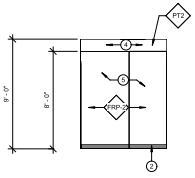
MEN 105 WEST 10
1/4" = 1'-0"



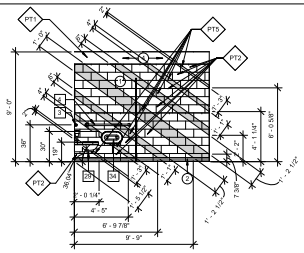
WOMEN 104 EAST 5
1/4" = 1'-0"



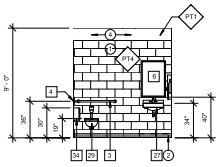
BATTING CAGE 202 WOMEN NORTH 19
1/4" = 1'-0"



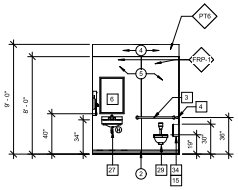
BATTING CAGE 201 MEN WEST 14
1/4" = 1'-0"



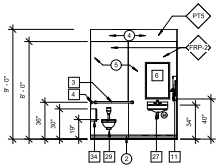
MEN 105 EAST 9
1/4" = 1'-0"



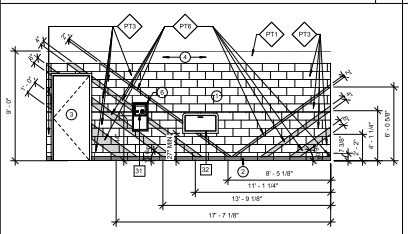
RR 103 SOUTH 4
1/4" = 1'-0"



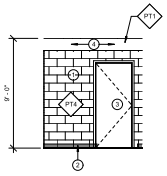
BATTING CAGE 202 WOMEN WEST 18
1/4" = 1'-0"



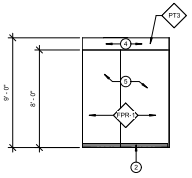
BATTING CAGE 201 MEN EAST 13
1/4" = 1'-0"



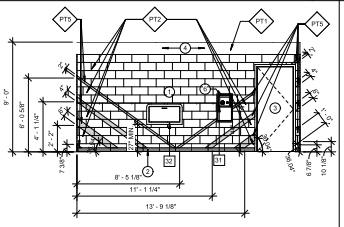
WOMEN 104 SOUTH 8
1/4" = 1'-0"



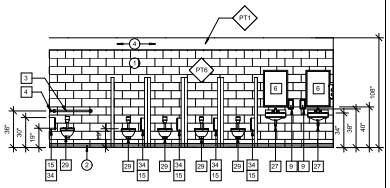
RR 103 NORTH 3
1/4" = 1'-0"



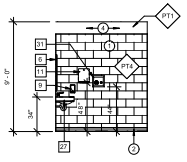
BATTING CAGE 202 WOMEN EAST 17
1/4" = 1'-0"



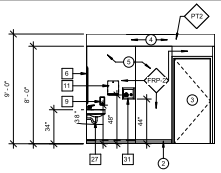
MEN 105 SOUTH 12
1/4" = 1'-0"



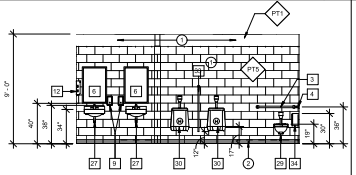
WOMEN 104 NORTH 7
1/4" = 1'-0"



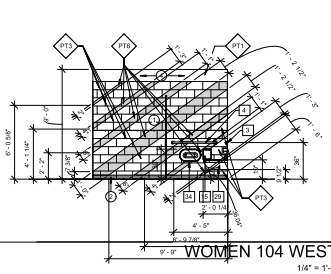
RR 103 WEST 2
1/4" = 1'-0"



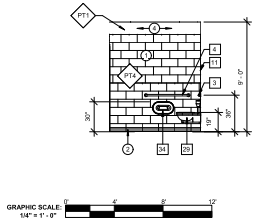
BATTING CAGE 201 MEN SOUTH 16
1/4" = 1'-0"



MEN 105 NORTH 11
1/4" = 1'-0"



WOMEN 104 WEST 6
1/4" = 1'-0"



RR 103 EAST ELEVATION 1
1/4" = 1'-0"

1. CMU WALL
2. SCHEDULED BASE
3. SCHEDULED DOOR
4. PAINTED GYP BD.
5. FRP WALL PANEL
6. MOTION SENSOR HAND DRYER WITH ADA COMPLIANT RECESSED KIT. RE SPECIFICATIONS

KEY NOTES

1. STAINLESS STEEL GRAB BAR 1'- 0"
2. STAINLESS STEEL GRAB BAR 2'- 0"
3. STAINLESS STEEL GRAB BAR 3'- 0"
4. STAINLESS STEEL GRAB BAR 3'- 6"
5. STAINLESS STEEL GRAB BAR
6. FRAMED MIRROR
6B. FULL LENGTH MIRROR
7. UNFRAMED MIRROR
8. SURFACE MOUNTED DOUBLE ROLL TOILET PAPER DISPENSER
9. SURFACED MOUNTED SOAP DISPENSER
10. RECESSED SOAP DISH
11. SURFACE MOUNTED PAPER TOWEL DISPENSER
12. RECESSED PAPER TOWEL DISPENSER AND WASTE RECEPTACLE
13. ROBE HOOK
14. TOWEL BAR
15. SURFACED MOUNTED SANITARY NAPKIN DISPOSAL
16. RECESSED SANITARY NAPKIN DISPENSER
17. SHOWER SEAT WITH FOLD-UP FEATURE
18. SHOWER CURTAIN ROD WITH RINGS
19. HORIZONTAL TWO WALL SHOWER COMPARTMENT GRAB BAR
20. CUBICLE CURTAIN TRACK
21. MOP & BROOM HOLDER WITH SHELF
22. RECESSED FIRE EXTINGUISHER CABINET
23. SURFACE MOUNTED FIRE EXTINGUISHER
24. PAY TELEPHONE WITH WALL BOOTH
25. BATHTUB
26. SHOWER
27. LAVATORY
28. WATER FOUNTAIN
29. TOILET W/SEAT
30. URINAL
31. SURFACE MOUNTED ELECTRIC HAND DRYER
32. SURFACE MOUNTED BABY CHANGER
33. PRIVACY SCREEN

LEGEND

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
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6. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES WITH ARCHITECT PRIOR TO BIDDING.
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8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
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Project No: 6001-02

CONSULTANTS:

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NEDU ENGINEERING SERVICES
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STRUCTURAL ENGINEER

RDP ENGINEERS
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MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

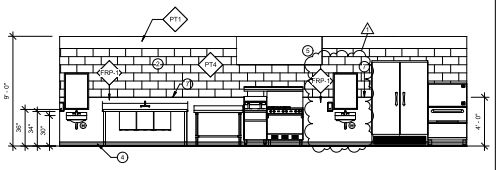
Drawing Date:	07/26/2021
Drawn:	HM
Checked:	BM, CD
Scale:	As indicated
ACAD File:	

Revisions:

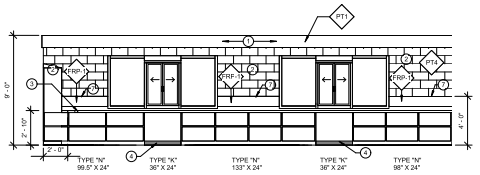
DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

RESTROOM ELEVATIONS

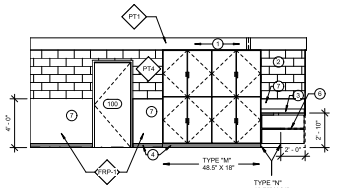
A700



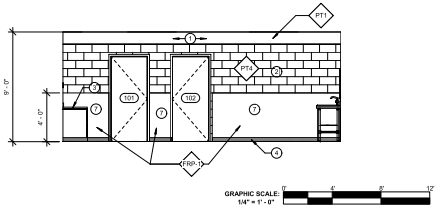
KITCHEN SOUTH ELEV. 4
1/4" = 1'-0"



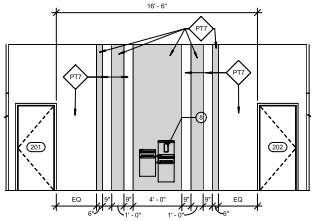
KITCHEN NORTH ELEV. 3
1/4" = 1'-0"



KITCHEN WEST ELEV. 2
1/4" = 1'-0"



KITCHEN EAST ELEV. 1
1/4" = 1'-0"



BATTING CAGE PARTIAL INTERIOR ELEV. 6
1/4" = 1'-0"

KEY NOTES

1. PAINTED GYP BD.
2. EPOXY PAINTED CMU
3. PLAM COUNTERTOP MILLWORK. RE: SPECIFICATIONS
4. SCHEDULED BASE
5. KITCHEN HOOD RE: MEP DRAWINGS & SPECIFICATIONS
6. REFERENCE OTHER ELEVATION
7. PROVIDE 4' HIGH FRP PANEL ALL SIDE OF THE CONCESSION KITCHEN WALLS. RE: SPECIFICATIONS
8. NEW BI-LEVEL WATER DRINKING FOUNTAIN WITH WATER BOTTLE REFILLING STATION. RE: MEP DRAWINGS AND SPECIFICATIONS

LEGEND

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MEP ENGINEER

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
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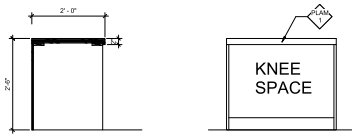
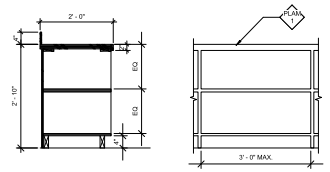
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

INTERIOR ELEVATIONS

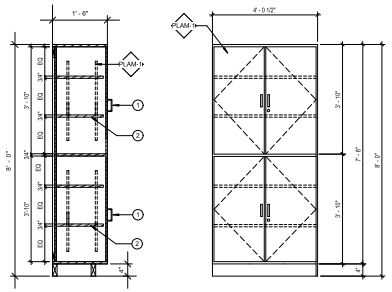
A701



TYPE "O"
3/4" = 1'-0"
5



TYPE "N"
3/4" = 1'-0"
4



TYPE "M"
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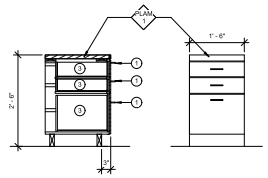
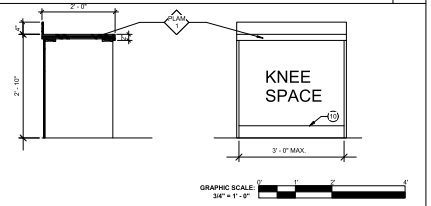
3



TYPE "L"
3/4" = 1'-0"
2



TYPE "K"
3/4" = 1'-0"
1

1. 4" PULL
2. ADJUSTABLE STAINLESS STEEL KITCHEN GRADE SHELVES RE: SPECIFICATIONS
3. DRAWER
4. SCHEDULED COUNTERTOP
5. FIXED SHELF
6. 1" PIPE ROD
7. 3" FLANGE AT 2 CABINET SIDES
8. 22" L-BRACKET WITH LAG SCREWS
9. WALL MOUNTED SHELVES
10. SCHEDULED BASE
11. PROVIDE SUPPORT AS SHOWN IN ELEVATION & PLAN

GENERAL NOTES

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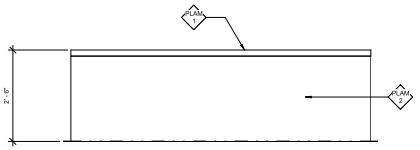
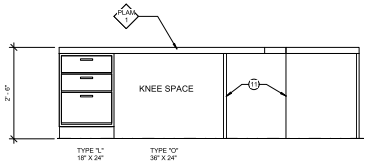
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

MILLWORK ELEVATIONS & MILLWORK TYPES (CONCESSION)

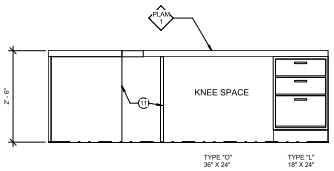
A702



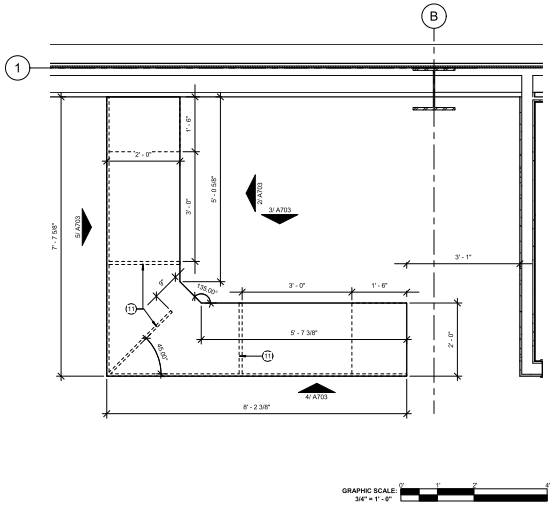
RECEPTION DESK ELEV. 3 — 4
3/4" = 1'-0"



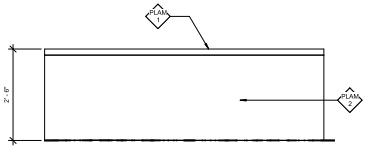
RECEPTION DESK ELEVATION — 3
3/4" = 1'-0"



RECEPTION DESK ELEVATION — 2
3/4" = 1'-0"



RECEPTION DESK ENLARGED PLAN — 1
3/4" = 1'-0"



RECEPTION DESK ELEV. 4 — 5
3/4" = 1'-0"

1. 4" PULL
2. ADJUSTABLE STAINLESS STEEL KITCHEN GRADE SHELVES RE: SPECIFICATIONS
3. DRAWER
4. SCHEDULED COUNTERTOP
5. FIXED SHELF
6. 1" PIPE ROD
7. 3" FLANGE AT 2 CABINET SIDES
8. 22" L-BRACKET WITH LAG SCREWS
9. WALL MOUNTED SHELVES
10. SCHEDULED BASE
11. PROVIDE SUPPORT AS SHOWN IN ELEVATION & PLAN

GENERAL NOTES

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Project No: 6001-02

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
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DESIGN DEVELOPMENT	08/23/2021
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MILLWORK ELEVATION & MILLWORK TYPE (BATTING CAGE)

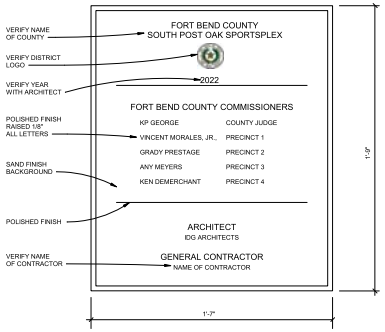
A703

Plaque Schedule - CONCESSION						
Door No.	Room Number	Plaque Location	Plaque Message	Occupant Load	Plaque Type	Remarks
100	100	A	CONCESSION		C	
100A	-	-	-		-	
100B	-	-	-		-	
101	101	A	STORAGE		C	
102	102	B	FOYER		C	
103	103	B	RESTROOM		A2	
104	104	A	WOMEN		A1	
105	105	B	MEN		A	
107	107	A	JANITOR		C	
108	108	B	MECHANICAL		C	
109	109	B	STORAGE		C	
110	110	B	MEETING I	31	C	
111	111	A	MEETING II	31	C	

Plaque Schedule - BATTING CAGE						
Door No.	Room Number	Plaque Location	Plaque Message	Occupant Load	Plaque Type	Remarks
200	200	B	BATTING CAGE	188	C	
200A	-	-	-		-	
200B	-	-	-		-	
200C	-	-	-		-	
200D	200D	B	BATTING CAGE	188	C	
200E	-	-	-		-	
200F	-	-	-		-	
200H	-	-	-		-	
201	201	B	MEN		A	
202	202	A	WOMEN		A1	

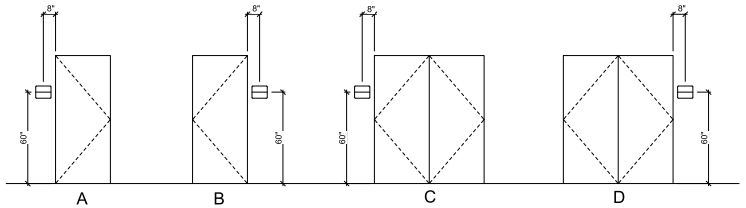
Plaque Schedule - PRESS BOXES						
Door No.	Room Number	Plaque Location	Plaque Message	Occupant Load	Plaque Type	Remarks
	300	B	PRESSBOX II		C	
	301	B	PRESSBOX I		C	

PLAQUE SCHEDULE 4

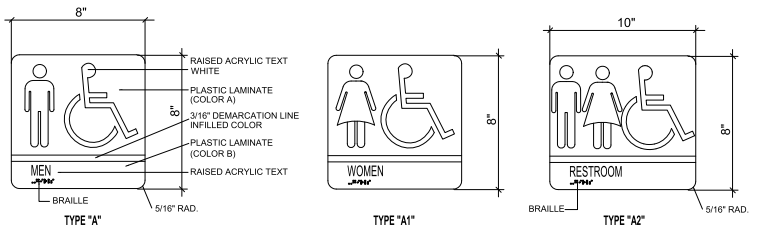


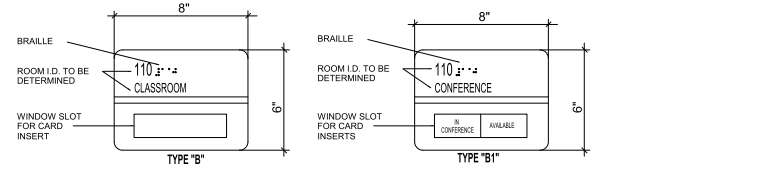
NOTE:
BUILDING PLAQUE TO GO ON THE FRONT OF THE CONCESSION BUILDING. VERIFY WITH OWNER FOR THE CORRECT LOCATION OF THE BUILDING PLAQUE

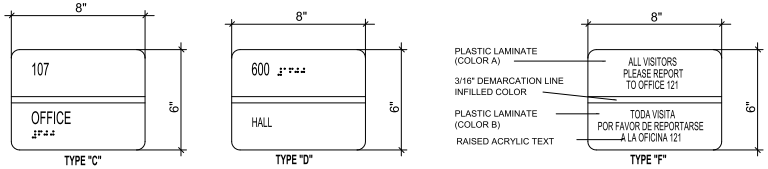
PLAQUE-BUILDING 3
1" = 10'-0"

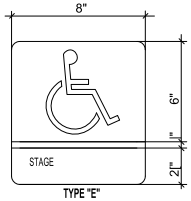


PLAQUE LOCATION 2
N.T.S









TYP. ROOM SIGNS:

GENERAL NOTES:

1. SINGLE SIDED
2. HELVETICA MED. LETTER STYLE
3. MOUNTING 1/16" FOAM TAPE
4. PROVIDE BACKER FOR GLASS @ DOOR OPENINGS WHERE NECESSARY

WALL SIGN COLOR SELECTION:

1. PLASTIC LAMINATE (COLOR A) WILSONART 1572-60 (ANTIQUE WHITE)
2. PLASTIC LAMINATE (COLOR B) WILSONART D417-60 (LAPIS BLUE)
3. RAISED ACRYLIC TEXT, BLACK ON ANTIQUE WHITE AND WHITE ON LAPIS BLUE.
4. DEMARCATION LINE AND EDGE TRIM, BLACK.

PLAQUE TYPE 1
1/8" = 1'-0"

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5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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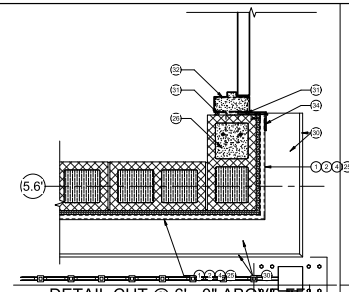
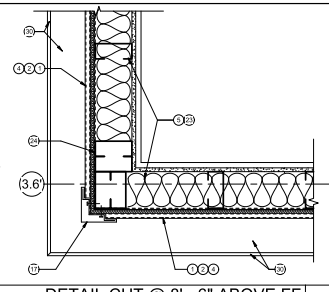
PLAQUE SCHEDULE

A704



DETAIL CUT @ 6' - 0" ABOVE FF 12
1 1/2" = 1'-0"



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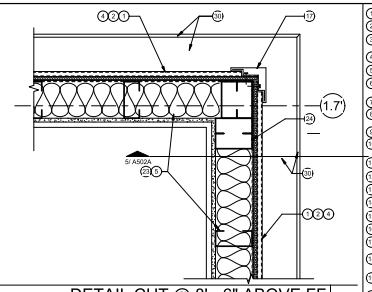

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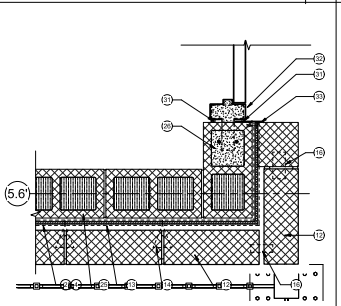
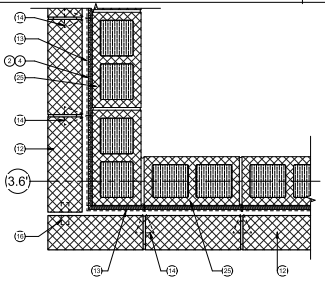
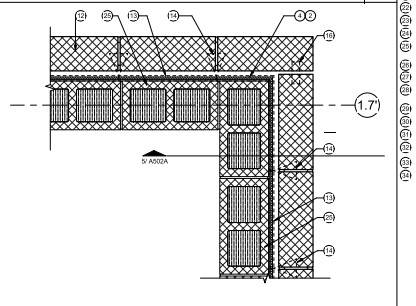
1 1/2" = 1'-0"



DETAIL 11
1 1/2" = 1'-0"

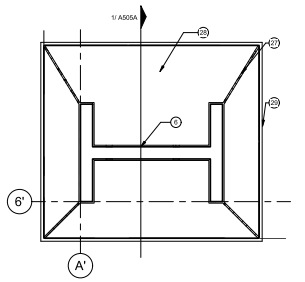


DETAIL 7
1 1/2" = 1'-0"

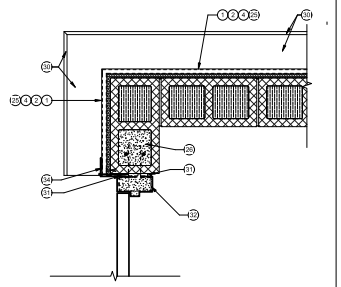


DETAIL 3
1 1/2" = 1'-0"

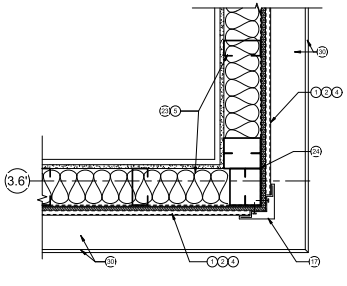
1. HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
2. CONTINUOUS SELF-ADHERING MEMBRANE WATERPROOFING
3. VERTICAL METAL 2 1/2" COLD ROLLED C-CHANNEL ANCHORED TO HORIZONTAL GIRTS WITH PERFORMED CLIP FLANGES AT 24 O.C., TYPICAL.
4. CONTINUOUS 5/8" THICK FIBER CEMENT BOARD, TYP.
5. 5-1/9 BATT WALL INSULATION, TYPICAL
6. PRE-ENGINEERED METAL BUILDING STRUCTURE FRAMING SYSTEM. RE: PRE-ENGINEERED BUILDING SPECIFICATIONS
7. FACTORY WELDED METAL GIRT CLIP
8. FLUSH MOUNTED 8" Z-GIRT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE.
9. 5" X 5" METAL DOWNSPOUT ANCHORED TO BUILDING STRUCTURE.
10. VERTICAL METAL INTERIOR LINER PANEL AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
11. LINER PANEL VERTICAL ATTACHMENT JOINT
12. 6"X8"X16" SPLIT FACE MASONRY BLOCK
13. CONTINUOUS 1" MIN. AIR CAVITY
14. ADJUSTABLE DOVE TAIL MASONRY TIES AT 16" O.C., TYPICAL.
15. LINER PANEL INSIDE CORNER ANCHOR CLIP AT 24" O.C. TYPICAL
16. HORIZONTAL MASONRY FIXED TIE AT 16" O.C., TYPICAL
17. OUTSIDE BRAKE METAL TRIM FLASHING WITH PERFORMED Z-ANCHOR CLIPS AS REQUIRED BY EXTERIOR METAL PANEL MANUFACTURE
18. INFILL Z- HEAVY DUTY PERFORMED ANCHOR TO SUPPORT EXTERIOR METAL PANEL WALL ASSEMBLY
19. VERTICAL BRAKE METAL JOINT COVER WITH ANCHOR HOLD-DOWN CLIPS PROVIDED BY METAL PANEL MANUFACTURE
20. DOWNSPOUT MECHANICAL ANCHOR FASTENERS SECURED TO BUILDING EXTERIOR STRUCTURE, TYPICAL
21. MASONRY CONTROL JOINT COMPRESSIBLE FILLER, TYPICAL
22. CONTROL JOINT SEALANT AND BACKER ROD VERTICAL, TYPICAL
23. 6" METAL STUD FRAMING AT 16" O.C. WITH CONTINUOUS 5/8" GYPSUM BOARD
24. DOUBLE 6" COLD ROLLED FRAMING AT CORNER TRANSITION, TYPICAL
25. 8X8X16 CONCRETE MASONRY UNIT EXTERIOR WALL STRUCTURE WITH LOOSE FILL INSULATION. RE: SPECIFICATIONS
26. REINFORCED GROUT FILLED CONCRETE MASONRY JAMB BLOCK, TYPICAL
27. CONTINUOUS 1/4" EPOXY GROUT JOINT, TYPICAL
28. CAST STONE COLUMN CAP. SAND TEXTURE CUT TO FIT AND PRE-FINIHSED PIGMENTED COLOR TO BE SELECTED
29. CONTINUOUS 1/4" BEVELED EDGE, TYPICAL
30. CONTINUOUS METAL TRIM FLASHING BELOW TYPICAL
31. SEALANT AND BACKER ROD, RE: SPECIFICATIONS, AT BOTH SIDES OF DOOR FRAME
32. GROUT FILLED HOLLOW METAL DOOR FRAME WITH JAMB ANCHOR AND SCHEDULED DOOR.
33. INTERIOR METAL TRIM RETURN
34. CLOSURE TRIM TO MATCH WALL PANEL FINISH



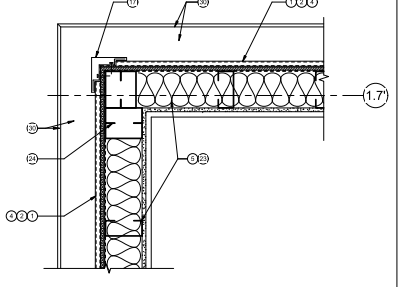
EXT. COL. MASONRY CLADDING TYP. 14
1 1/2" = 1'-0"



DETAIL CUT @ 6' - 0" ABOVE FF 10
1 1/2" = 1'-0"

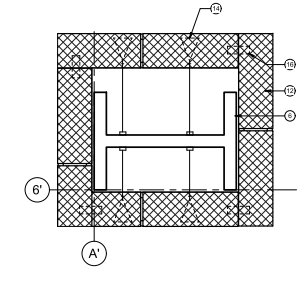


DETAIL CUT @ 8' - 6" ABOVE FF 6
1 1/2" = 1'-0"

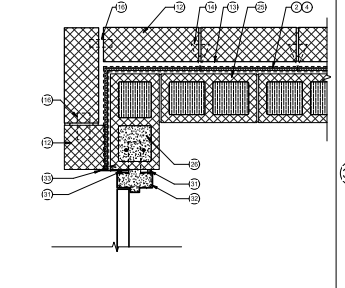


DETAIL CUT @ 8' - 6" ABOVE FF 2
1 1/2" = 1'-0"

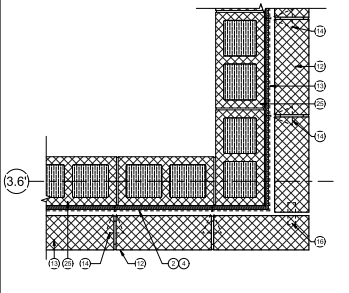
KEY NOTES



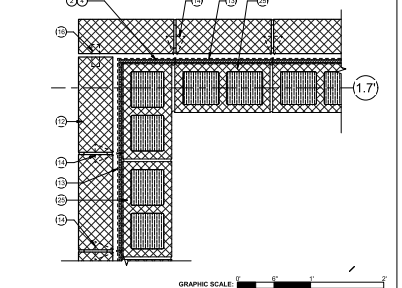
EXT. COL. MASONRY CLADDING TYP. 13
1 1/2" = 1'-0"



DETAIL 9
1 1/2" = 1'-0"



DETAIL 5
1 1/2" = 1'-0"



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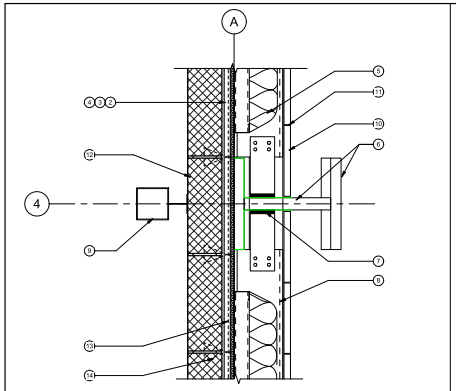
1 CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

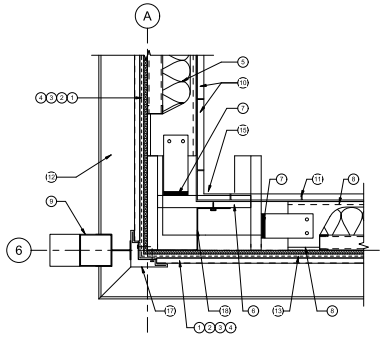
CONCESSION BUILDING PLAN DETAILS

1

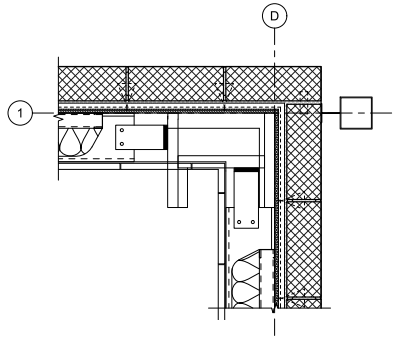
A800A



DETAIL 12
1 1/2" = 1'-0"



DETAIL CUT @ 6' - 0" ABOVE FF 6
1 1/2" = 1'-0"



DETAIL 3
1 1/2" = 1'-0"

1. HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
2. CONTINUOUS SELF-ADHERING MEMBRANE WATERPROOFING
3. VERTICAL METAL 2 1/2" COLD ROLLED C-CHANNEL ANCHORED TO HORIZONTAL GIRTS WITH PERFORMED CLIP FLANGES AT 24 O.C., TYPICAL.
4. CONTINUOUS 5/8" THICK FIBER CEMENT BOARD, TYP.
5. 5-19 BATT WALL INSULATION, TYPICAL
6. PRE-ENGINEERED METAL BUILDING STRUCTURE FRAMING SYSTEM, RE: PRE-ENGINEERED BUILDING SPECIFICATIONS
7. FACTORY WELDED METAL GIRT CLIP
8. FLUSH MOUNTED 8" Z-GIRT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE.
9. 5" X 5" METAL DOWNSPOUT ANCHORED TO BUILDING STRUCTURE.
10. VERTICAL METAL INTERIOR LINER PANEL AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
11. LINER PANEL VERTICAL ATTACHMENT JOINT
12. 8"X8"X16" SPLIT FACE MASONRY BLOCK
13. CONTINUOUS 1" MIN. AIR CAVITY
14. ADJUSTABLE DOVE TAIL MASONRY TIES AT 16" O.C., TYPICAL.
15. LINER PANEL INSIDE CORNER ANCHOR CLIP AT 24" O.C. TYPICAL
16. HORIZONTAL MASONRY FIXED TIE AT 16" O.C., TYPICAL
17. OUTSIDE BRAKE METAL TRIM FLASHING WITH PERFORMED Z-ANCHOR CLIPS AS REQUIRED BY EXTERIOR METAL PANEL MANUFACTURE
18. INFILL Z- HEAVY DUTY PERFORMED ANCHOR TO SUPPORT EXTERIOR METAL PANEL WALL ASSEMBLY
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20. DOWNSPOUT MECHANICAL ANCHOR FASTENERS SECURED TO BUILDING EXTERIOR STRUCTURE, TYPICAL
21. MASONRY CONTROL JOINT COMPRESSIBLE FILLER, TYPICAL
22. CONTROL JOINT SEALANT AND BACKER ROD VERTICAL, TYPICAL
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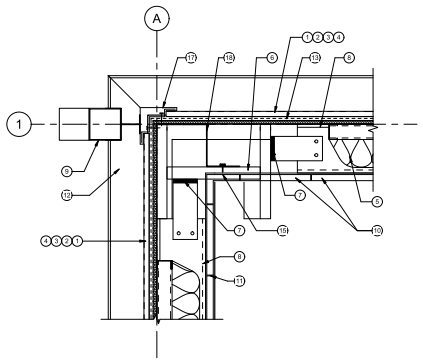
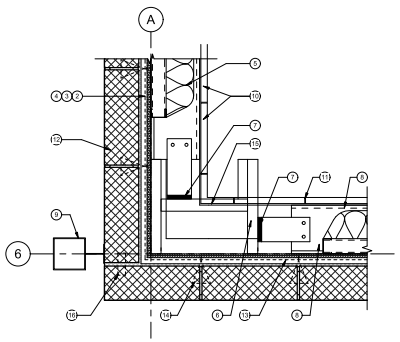
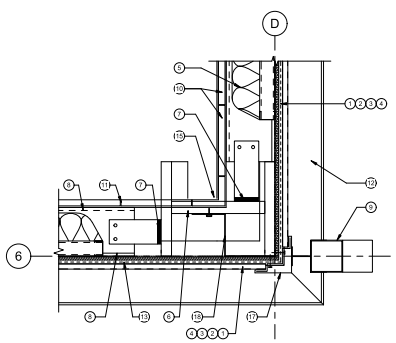
26. REINFORCED GROUT FILLED CONCRETE MASONRY JAMB BLOCK, TYPICAL
27. CONTINUOUS 1/4" EPOXY GROUT JOINT, TYPICAL
28. CAST STONE COLUMN CAP, SAND TEXTURE CUT TO FIT AND PRE-FINIHSED PIGMENTED COLOR TO BE SELECTED
29. CONTINUOUS 1/4" BEVELED EDGE, TYPICAL
30. CONTINUOUS METAL TRIM FLASHING BELOW TYPICAL
31. SEALANT AND BACKER ROD, RE: SPECIFICATIONS, AT BOTH SIDES OF DOOR FRAME
32. GROUT FILLED HOLLOW METAL DOOR FRAME WITH JAMB ANCHOR AND SCHEDULED DOOR
33. INTERIOR METAL TRIM RETURN
34. CLOSURE TRIM TO MATCH WALL PANEL FINISH



DETAIL CUT @ 6' - 0" ABOVE FF 8
1 1/2" = 1'-0"

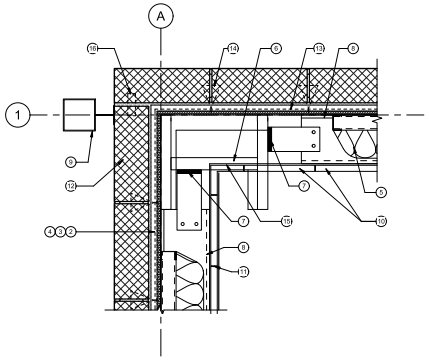


DETAIL 5
1 1/2" = 1'-0"

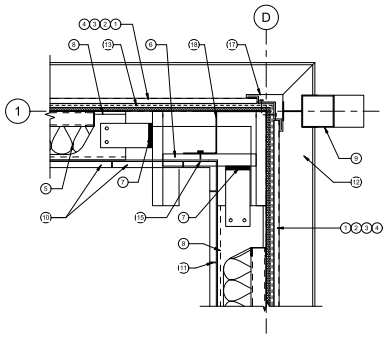


DETAIL CUT @ 6' - 0" ABOVE FF 2
1 1/2" = 1'-0"

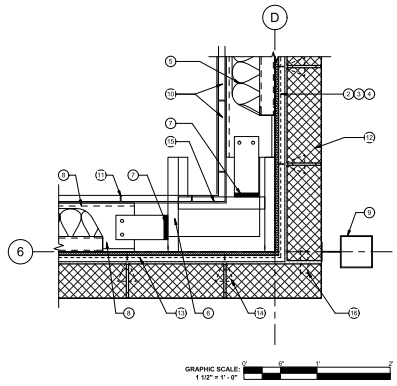
KEY NOTES



DETAIL 7
1 1/2" = 1'-0"



DETAIL CUT @ 6' - 0" ABOVE FF 4
1 1/2" = 1'-0"



DETAIL 1
1 1/2" = 1'-0"

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES AND APPLICATIONS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL DIMENSIONS AND OR EXISTING FIELD CONDITIONS PRIOR TO START.
5. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO THE ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.
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7. THE GENERAL CONTRACTOR SHALL PROTECT ANY CONSTRUCTION OR FINISHES THAT IS TO REMAIN.
8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
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FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

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NEDU ENGINEERING SERVICES
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RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

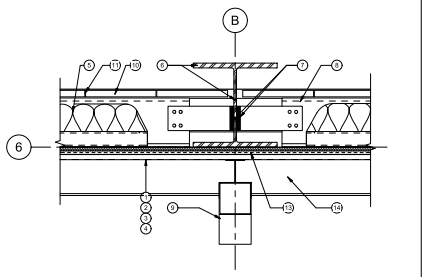
Drawing Date:	07/26/2021
Drawn:	HM
Checked:	BM, CD
Scale:	As indicated
ACAD File:	

Revisions:

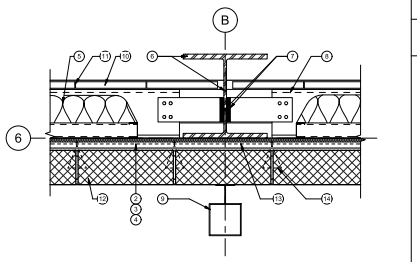
DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

BATTING CAGE PLAN DETAILS

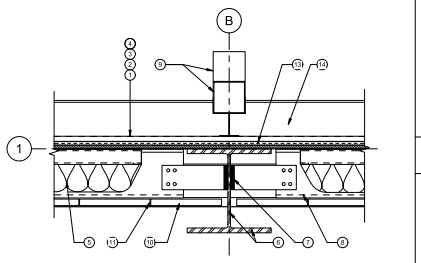
A800B



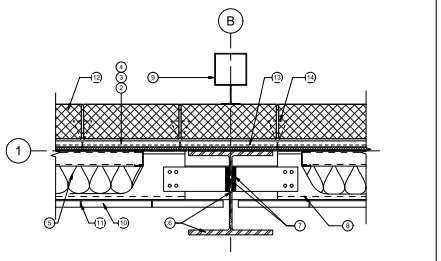
DETAIL 10
1 1/2" = 1'-0"



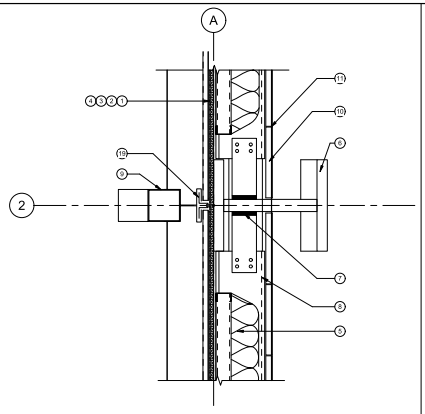
DETAIL 9
1 1/2" = 1'-0"



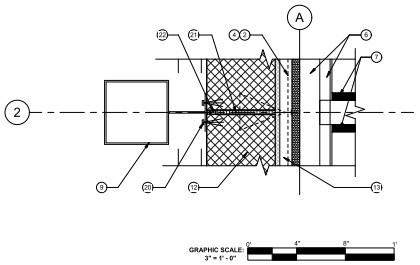
DETAIL CUT @ 6' - 0" ABOVE FF 8
1 1/2" = 1'-0"



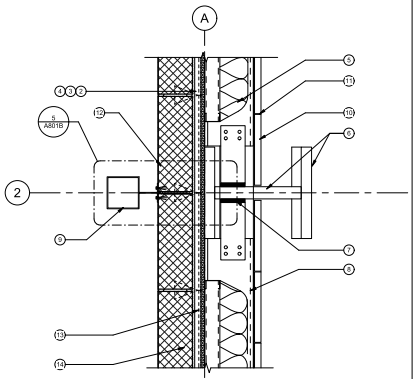
DETAIL 7
1 1/2" = 1'-0"



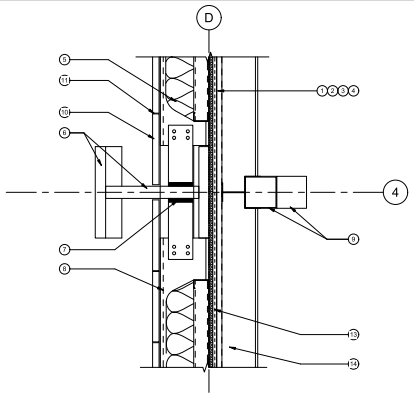
DETAIL @ 6' - 0" ABOVE FF (CONTROL JOINT) 6
1 1/2" = 1'-0"



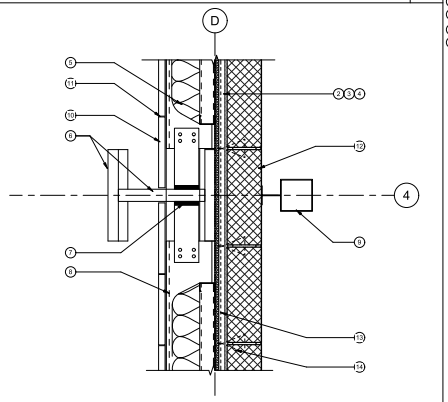
DETAIL @ CONTROL JOINT MAKE-UP 5
3" = 1'-0"



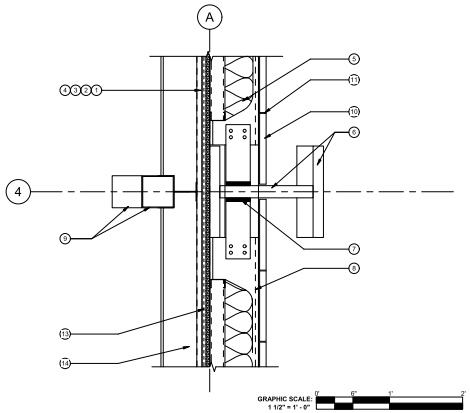
DETAIL @ CONTROL JOINT 4
1 1/2" = 1'-0"



DETAIL CUT @ 6' - 0" ABOVE FF 3
1 1/2" = 1'-0"



DETAIL 2
1 1/2" = 1'-0"



DETAIL CUT @ 6' - 0" ABOVE FF 1
1 1/2" = 1'-0"

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34. CLOSURE TRIM TO MATCH WALL PANEL FINISH

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GENERAL NOTES

IDG+ ARCHITECTS

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PH: 832-448-2462

FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

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RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

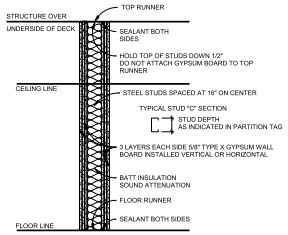
Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

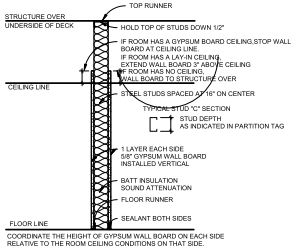
DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

BATTING CAGE PLAN DETAILS

A801B

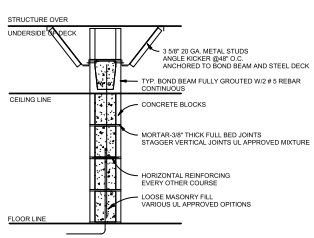


TYPE **A** WITHOUT INSULATION
TYPE a INSULATION AS SHOWN
TYPE a' ONE HOUR RATED PER UL DESIGN U494

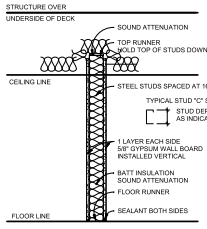


COORDINATE THE HEIGHT OF GYPSUM WALL BOARD ON EACH SIDE RELATIVE TO THE ROOM CEILING CONDITIONS ON THAT SIDE.

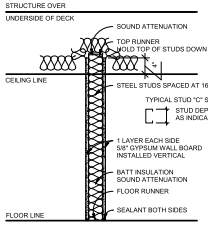
TYPE **B** WITHOUT INSULATION
TYPE b INSULATION AS SHOWN



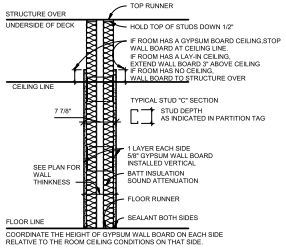
TYPE **C** WITHOUT FILLED CELLS
TYPE c FILLED CELLS AS SHOWN



TYPE **D** WITHOUT INSULATION
TYPE d INSULATION AS SHOWN

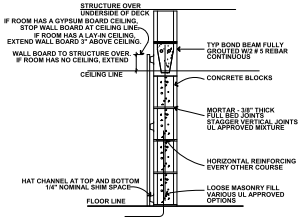


TYPE **E** WITHOUT INSULATION
TYPE e INSULATION AS SHOWN

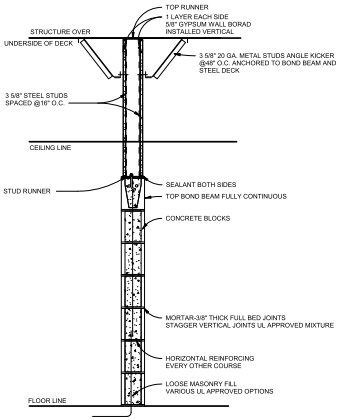


COORDINATE THE HEIGHT OF GYPSUM WALL BOARD ON EACH SIDE RELATIVE TO THE ROOM CEILING CONDITIONS ON THAT SIDE.

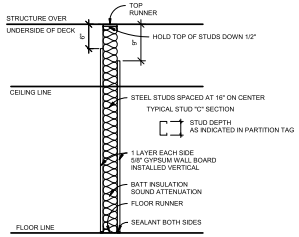
TYPE **F** WITHOUT INSULATION
TYPE f INSULATION AS SHOWN



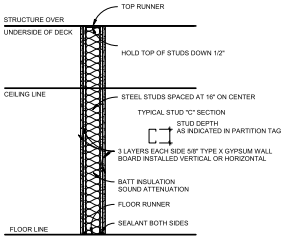
TYPE **G** WITHOUT FILLED CELLS
TYPE g FILLED CELLS AS SHOWN



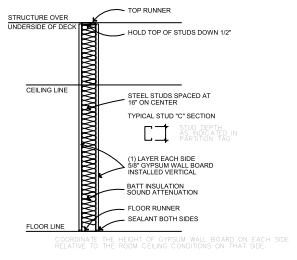
TYPE **H** WITHOUT FILLED CELLS
TYPE h FILLED CELLS AS SHOWN



TYPE **I** WITHOUT INSULATION
TYPE i INSULATION AS SHOWN

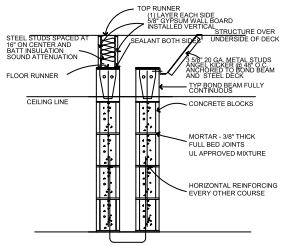


TYPE **J** WITHOUT INSULATION
TYPE j INSULATION AS SHOWN



COORDINATE THE HEIGHT OF GYPSUM WALL BOARD ON EACH SIDE RELATIVE TO THE ROOM CEILING CONDITIONS ON THAT SIDE.

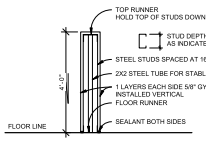
TYPE **K** WITHOUT INSULATION
TYPE k INSULATION AS SHOWN



TYPE **L** WITHOUT FILLED CELLS
TYPE l FILLED CELLS AS SHOWN

TYPE **M** WITHOUT INSULATION

PONY WALL



PARTITION NOTES

PARTITION TAG LEGEND

PARTITION TAG — XX — DESIGNATES PARTITION TYPE. LOWER CASE LETTER INDICATES PARTITION WITH INSULATION.

PARTITION — DESIGNATES STUD OPTION, DEPTH AND GAUGE. SEE STUD SCHEDULE BELOW.

PARTITIONS REQUIRED FOR THIS PROJECT ARE INDICATED BY TAG REFERENCES SHOWN ON THE ARCHITECTURAL FLOOR PLANS. UNTAGGED PARTITIONS SHALL BE TYPE "A3". THIS PARTITION SCHEDULE MAY CONTAIN A PARTITION TYPE OR STUD OPTION THAT IS NOT REFERENCED FROM THE PLANS. ONLY REFERENCED TYPES ARE REQUIRED.

STUD SCHEDULE

STUD OPTION	STUD DEPTH	MINIMUM GAUGE	HEIGHT LIMIT	STUD OPTION	STUD DEPTH	MINIMUM GAUGE	HEIGHT LIMIT
1	1 5/8"	25	9'-6"	5	7/8"	25	4'-0"
2	2 1/2"	25	12'-6"	6	6	25	20'-0"
3	3 5/8"	25	16'-0"	7	NOT USED		
4	4	25	17'-3"	8	NOT USED		

STUD SECTIONS AND HEIGHT LIMITS ARE BASED ON U.S. GYPSUM PRODUCT DATA."C" STUDS MAY BE TYPE "ST" OR "SJ". HEIGHT LIMIT IS FOR A TYPICAL CASE WITH STUDS 16" ON CENTER, 1 LAYER GYPSUM WALL BOARD EACH SIDE, A 5 PSF LIVE LOAD ACTING NORMAL TO THE FACE OF THE PARTITION AND A DEFLECTION LIMIT OF 1/240 OF THE UNBRACED HEIGHT. REFER TO U.S. GYPSUM PRODUCT DATA FOR OTHER CONDITIONS.

GENERAL NOTES

PARTITION TYPE DRAWINGS ARE NOT TO SCALE.

WALLS AND PARTITIONS ARE INTERIOR NON-BEARING SYSTEMS AND ARE NOT REQUIRED OR INTENDED TO RESIST WIND LOADS OR SUPPORT FLOOR LOADS.

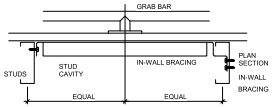
PARTITIONS ARE CONTINUOUS ACROSS DOORWAYS, OPENINGS AND ABUTTING PARTITIONS. A TAG SHOWN IN ONE SEGMENT OF A PARTITION APPLIES TO ALL UNMARKED SEGMENTS THAT ARE IN LINE WITH AND CONTINUOUS WITH THE TAGGED SEGMENT.

RATED WALLS AND PARTITIONS EXTEND THRU THE CEILING TO THE STRUCTURE OVER. PARTITIONS SHALL EXTEND TO THE DECK AND BE PROFILED TO FIT NEATLY AROUND FRAMING MEMBERS WITHIN 1/2" . JOINTS TO BE SEALED ALONG THE ENTIRE LENGTH. PORTIONS OF THE PARTITION ABOVE THE CEILING ARE CONTINUOUS, WITHOUTOPENINGS OTHER THAN THOSE REQUIRED FOR PENETRATION OF SERVICES.

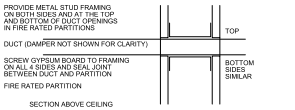
WHERE WALLS OR PARTITIONS WITH DISIMILAR RATINGS INTERSECT, ASSEMBLIES WITH HIGHER RATINGS HAVE PRIORITY. SMOKE PARTITIONS HAVE PRIORITY OVER FIRE PARTITIONS WITH EQUAL RATING. FIRE RATINGS HAVE PRIORITY OVER ACOUSTIC RATINGS. CONSTRUCT PARTITION SUCH THAT THE HIGHER RATED ASSEMBLY IS CONTINUOUS THRU THE INTERSECTION.

REQUIREMENTS TO LABEL WALLS ABOVE CEILINGS AND IN CONCEALED SPACES APPLY ONLY TO PROJECTS UNDER STANDARD BUILDING CODE JURISDICTION. IF A PARTITION IS DESIGNATED AS A "SMOKE" PARTITION, THE WORD SMOKE SHALL BE INCORPORATED INTO THE LABEL; EG "2 HOUR FIRE WALL" BECOMES "2 HOUR SMOKE AND FIRE WALL".

PROVIDE IN-WALL BRACING IN ALL PARTITIONS OR EXTERIOR WALLS WHERE GRAB BARS, HANDRAILS, SHOWER SEATS OR OTHER EQUIPMENT ANCHORS TO METAL STUD WALLS AND IN OTHER LOCATIONS AS NOTED ON THE DRAWINGS. CENTER STUDS ABOUT THE LOCATION OF THE DEVICE ANCHOR POINT. GRAB BAR BRACKET SHOWN, OTHER DEVICES SIMILAR



IN-WALL BRACING SHALL BE NO LESS THAN A 6" x 1.1/4" x 14 GUAGE CHANNEL, STEEL Fy = 50ksi, AND SHALL SUPPORT A 250 POUND GRAVITY LOAD CONCENTRATED AT ANY POINT ON THE DEVICE BEING ANCHORED.



MASONRY PARTITION TAG LEGEND

PARTITION TAG — XX — DESIGNATES PARTITION TYPE. SEE STRUCTURAL DRAWINGS FOR REINFORCING.

PARTITION — DESIGNATES MASONRY UNIT SIZE. SEE MASONRY SCHEDULE BELOW.

MASONRY SCHEDULE

MASONRY OPTION	MASONRY DEPTH	MASONRY WIDTH	MASONRY HEIGHT
4	3 5/8"	15 5/8"	7 5/8"
6	5 5/8"	15 5/8"	7 5/8"
8	7 5/8"	15 5/8"	7 5/8"
12	11 5/8"	15 5/8"	7 5/8"

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Project No: 6001-02

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RDP ENGINEERS
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

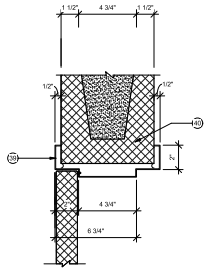
Drawing Date:	07/26/2021
Drawn:	HM
Checked:	BM, CD
Scale:	As indicated
ACAD File:	

Revisions:

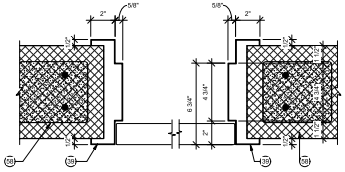
DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

PARTITION TYPES

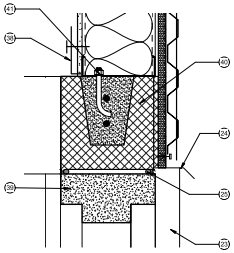
A900



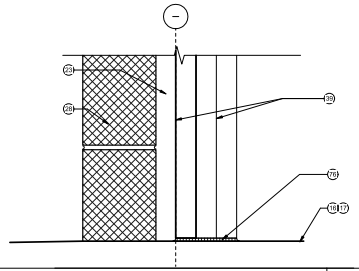
HM DOOR HEAD @ CMU OPENING 8
3" = 1'-0"



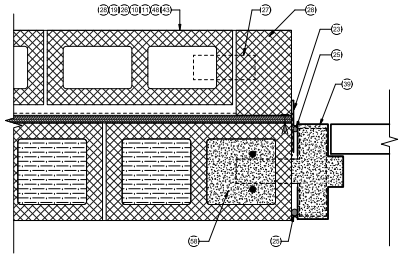
HM DOOR JAMB @ CMU OPENING 7
3" = 1'-0"



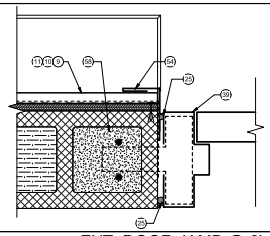
EXT. DOOR HEAD 6
3" = 1'-0"



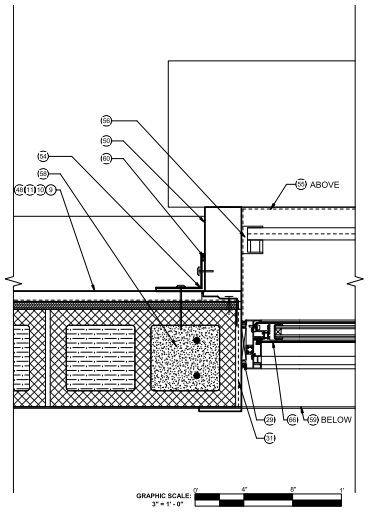
EXTERIOR DOOR SILL 9
3" = 1'-0"



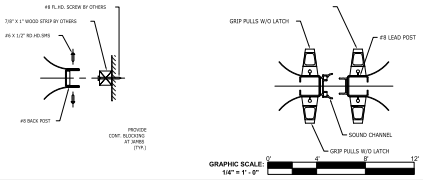
EXT. DOOR JAMB @ 3' - 0" FF 5
3" = 1'-0"



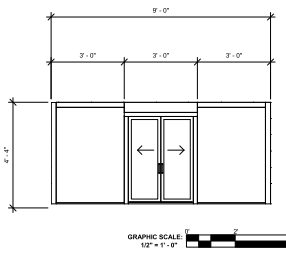
EXT. DOOR JAMB @ 6'-0" FF 4
3" = 1'-0"



WINDOW JAMB (TYPICAL) 3
3" = 1'-0"



ACCORDION PARITION JAMB & MEETING DETAILS 2
1/4" = 1'-0"



EXTERIOR ALUMINUM WINDOW TYPE 1 1
1/2" = 1'-0"

1. THERMAL BREAK TAPE, RE: SPECIFICATIONS
2. METAL 8" -Z- PURLING SPACED AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
3. STANDING SEAM METAL ROOFING. RE: SPECIFICATIONS
4. R-30 BATT ROOFING INSULATION
5. EAVE STRUT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE.
6. METAL EAVE FLASHING ANCHORED TO BUILDING FRAMING AND HOLD-DOWN CLEAT CONTINUOUS ALONG EAVE FRAMING TYPICAL
7. METAL GUTTER AND 5"X5" DOWNSPOUT
8. GUTTER CLIP ANCHOR AT 24" O.C.
9. HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
10. CONTINUOUS SELF-ADHERING MEMBRANE WATER PROOFING
11. CONTINUOUS 5/8" THICK FIBER CEMENT BOARD, TYPICAL
12. VERTICAL METAL 6" COLD ROLLED C-CHANNEL ANCHORED TO HORIZONTAL STRUCTURAL BEAM PREFORMED CLIP FLANGES AT 24" O.C., TYPICAL
13. PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM, PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR) RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
14. R-19 BATT WALL INSULATION, TYPICAL
15. LINER PANEL. CLOSURE TRIM AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
16. CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
17. ARCHITECTURE FINISH. RE: FINISH FLOOR PLAN AND SCHEDULE
18. DOWNSPOUT ANCHOR STRAPS EQUALLY SPACED
19. CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL.
20. PRE-FINISHED SHEET METAL CLOSURE TRIM ANCHORED TO WALL FRAME, SIZE TO FIT
21. FLUSH MOUNTED 8" C-GIRT ANCHORED TO STRUCTURAL BUILDING FRAME
22. 3 5/8" METAL STUD BRACING AT 24" O.C. ANCHORED TO Z-PURLIN
23. INTERIOR METAL TRIM RETURN
24. CONTINUOUS METAL TRIM FLASHING
25. SEALANT AND BACKER ROD, RE: SPECIFICATIONS, AT BOTH SIDES OF DOOR FRAME
26. CONTINUOUS 1" MIN. AIR CAVITY
27. HORIZONTAL MASONRY FIXED TIE AT 16" O.C. TYPICAL
28. 8" X 8" X 16" SPLIT FACE MASONRY BLOCK
29. SEALANT AND BACKER ROD AT BOTH SIDES OF WINDOW UNIT, RE: SPECIFICATIONS
30. SEALANT AND BACKER ROD AT BOTH SIDES OF OVERHEAD PUSH-UP DOOR FRAME, RE: SPECIFICATIONS
31. EXTEND WATERPROOF MEMBRANE ALL AROUND BUILDING FRAME, HEAD AND JAMB FACE SURFACE
32. INTERIOR FACE OF ROOFING/WALL PANELS BEYOND.
33. PRE-FINISH SHEET METAL SOFFIT PANEL TRIM MECHANICALLY ANCHORED TO BUILDING FRAMING
34. RAKE LINE FLASHING EXTERIOR RETURN TRIM
35. ACOUSTICAL LAY-IN CEILING, RE: FINISH SCHEDULE AND ARCHITECTURE SPECIFICATIONS
36. 5/8" GYPSUM BOARD. COLOR TO MATCH ROOM CMU WALL COLOR.
37. CONTINUOUS STRUCTURAL BEAM STRUCTURALLY CONNECTED ON BOTH ENDS BY THE PRE-ENGINEERED BUILDING COLUMNS (ON GRID A' & B') AND ON THE CENTER BY THE ADJACENT BEAMS (ON GRID A.3',A.45',A.65',A.7') RE: STRUCTURAL DRAWINGS.
38. METAL CORNER BEAD, TYPICAL
39. GROUT FILLED HOLLOW METAL DOOR FRAME WITH JAMB ANCHOR AND SCHEDULED DOOR.
40. REINFORCED GROUT FILLED CONCRETE MASONRY LINTEL AND BOND BEAM
41. BOTTOM TRACK. ANCHOR BOLT WITH METAL STUD BLOCKING SPACED AS REQUIRED.
42. 6" METAL STUD (16 GAUGE) FRAMING AT 16" O.C.
43. 4' HIGH FRP PANEL ON ALL SIDES OF THE CONCESSION KITCHEN WALLS. RE: SPECIFICATIONS
44. CONTINUOUS METAL TOP SUP TRACK ANCHORED TO ROOF FRAMING
45. CONTINUOUS 8" CLOSURE AND ANCHOR GIRT ATTACHED TO ROOF FRAMING, TYPICAL
46. FACTORY FORMED 6" COLD ROLLED HEAD BEAM TO SPAN BREEZEWAY
47. VERTICAL METAL WALL PANEL CORNER TRIM PRE-FINISHED TO MATCH WALL PANEL PROVIDED BY WALL PANEL MANUFACTURER
48. 8X8X16 CONCRETE MASONRY UNIT EXTERIOR WALL STRUCTURE WITH LOOSE FILL INSULATION. RE: SPECIFICATIONS
49. COLD ROLLED HEAD BEAM STIFFENER PLATE FACTORY APPLIED, SPACED AS REQUIRED.
50. PRE-FINISHED METAL ROLLING COUNTER DOOR JAMB WITH ANCHOR CLEATS CLOSURE PANEL TO MATCH DOOR HOUSING FINISH
51. SCHEDULED WALL BASE, RE: FINISH SCHEDULE AND SPECIFICATIONS
52. CLARK DIETRICH 093 ZINC CONTROL JOINT AT SOFFIT CEILING PANEL OR APPROVED EQUAL, TYPICAL
53. SUB-FLASHING, CONTINUOUS
54. CLOSURE TRIM TO MATCH WALL PANEL FINISH
55. ROLLING COUNTER DOOR HOOD, RE: ARCHITECTURE SPECIFICATIONS
56. INSULATED ROLLING PUSH-UP COUNTER DOOR CURTAIN, GALVANIZED STEEL FACTORY FINISHED WITH CLEAR ANODIZED EXTRUDED ALUMINUM BOTTOM BAR WITH WEATHER SEAL AND MANUFACTURER LOCK MECHANISMS KEYED TO INTERIOR
57. PRE-FINISHED METAL ROLLING COUNTER DOOR HEAD CLOSURE PANEL TO MATCH DOOR FINISH
58. REINFORCED GROUT FILLED CONCRETE MASONRY JAMB BLOCK, TYPICAL
59. GALVANIZED STEEL SERVING COUNTER TOP FACTORY FINISH MECHANICALLY ANCHORED TO WALL ASSEMBLY
60. CONTINUOUS SEALANT
61. ANCHOR PLATE SPACED AS REQUIRED TO SECURE BRACING
62. 6" METAL COLD ROLLED SOFFIT FRAMING AT 16" O.C. ANCHORED TO WALL FRAMING
63. EXTERIOR SOFFIT GYPSUM BOARD MECHANICALLY FASTENED TO FRAMING
64. CONTINUOUS METAL SOFFIT VENT, MANUFACTURER AIR VENT MODEL #SV301WH, COLOR TO BE SELECTED OR APPROVED EQUAL
65. TRANSVERSE COLD ROLLED FRAMING MEMBER AT BREEZEWAY SOFFIT AT 16" O.C.
66. HORIZONTAL SCHEDULED SLIDING WINDOW UNIT WITH JAMB AND HEAD ANCHOR, RE: ARCHITECTURE SPECIFICATIONS
67. CONTINUOUS METAL HOLD-DOWN CLEAT, TYPICAL
68. CAST STONE PIN ANCHOR BRACKET SPACE AS REQUIRED TO SECURE STONE CAP, TYPICAL
69. CONTINUOUS 1/4" EPOXY GROUT JOINT, TYPICAL
70. CONTINUOUS 1/4" BEVELED EDGE, TYPICAL
71. CAST STONE COLUMN CAP, TYPICAL
72. GROUT JOINT, TYPICAL
73. CONTINUOUS STRUCTURAL HANGER BEYOND CONNECTED ON THE TOP WITH THE PRE-ENGINEERED BUILDING STRUCTURE AND ON THE BOTTOM WITH A CONTINUOUS BEAM. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
74. CONTINUOUS STRUCTURAL BEAM BEYOND CONNECTED ON ONE SIDE BY A STRUCTURAL COLUMN BEYOND AND THE OTHER SIDE WITH A CONTINUOUS HORIZONTAL BEAM SUPPORTING THE PRE-ENGINEERED END WALL. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
75. STRUCTURAL COLUMN BEYOND. RE: STRUCTURAL DRAWINGS AND SPECIFICATIONS
76. DOOR THRESHOLD, RE: SPECIFICATIONS SET-IN WATERPROOF MASTIC

KEY NOTES

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES AND APPLICATIONS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL DIMENSIONS AND OR EXISTING FIELD CONDITIONS PRIOR TO START.
5. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO THE ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.
6. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES WITH ARCHITECT PRIOR TO BIDDING.
7. THE GENERAL CONTRACTOR SHALL PROTECT ANY CONSTRUCTION OR FINISHES THAT IS TO REMAIN.
8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	IK
Checked:	BM, CD
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
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DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
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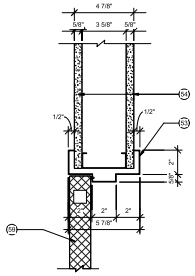
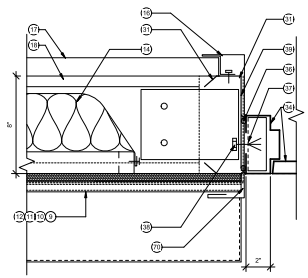
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

CONCESSION WINDOW & DOOR FRAME DETAILS

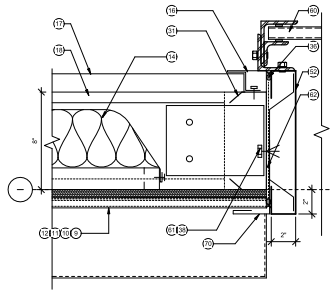
A901A



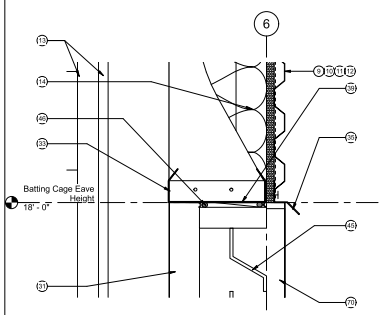
HM DOOR HEAD 11
3" = 1'-0"



EXT. DOOR JAMB DET. 8
3" = 1'-0"

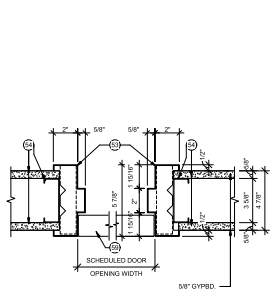


COILING DOOR JAMB DET. 5
3" = 1'-0"

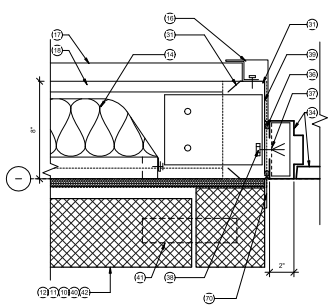


LOUVER VENT HEAD DETAIL 3
3" = 1'-0"

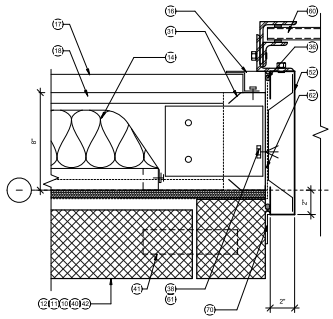
1 THERMAL BREAK TAPE, RE: SPECIFICATIONS
2 METAL 8" -Z- PURLING SPACED AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURER
3 STANDING SEAM METAL ROOFING. RE: SPECIFICATIONS
4 R-30 BATT ROOFING INSULATION
5 EAVE STRUT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE.
6 METAL EAVE FLASHING ANCHORED TO BUILDING FRAMING AND HOLD-DOWN CLEAT CONTINUOUS ALONG EAVE FRAMING TYPICAL
7 METAL GUTTER AND 5"DIA DOWNSPOUT
8 GUTTER CLIP ANCHOR AT 24" O.C.
9 HORIZONTAL METAL WALL PANELS, RE: ARCHITECTURE SPECIFICATIONS
10 CONTINUOUS SELF-ADHERING MEMBRANE WATER PROOFING
11 CONTINUOUS 5/8" THICK FIBER CEMENT BOARD, TYPICAL
12 VERTICAL METAL 2 1/2" COLD ROLLED C-CHANNEL (16 GAUGE) ANCHORED TO HORIZONTAL GIRTS PREFORMED CLIP FLANGES AT 24" O.C., TYPICAL
13 PRE-ENGINEERED BUILDING STRUCTURE FRAMING SYSTEM, PAINT STRUCTURE (TYP) (ARCHITECT TO SELECT COLOR).RE: PRE-ENGINEERED METAL BUILDING SPECIFICATIONS
14 R-19 BATT WALL INSULATION, TYPICAL
15 INSULATION CLIP ANCHOR, CONTINUOUS
16 LINER PANEL, CLOSURE TRIM AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
17 VERTICAL METAL INTERIOR LINER PANEL AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURER
18 FLUSH MOUNTED 8"-Z-GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
19 HORIZONTAL ANCHOR GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
20 PRE-ENGINEERED BUILDING BASE GIRT
21 CONCRETE FLOORING, RE: STRUCTURE DRAWINGS
22 ARCHITECTURE FINISH. RE: FINISH FLOOR PLAN AND SCHEDULE
23 DOWNSPOUT ANCHOR STRAP EQUALLY SPACED
24 CONTINUOUS AIR CAVITY FLASHING WITH WEEP HOLES SPACED AT 32" O.C. OVER CONTINUOUS GROUT BED, TYPICAL
25 HORIZONTAL 8"-C-GIRT TO ANCHOR METAL LINER PANEL, TYPICAL
26 ADJUSTABLE DOVE TAIL MASONRY TIES AT 16" O.C. TYPICAL
27 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
28 CONTINUOUS METAL TRIM FLASHING
29 CONTINUOUS METAL RAKE LINE FLASHING ANCHORED TO BUILDING FRAMING AND HOLD-DOWN CLIT CONTINUOUS ALONG RAKE FRAMING, TYPICAL
30 RAKE LINE STRUT AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
31 VERTICAL JAMB FRAME AS REQUIRED BY PRE-ENGINEERED METAL BUILDING MANUFACTURE
32 INTERIOR METAL TRIM RETURN
33 8"-C-SECTION HEAD GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
34 EXTERIOR DOOR AND FRAME, RE: SPECIFICATION AND DOOR SCHEDULE
35 CONTINUOUS METAL TRIM FLASHING
36 SEALANT AND BACKER ROD, RE: SPECIFICATIONS, AT BOTH SIDES OF DOOR FRAME
37 DOOR FRAME Z-CLIP ANCHORS FACTORY SET, MINIMUM 4 EACH JAMB EQUALLY SPACED
38 METAL FASTENERS AT EACH JAMB EQUALLY SPACED
39 EXTEND WATERPROOF MEMBRANE ALL AROUND BUILDING FRAME HEAD, JAMB, SILL FACE SURFACE
40 CONTINUOUS 1" MIN. AIR CAVITY
41 HORIZONTAL MASONRY FIXED TIE AT 16" O.C. TYPICAL
42 6" X 8" X 16" SPLIT FACE MASONRY BLOCK
43 CONCRETE PAVED SURFACE, RE: CIVIL DRAWINGS
44 DOOR THRESHOLD, RE: SPECIFICATIONS SET-IN WATERPROOF MASTIC
45 SCHEDULED WALL LOUVER WITH INSECT SCREEN, RE: MEP & ARCHITECTURE SPECIFICATIONS
46 SEALANT AND BACKER ROD AT BOTH SIDES OF LOUVER VENT UNIT, RE: SPECIFICATIONS
47 VENT LOUVER FRAME CLIP ANCHOR FACTORY SET PRIOR TO INSTALLATION
48 8" C-SECTION SILL GIRT AS REQUIRED BY PRE-ENGINEERED BUILDING MANUFACTURE
49 SPECIFIED EXTERIOR WINDOW UNIT WITH 1" INSULATED GLASS
50 SEALANT AND BACKER ROD AT BOTH SIDES OF WINDOW UNIT, RE: SPECIFICATIONS
51 WINDOW FRAME JAMB ANCHORED AS RECOMMENDED BY MANUFACTURE
52 PRE-FINISHED HEAVY-DUTY METAL CLOSURE FRAME ANCHORED TO METAL BUILDING FRAMING SYSTEM
53 SCHEDULED HOLLOW METAL DOOR FRAME
54 CONTINUOUS 5/8" THICK ON 3 5/8" METAL STUD FRAME GYPSUM BOARD, RE: ARCHITECTURE FINISH SCHEDULE
55 OVERHEAD PUSH-UP DOOR VERTICAL TRACK
56 SEALANT AND BACKER ROD AT BOTH SIDES OF OVERHEAD PUSH-UP DOOR FRAME, RE: SPECIFICATIONS
57 HORIZONTAL ANCHOR GIRT TO SUPPORT OVERHEAD PUSH-UP DOOR TRACK
58 CONTINUOUS CLOSURE TRIM
59 SCHEDULED DOOR, RE: DOOR SCHEDULE, SPECIFICATIONS, DOOR HARDWARE
60 OVERHEAD DOOR AND TRACK ASSEMBLY, RE: SPECIFICATIONS, DOOR SCHEDULE
61 OVERHEAD PUSH-UP DOOR JAMB ANCHOR FACTORY WELDED TO FRAME PRIOR TO INSTALLATION
62 EXTEND WATERPROOF MEMBRANE ALL AROUND BUILDING FRAME, HEAD AND JAMB FACE SURFACE
63 CONCRETE FLOOR AND ARCHITECTURE FINISH. RE: STRUCTURE DRAWINGS AND ARCHITECTURE FLOOR PLAN AND SCHEDULE
64 CONCRETE PAVED SURFACE. RE:CIVIL DRAWINGS
65 CONTINUOUS INTERIOR LINER PANEL METAL BASE TRIM ANCHORED TO FLOOR AND LINER PANEL
66 METAL RIDGE CAP FLASHING. RE: SPECIFICATIONS
67 OUTSIDE Z-CLOSURE AND RIDGE CAP HOLD-DOWN ANCHOR CLIT (TYPICAL)
68 STANDING SEAM METAL ROOF PANEL ANCHOR CLIP
69 SECONDARY PURLIN FRAMING SECTION TO SUPPORT METAL RIDGE CAP FLASHING TYPICAL
70 EXTERIOR METAL TRIM RETURN
71 5/8" GYPSUM BOARD ON 2 1/2" METAL STUD FRAME @ 16" O.C. AS FULL HEIGHT SHOWN IN SECTIONS. INSTALL 4'X8' FRP PANEL ON ALL INTERIOR WALLS SIDES OF THE RESTROOMS. RE FINISH SCHEDULE: ROOM FINISH SCHEDULE.



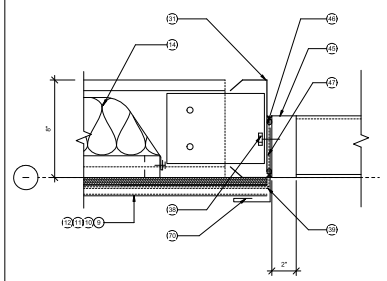
HM DOOR JAMB 10
3" = 1'-0"



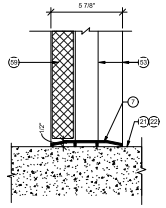
EXTERIOR DOOR JAMB DETAIL 7
3" = 1'-0"



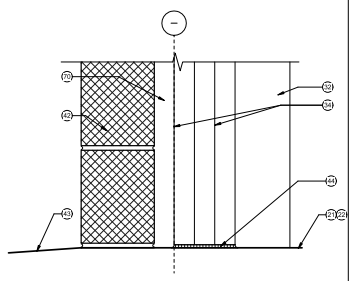
COILING DOOR JAMB DETAIL 4
3" = 1'-0"



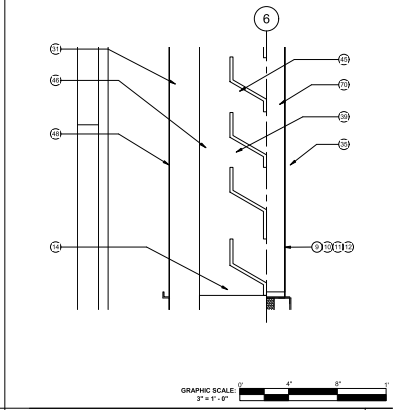
LOUVER VENT JAMB DETAIL 2
3" = 1'-0"



HM DOOR SILL 9
3" = 1'-0"



EXTERIOR DOOR SILL 6
3" = 1'-0"



LOUVER VENT SILL DETAIL 1
3" = 1'-0"

KEY NOTES

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC. AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES AND APPLICATIONS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL DIMENSIONS AND OR EXISTING FIELD CONDITIONS PRIOR TO START.
5. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO THE ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.
6. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES WITH ARCHITECT PRIOR TO BIDDING.
7. THE GENERAL CONTRACTOR SHALL PROTECT ANY CONSTRUCTION OR FINISHES THAT IS TO REMAIN.
8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

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NEDU ENGINEERING SERVICES
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STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

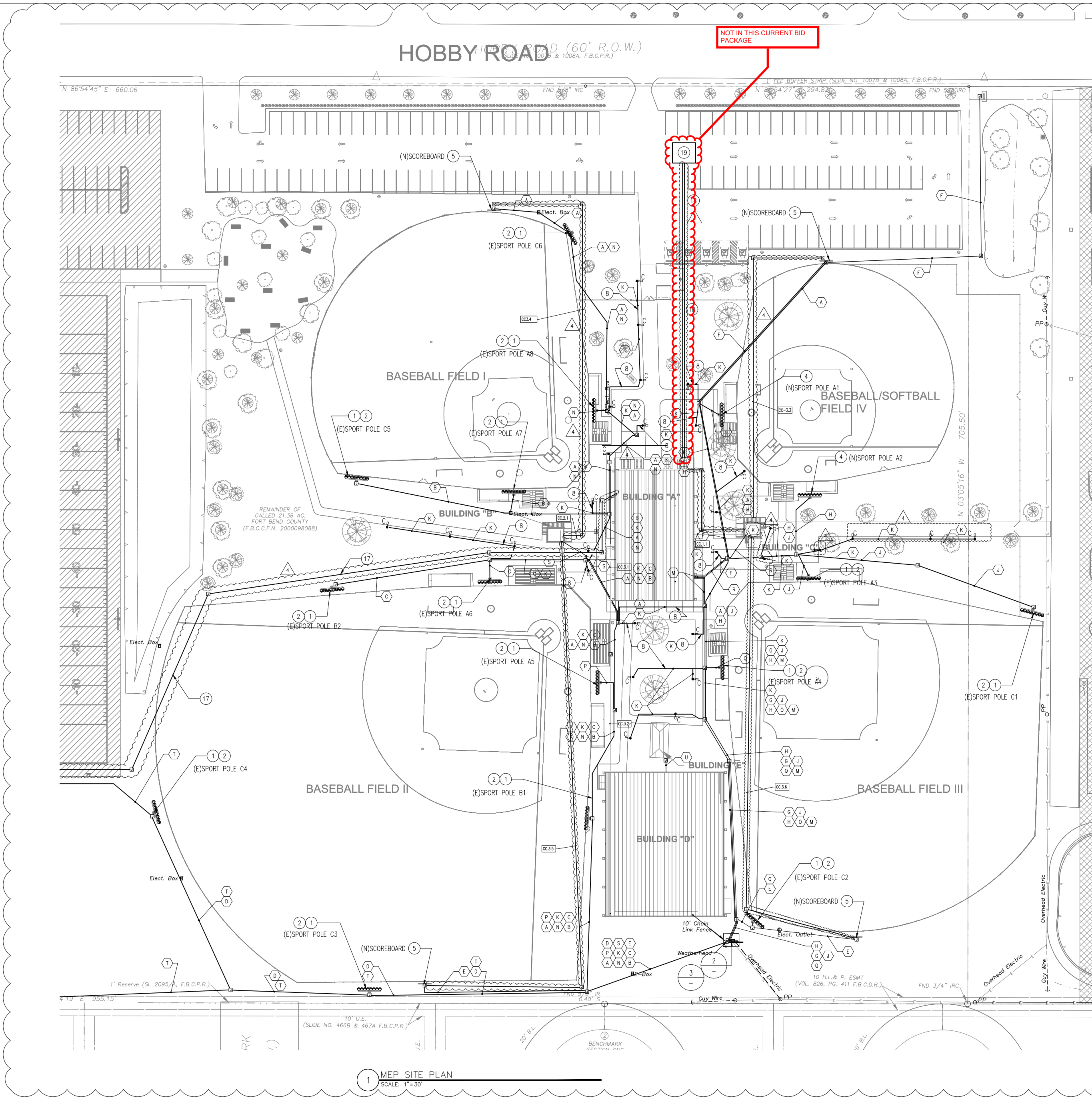
Drawing Date:	07/26/2021
Drawn:	Author
Checked:	Checker
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

BATTING CAGE WINDOW & DOOR FRAME DETAILS

A901B

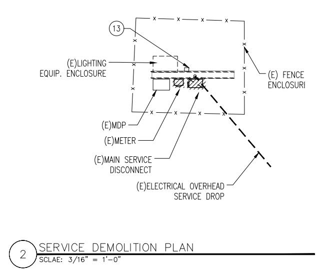


1 MEP SITE PLAN
SCALE: 1"=30'

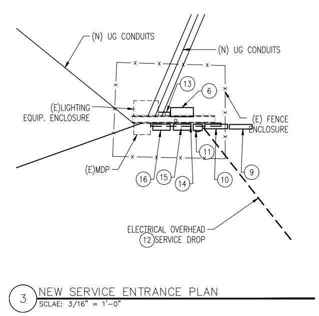
KEY NOTES:

1. EXISTING SPORTS LIGHTING FIXTURES TO BE REMOVED.
2. NEW SPORTS LIGHT FIXTURES ON EXISTING SPORT LIGHTING POLE.
3. NEW UNDERGROUND 2-2" COMMUNICATION CONDUIT AND PULL BOX PER PLAN.
4. NEW SPORTS LIGHTING POLE AND FIXTURES.
5. PROVIDE NEMA 3R DISCONNECT AND 277V/1ø PRIMARY, 120V, SECONDARY TRANSFORMER FOR SCORE BOARD POWER.
6. NEW SPORT LIGHTING CONTROLLER IN NEMA 3R ENCLOSURE AND NODE TRANSPONDER SYSTEM. LOCATE ECOLINK WIRELESS BASE STATION IN IT ROOM BUILDING A, ROOM 101.
7. NEW COMMUNICATION PULL-BOX AT ELECTRONIC SCOREBOARD.
8. 1" ELECTRICAL CONDUIT TO WALKWAY POLE FIXTURES.
9. NEW NEMA 3R, 600 AMP SERVICE DISCONNECT WITH 3 600 AMP FUSES INSTALL PER CENTER POINT ENERGY (CPE) STANDARDS.
10. NEW 30X42 METER C.T. CABINET PER CPE STANDARDS. CABINET FURNISHED BY CPE AND INSTALLED BY CONTRACTOR.
11. NEW METER. METER BASE BY PROVIDED BY CONTRACTOR. METER PROVIDED BY CPE.
12. NEW UNDERGROUND ELECTRICAL SERVICE. 2 SETS 4/0 THWN, 2" PVC.
13. EXISTING CONTROL TRANFORMER. 277V PRMARY/120V SECONDARY.
14. 12X12 AUXILLARY WIREWAY PER NEC.
15. 400 AMP NEMA 3R FUSED DISCONNECT WITH 3-250 AMP FUSES. ROUTE FEEDERS FROM DISCONNECT TO BUILDING A.
16. 200 AMP NEMA 3R FUSED DISCONNECT WITH 3-120 AMP FUSES. ROUTE FEEDERS FROM DISCONNECT TO BUILDING D.
17. 4"C WITH MAXCELL INTERDUCT. FIELD VERIFY EXACT LOCATION AND INSTALLATION DEPTH WITH OTHER DISCIPLINES TO AVOID OBSTRUCTIONS.
18. 2-4"C WITH MAXCELL INTERDUCT. FIELD VERIFY EXACT LOCATION WITH INSTALLATION DEPTH WITH DISCIPLINES TO AVOID OBSTRUCTIONS.
19. IT VAULT FOR IT COMMUNICATIONS CONDUIT STUB-UPS. FIELD VERIFY EXACT LOCATION.

NOT IN THIS CURRENT BID PACKAGE



2 SERVICE DEMOLITION PLAN
SCLAE: 3/16" = 1'-0"



3 NEW SERVICE ENTRANCE PLAN
SCLAE: 3/16" = 1'-0"

SCALE: 3/16" = 1'-0"
SCALE: 1" = 30'

IDG+ ARCHITECTS

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Project No: 6001-02

CONSULTANTS:

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STATE OF TEXAS CLIFFORD TONY MARSHALL 127321 REGISTERED PROFESSIONAL ENGINEER
09/07/22
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	09/09/2021
Drawn:	PM,CTM
Checked:	CTM
Scale:	
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
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1 CITY OF HOUSTON COMMENTS	02/24/2022
2 CITY OF HOUSTON COMMENTS	03/22/2022
3 CITY OF HOUSTON COMMENTS	05/19/2022
BID PACKAGE #2	09/07/2022

ELECTRICAL SITE PLAN

MEP100

EXISTING LIGHTING CONTROLLER TO REMAIN

PLAN NOTES

1. UTILITY TRANSFORMER.
2. SERVICE DISCONNECT.
3. UTILITY METER.
4. EXISTING MAIN DISTRIBUTION PANEL
5. EXISTING LIGHTING CONTROL PANEL
6. INTERNAL VIEW OF LIGHTING CONTROL PANEL.
7. SERVICE METER

PROVIDE NEW LIGTING CONTROLLERS FOR POLES A1 AND A2 (FIELD IV))

EXISTING LIGHTING CONTROLLERS FOR FIELD II (COLT)

PROVIDE CONTROLLER FOR WALKWAY LIGHTING

EXISTING MDP TO REMAIN

REMOVE LIGHTING CONTROLLER AND PROVIDE NEW

REMOVE METER BASE AND SERVICE

GROUND LUG TO REMAIN

REMOVE TIME CLOCK

PROVIDE CONTROLLER FOR NEW POLE P1,P2

REMOVE SERVICE DISCONNECT

PICTORIAL PLAN NOTES

1. UTILITY TRANSFORMER.
2. SERVICE DISCONNECT.
3. UTILITY METER.
4. EXISTING MAIN DISTRIBUTION PANEL
5. EXISTING LIGHTING CONTROL PANEL
6. INTERNAL VIEW OF LIGHTING CONTROL PANEL
7. SERVICE METER

SERVICE ENTRANCE PICTORIALS

NO SCALE

SITE LIGHTING SEQUENCE OF OPERATION

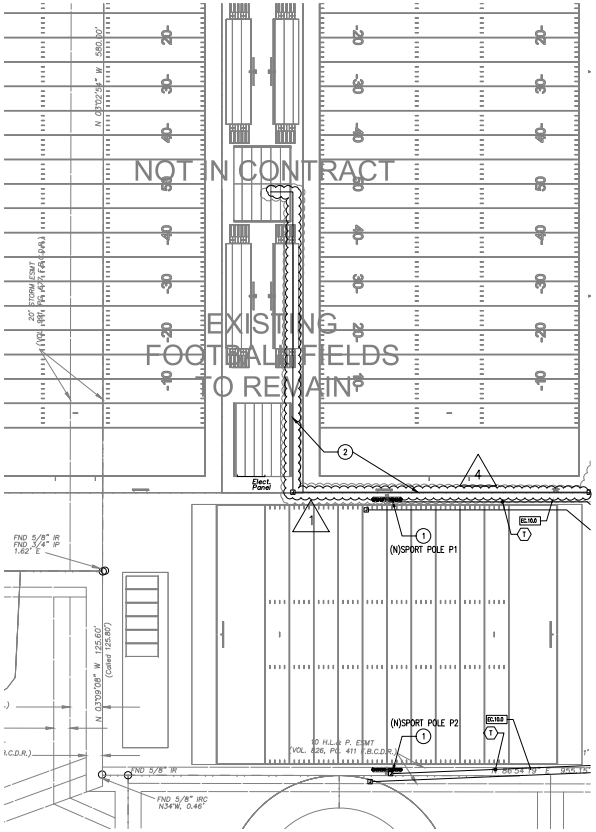
1. ALL SPORTS FIELD LIGHTING SHALL BE CONTROLLED BY INTERNET ENABLED LIGHTING CONTROL SYSTEM AS SHOWN ON PLANS.
2. THE LIGHTING SHALL BE TURNED ON AND OFF VIA INTERPOSING LIGHTING CONTROL RELAY.
3. INTERNET ENABLED SYSTEM SHALL BE MANUFACTURED BY SPORT LIGHTING. OTHER APPROVED SUPPLIERS ARE MUSCO LIGHTING AND SKYLOGIC
4. WALKWAY LIGHTING SHALL BE CONTROLLED VIA THE INTERNET ENABLED LIGHTING CONTROL. PROVIDE PHOTOCELL OVERRIDE FOR WALKWAY LIGHTING.

KEY NOTES:

1. NEW SPORTS LIGHTING POLE AND FIXTURES.
2. 4"C WITH MAXCELL INTERDUCT. FIELD VERIFY EXACT LOCATION AND INSTALLATION DEPTH WITH OTHER DISCIPLINES TO AVOID OBSTRUCTIONS.

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND ELECTRICAL GENERAL NOTES, SEE SHEET E001.
2. REFER TO SHEET E004 FOR CONDUIT SCHEDULES.



PRACTICE FIELD LIGHTING

1"=50'-0"

1

0 15' 30' 60'

SCALE: 1" = 30'

IDG+ ARCHITECTS

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CLIFFORD TONY MARSHALL
83782
LICENSED
PROFESSIONAL ENGINEER
8/07/22
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

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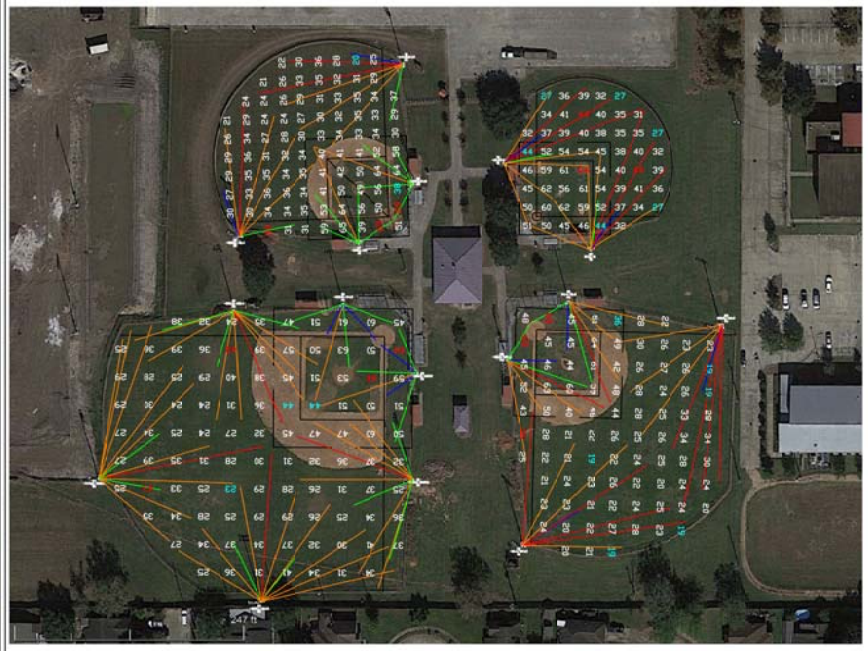
PHOTO DEPICTIONS OF WORK

MEP101



Pole	x-loc	y-loc	height	N	E	W	EW	Total	kw
A1	-36	57.6	70ft	3	5	1	1	10	6.5
A2	57.6	-36	70ft	3	5	1	1	10	6.5
A3	34.4	-91.6	50ft	1	3	2	1	7	4.5
A4	-32.2	-154.8	50ft	1	3	2	1	7	4.5
A5	-128.9	-168.9	50ft		1	3	2	6	3.9
A6	-208.8	-94.5	50ft		1	3	2	6	3.9
A7	-192.6	-29	40ft		1	4		5	3.2
A8	-133.3	34.8	40ft		1	4		5	3.2
B1	-133.2	-283.6	60ft	1	5	3		10	6.5
B2	-326.2	-101.4	60ft	1	7	3		11	7.1
C1	200.5	-116.9	60ft	4	3		1	8	5.2
C2	-15.4	-354.5	60ft	4	3		1	8	5.2
C3	-297.1	-414.9	60ft	1	8	2		11	7.1
C4	-472.2	-282.5	60ft	1	9	2		12	7.8
C5	-326.8	-21.4	50ft	1	4	1	1	7	4.5
C6	-144.3	164.5	50ft	2	3	1	1	7	4.5
Total				23	63	32	12	130	84.0

EW
CLIR 630 DM EW
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires used = 12
kw these luminaires = 7.8

V
CLIR 630 DM V
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires used = 32
kw these luminaires = 20.7

M
CLIR 630 DM M
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires used = 63
kw these luminaires = 40.7

N
CLIR 630 DM N
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires used = 23
kw these luminaires = 14.9

North-West Field (175'/215'/180')
90 points (25 infield, 65 outfield) at z=3, sp 20ft by 20ft
HORIZONTAL FOOTCANDLES

	Outfield	Infield
Average	31	52
Maximum	39	69
Minimum	20	38
AvgMin	1.53	1.37
MaxMin	1.95	1.82
Coef Var	0.14	0.19
UnifGrad	1.55	1.82

North-East T-Ball (135'/170'/130')
57 points (25 infield, 32 outfield) at z=3, sp 20ft by 20ft
HORIZONTAL FOOTCANDLES

	Outfield	Infield
Average	36	53
Maximum	44	64
Minimum	27	44
AvgMin	1.33	1.21
MaxMin	1.63	1.45
Coef Var	0.13	0.12
UnifGrad	1.33	1.38

South-West Field (285'/308'/275')
101 points (25 infield, 76 outfield) at z=3, sp 30ft by 30ft
HORIZONTAL FOOTCANDLES

	Outfield	Infield
Average	32	52
Maximum	43	64
Minimum	23	44
AvgMin	1.38	1.19
MaxMin	1.87	1.45
Coef Var	0.16	0.12
UnifGrad	1.79	1.42

South-East Field (230'/270'/215')
67 points (25 infield, 42 outfield) at z=3, sp 25ft by 25ft
HORIZONTAL FOOTCANDLES

	Outfield	Infield
Average	34	50
Maximum	36	65
Minimum	19	36
AvgMin	1.29	1.40
MaxMin	1.89	1.81
Coef Var	0.16	0.17
UnifGrad	1.47	1.50

TECHLINE SPORTS LIGHTING powered by GEOSPORT

SOUTH POST OAK
HOUSTON, TX
BASEBALL

1. THIS LIGHTING DESIGN IS BASED ON INFORMATION SUPPLIED BY OTHERS. SITE DETAIL PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALISATION AID. FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, CRITICAL SITE INFORMATION (POLE LOCATIONS, ORIENTATION, MOUNTING HEIGHT, ETC.) SHOULD BE CONFIRMED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.
2. LUMINAIRE DATA IS TESTED TO INDUSTRY STANDARDS UNDER LABORATORY CONDITIONS. OPERATING VOLTAGE AND NORMAL MANUFACTURING TOLERANCES OF LAMP, BALLAST, AND LUMINAIRE MAY AFFECT FIELD RESULTS.
3. CONFORMANCE TO FACILITY CODE AND OTHER LOCAL REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.
4. CALCULATIONS DO NOT TAKE INTO CONSIDERATION ANY OBSTRUCTIONS OR LIGHTING POLLUTION CAUSED BY NEIGHBORING LIGHT SOURCES.

DRAWN BY:JCIE
Date:8/4/2021
SCALE:NTS
Page:1 of 1
Dwg #:21-3237-R1

IDG ARCHITECTS
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Project No: 6001-02

CONSULTANTS:

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marshallengineeringco.com

8/07/22
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	09/09/2021
Drawn:	PM,CTM
Checked:	CTM
Scale:	
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
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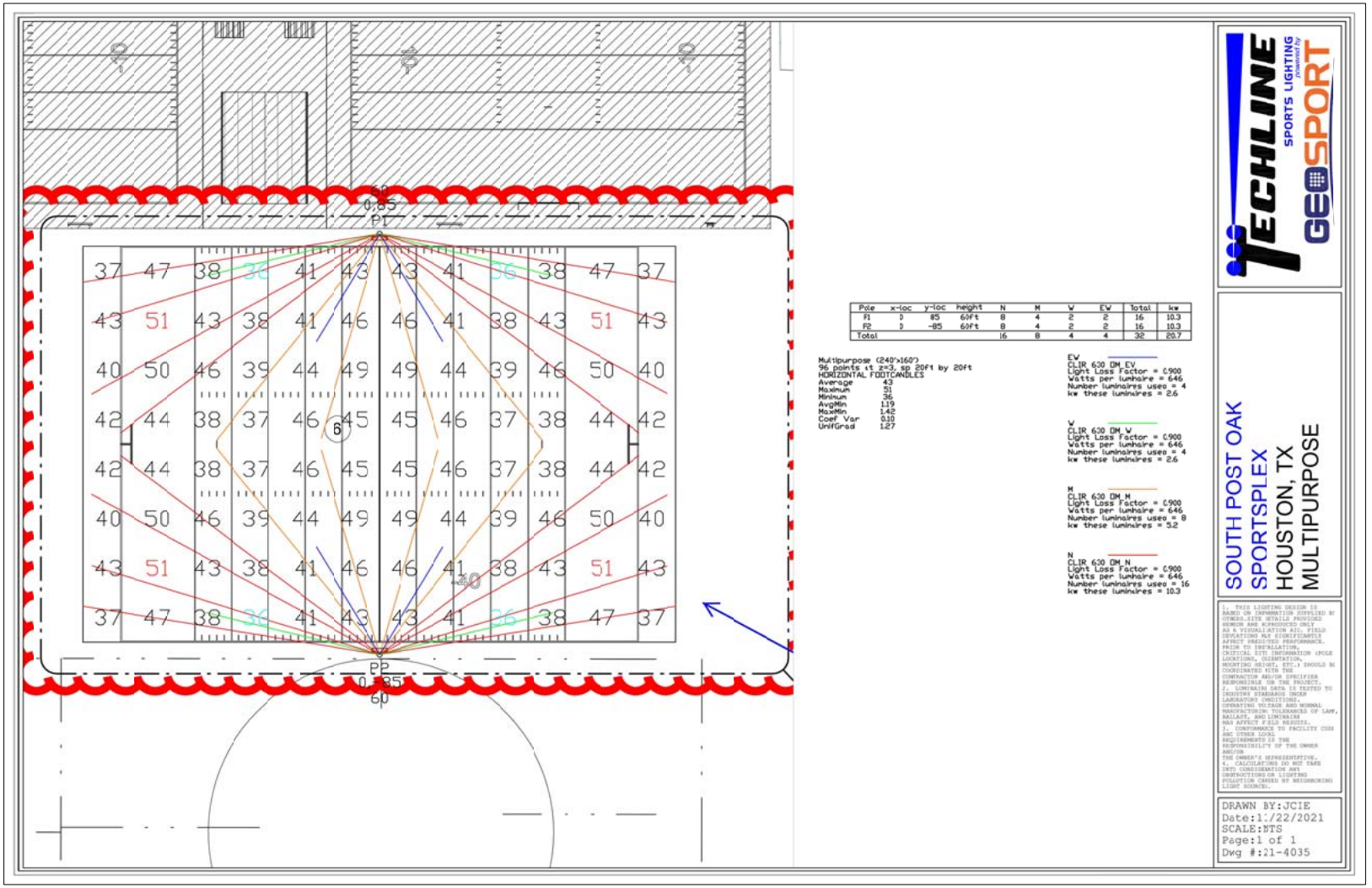
3 CITY OF HOUSTON COMMENTS	05/19/2022
BID PACKAGE #2	09/07/2022

SPORT LIGHTING PHOTOMETRIC PLAN

MEP102



Pole	x-loc	y-loc	height	N	M	V	EV	Total	kw
P1	0	85	60ft	8	4	2	2	16	10.3
P2	0	-85	60ft	8	4	2	2	16	10.3
Total				16	8	4	4	32	20.7

Multipurpose (240'x160')
96 points at Z=3, sp 20ft by 20ft
HORIZONTAL FOOTCANDLES

Average	43
Maximum	51
Minimum	36
AvgMin	1.19
MaxMin	1.42
Coef Var	0.10
UnifGrad	1.27

EV
CLIR 630 DM_EV
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires usea = 4
kw these luminaires = 2.6

V
CLIR 630 DM_V
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires usea = 4
kw these luminaires = 2.6

M
CLIR 630 DM_M
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires usea = 8
kw these luminaires = 5.2

N
CLIR 630 DM_N
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires usea = 16
kw these luminaires = 10.3

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TECHLINE SPORTS LIGHTING GEOSPORT

SOUTH POST OAK SPORTSPLEX
HOUSTON, TX
MULTIPURPOSE

DRAWN BY:JCIE
Date:1:/22/2021
SCALE:BTS
Page:1 of 1
Dwg #:21-4035

IDG+ ARCHITECTS
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CLIFFORD TONY MARSHALL 137701 REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
8/07/22
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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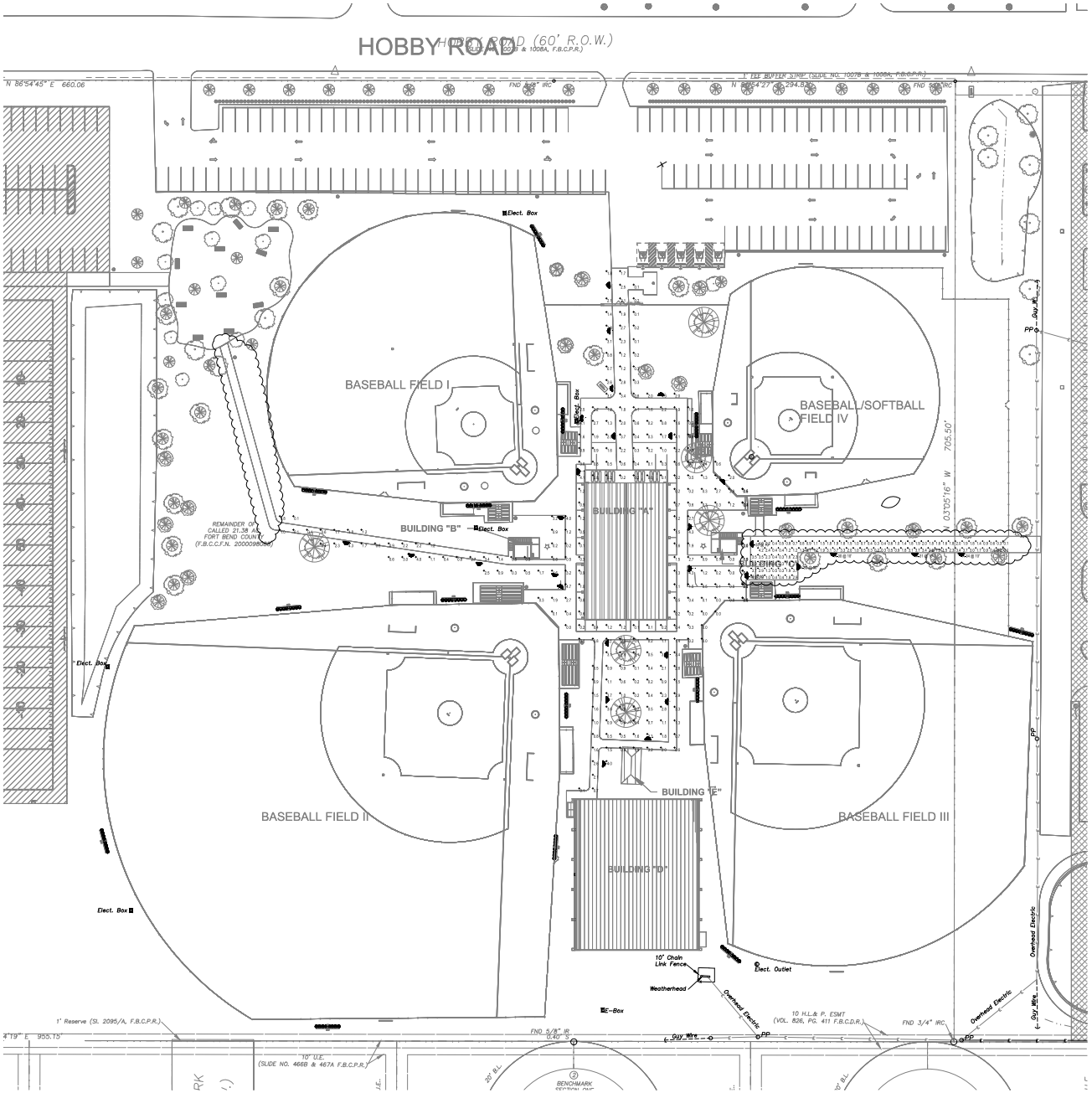
BID PACKAGE #2	09/07/2022

SPORT LIGHTING PHOTOMETRIC PLAN

MEP103



1 WALKWAY PHOTOMETRICS
SCALE: 1"=30'

SCALE: 1" = 30'

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
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WALK WAY PHOTOMETRICS

MEP104

MECHANICAL GENERAL NOTES

1. ALL WORK IS NEW UNLESS OTHERWISE NOTED.
2. CONSTRUCTION METHODS AND PROCEDURES ARE THE CONTRACTOR'S RESPONSIBILITY AND THE CONTRACTOR SHALL TAKE ALL NECESSARY MEANS TO MAINTAIN AND PROTECT THE INTEGRITY OF ALL CONSTRUCTION AT ALL TIMES.
3. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS WHICH WILL AFFECT THE WORK AND/OR CONSTRUCTION PROCEDURES AND SHALL NOTIFY THE ENGINEER OF ANY CONFLICTS NOT SHOWN OR NOTED ON THE DRAWINGS.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR METHODS AND MEANS AND ALL CONSTRUCTION PROCEDURES AND SEQUENCES REQUIRED TO CONSTRUCT THE PROPOSED WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR AND SHALL INCLUDE THE COSTS THEREOF FOR ADDITIONAL MATERIALS AND LABOR REQUIRED TO ACCOMMODATE THE CONSTRUCTION PROCEDURES AND SEQUENCES SELECTED TO EXECUTE THE CONSTRUCTION OF THE WORK.
5. ALL THE CONTRACTOR'S PROPOSED SUBSTITUTIONS MUST BE EQUAL TO OR BETTER THAN THOSE SPECIFIED. ALL PROPOSED SUBSTITUTIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO THE AWARD OF THE CONTRACT.
6. CONTRACTOR TO COORDINATE ALL WORK WITH OTHER TRADES. FIELD VERIFY THE EXACT LOCATION OF ALL CHASES, INSERTS, OPENINGS, SLEEVES, AND RELATED PIPING SPECIALTIES.
7. CONTRACTOR SHALL PATCH AND FINISH EXISTING ROOF, CEILINGS, AND WALLS AT LOCATIONS THAT HAVE BEEN DISTURBED BY DEMOLITION OR INSTALLATION OF EQUIPMENT, PIPING, OR CONTROLS.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR REROUTING OF EXISTING CONDUIT OR PIPING AS REQUIRED BY NEW INSTALLATION.
9. ALL WORK ON THIS PROJECT SHALL COMPLY WITH ALL APPLICABLE STATE AND LOCAL CODES.
10. AIR AND WATER BALANCE ALL MECHANICAL EQUIPMENT TO QUANTITIES SHOWN ON DRAWINGS.
11. ALL CONDENSATE DRAINS TO MAINTAIN 1/4" SLOPE PER FOOT.
12. PROVIDE EACH HEATING OR COOLING SYSTEM SERVING A SINGLE ZONE WITH ITS OWN TEMPERATURE CONTROL DEVICE.
13. THERMOSTATS CONTROLLING BOTH HEATING AND COOLING MUST BE CAPABLE OF MAINTAINING A 5 DEGREE F DEADBAND (A RANGE OF TEMPERATURE WHERE NO HEATING OR COOLING IS PROVIDED).
14. THE SYSTEM OR ZONE CONTROL MUST BE A PROGRAMMABLE THERMOSTAT OR OTHER AUTOMATIC CONTROL MEETING THE FOLLOWING CRITERIA:
    - A. CAPABLE OF SETTING BACK TEMPERATURE TO 55 DEGREE F DURING HEATING AND SETTING UP TO 85 DEGREE F DURING COOLING:
    - B. CAPABLE OF AUTOMATICALLY SETTING BACK OR SHUTTING DOWN SYSTEMS DURING UNOCCUPIED HOURS USING 7 DIFFERENT DAY SCHEDULES:
    - C. HAVE AN ACCESSIBLE 2-HOUR OCCUPANT OVERRIDE:
    - D. HAVE A BATTERY BACK-UP CAPABLE OF MAINTAINING PROGRAMMED SETTINGS FOR AT LEAST 10 HOURS WITHOUT POWER.
14. INSULATE AIR DUCTS TO THE FOLLOWING LEVELS:
    - A. SUPPLY & RETURN DUCTS IN CONDITIONED SPACES- R6 (MINIMUM)
    - B. SUPPLY & RETURN DUCTS IN UNCONDITIONED SPACES- R8 (MINIMUM)
16. ALL JOINTS, LONGITUDINAL AND TRANSVERSE SEAMS, AND CONNECTIONS IN DUCTWORK MUST BE SECURELY SEALED USING WELDMENTS; MECHANICAL FASTENERS WITH SEALS, GASKETS, OR MASTICS; MESH AND MASTIC SEALING SYSTEMS; OR TAPES. TAPES AND MASTICS MUST BE LISTED AND LABELED IN ACCORDANCE WITH UL 181A OR UL 181B.
17. MECHANICAL FASTENERS AND SEALS, MASTICS, OR GASKETS MUST BE USED WHEN CONNECTING DUCTS TO FANS AND OTHER AIR DISTRIBUTION EQUIPMENT, INCLUDING MULTIPLE-ZONE TERMINAL UNITS.
18. CONTRACTOR TO PROVIDE OPERATION AND MAINTENANCE DOCUMENTATION TO THE OWNER THAT INCLUDES AT LEAST THE FOLLOWING INFORMATION:
    - A. EQUIPMENT CAPACITY (INPUT AND OUTPUT) AND REQUIRED MAINTENANCE ACTION
    - B. EQUIPMENT OPERATION AND MAINTENANCE MANUALS
    - C. HVAC SYSTEM CONTROL MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS, SCHEMATICS, AND CONTROL SEQUENCE DESCRIPTIONS; DESIRED OR FIELD-DETERMINED SET POINTS MUST BE PERMANENTLY RECORDED ON CONTROL DRAWINGS, AT CONTROL DEVICES, OR, FOR DIGITAL CONTROL SYSTEMS, IN PROGRAMMING COMMENTS
    - D. COMPLETE NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE.
19. EACH SUPPLY AIR OUTLET OR DIFFUSER AND EACH ZONE TERMINAL DEVICE (SUCH AS VAV OR MIXING BOX) TO BE PROVIDED WITH ITS OWN BALANCING DEVICE. ACCEPTABLE BALANCING DEVICES INCLUDE ADJUSTABLE DAMPERS LOCATED WITHIN THE DUCTWORK, TERMINAL DEVICES, AND SUPPLY AIR DIFFUSERS.
20. ALL MECHANICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE TO SHOW EQUIPMENT ARRANGEMENT. DO NOT SCALE UNLESS DIMENSIONS ARE INDICATED, REFER TO ARCHITECTURAL PLANS AND EQUIPMENT SPECIFICATION SHEETS FOR EXACT LOCATION.

MECHANICAL SYMBOLS

SYMBOL	DESCRIPTION
	EXISTING WORK TO REMAIN
	REMOVE EXISTING WORK
	NEW WORK
12x9	DUCT SIZE, FIRST FIGURE IS SIDE SHOWN .
12x9	
	RECTANGULAR POSITIVE PRESSURE DUCT IN SECTION OR GOING UP
	RECTANGULAR NEGATIVE PRESSURE DUCT IN SECTION OR GOING UP
	RECTANGULAR POSITIVE PRESSURE GOING DOWN
	RECTANGULAR NEGATIVE PRESSURE GOING DOWN
T	THERMOSTAT
XX	PLAN NOTE
	CONNECT TO EXISTING
	BRANCH CONNECTION OUT OF BOTTOM
	BRANCH CONNECTION TOP TAKE OFF
	PIPE CAP
S R	STANDARD DUCT BRANCH SUPPLY OR RETURN, WITH VOLUME DAMPER
	TRANSITION
	SQUARE TO ROUND TRANSITION
	CEILING SUPPLY AIR DIFFUSER
	CEILING GRILLE OR EXHAUST REGISTER
SD	SMOKE DETECTOR
	SIDEWALL REGISTER
	ROUND DUCT IN SECTION AND GOING UP
	ROUND DUCT IN SECTION GOING DOWN
	BELLMOUTH DIFFUSER WITH VOLUME DAMPER
OC	CEILING MOUNTED OCCUPANCY SENSOR
OC	WALL MOUNTED OCCUPANCY SENSOR

ENERGY CODE NOTES

1. PIPE INSULATION PIPING SHALL BE THERMALLY INSULATED IN ACCORDANCE WITH TABLE 6.8.3 SECTION 64.4.1.3-2015 IECC COMMERCIAL ENERGY CONSERVATION CODE.

EXCEPTIONS ARE AS BELOW;

(A) FACTORY-INSTALLED PIPING WITHIN HVAC EQUIPMENT TESTED AND RATED IN ACCORDANCE WITH 6.4.1.

(B) PIPING THAT CONVEYS FLUIDS HAVING A DESIGN OPERATING TEMPERATURE RANGE BETWEEN 60F AND 105 F, INCLUSIVE.

(C) PIPING THAT CONVEYS FLUIDS THAT HAVE NOT BEEN HEATED OR COOLED THROUGH THE USE OF NONRENEWABLE ENERGY WHERE HEAT GAIN OR HEAT LOSS WILL NOT INCREASE ENERGY USAGE.

(D) HOT WATER PIPING BETWEEN THE SHUTOFF VALVE AND THE COIL. NOT EXCEEDING 4FT IN LENGTH, WHEN LOCATED IN CONDITIONED SPACES.

(E) PIPE UNIONS IN HEATING SYSTEMS (STEAM, STEAM CONDENSATE, AND HOT WATER).

2. THE FOLLOWING REQUIREMENTS ARE MANDATORY PROVISIONS AND ARE NECESSARY FOR COMPLIANCE WITH THE CODE. SECTION 6.7.2 - 2009 HOUSTON COMMERCIAL ENERGY CONSERVATION CODE.

(A)DRAWINGS: CONSTRUCTION DOCUMENTS SHALL REQUIRE THAT WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE RECORD DRAWINGS OF THE ACTUAL INSTALLATION BE PROVIDED TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER. RECORD DRAWINGS SHALL INCLUDE AS A MINIMUM THE LOCATION AND PERFORMANCE DATA ON EACH PIECE OF EQUIPMENT, GENERAL CONFIGURATION OF DUCT AND PIPE DISTRIBUTION SYSTEM INCLUDING SIZES, AND THE TERMINAL AIR OR WATER
DESIGN FLOW RATES.

(B) MANUALS: CONSTRUCTION DOCUMENTS SHALL REQUIRE THAT AN OPERATING MANUAL AND A MAINTENANCE MANUAL BE PROVIDED TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE.

(C) ACCEPTANCE: THESE MANUALS SHALL BE IN ACCORDANCE WITH INDUSTRY-ACCEPTED STANDARDS (SEE APPENDIX E) AND SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING:
(i) SUBMITTAL DATA STATING EQUIPMENT SIZE AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE.

(ii) OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE, EXCEPT EQUIPMENT NOT FURNISHED AS PART OF THE PROJECT. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED.

(iii) NAMES AND ADDRESSES OF AT LEAST ONE SERVICE AGENCY.

(iv) HVAC CONTROLS SYSTEM MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS, SCHEMATICS, AND CONTROL SEQUENCE DESCRIPTIONS. DESIRED OR FIELD-DETERMINED SET-POINTS SHALL BE PERMANENTLY RECORDED ON CONTROL DRAWINGS AT CONTROL DEVICES OR, FOR DIGITAL CONTROL SYSTEMS, IN PROGRAMMING COMMENTS.

(v) A COMPLETE NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE, INCLUDING SUGGESTED SET-POINTS.

IDG+ ARCHITECTS

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STATE OF TEXAS · CLIFFORD TONY MARSHALL · 137701 · LICENSED PROFESSIONAL ENGINEER
02/24/22
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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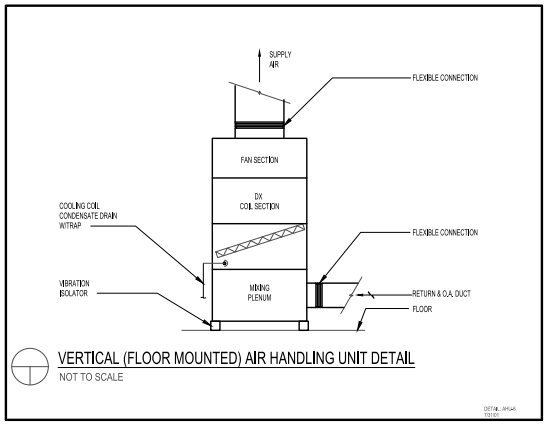
MECHANICAL LEGEND, NOTES AND SCHEDULES

M001

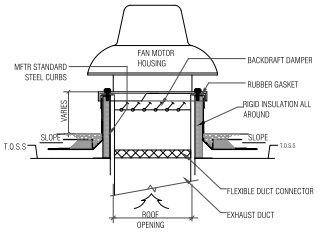


VERTICAL (FLOOR MOUNTED) AIR HANDLING UNIT DETAIL

NOT TO SCALE

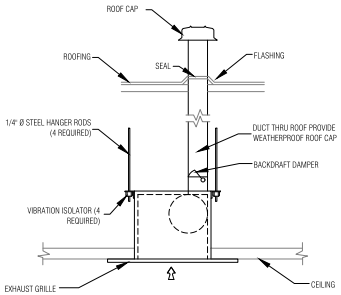
NOTES

1. FOR FAN DETAILS AND OTHER ACCESSORIES REQUIRED SEE EQUIPMENT SCHEDULES AND SPECIFICATIONS.
2. FOR REQUIRED ROOF OPENING REFER TO EQUIPMENT MANUFACTURER'S CATALOG.
3. PROVIDE SAFETY DISCONNECT SWITCH INSTALLED ON MOTOR MOUNTING PLATE UNDER MOTOR DOME.



ROOF MOUNTED EXHAUST FAN ON ROOF CURB 1

SCALE: N.T.S.



CEILING EXHAUST FAN 2

SCALE: N.T.S.

IDG+ ARCHITECTS

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CLIFFORD TONY MARSHALL 83782 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

02/22/22
DATE

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MECHANICAL DETAILS

M002

AIR HANDLING UNIT SCHEDULE

TAG	LOCATION	MANUFACTURER	MODEL	TONNAGE	E.S.P. (IN WG)	TOTAL CFM	OUTSIDE AIR CFM	TOTAL CAPACITY MBH	SENSIBLE CAPACITY MBH	EVAPORATOR		HEATING DATA				ELECTRICAL SERVICE			UNIT WEIGHT LBS	NOTES
										E.A.T.	L.A.T.	KW/ STAGE	NO. OF STAGE	HEAT FLA	E.A.T.	L.A.T.	V/PH/HZ	MCA	MOCP	
AHU-1	MECHANICAL ROOM	CARRIER	40RUA	6.0	1.00	2,100	1,000	74.2	53.7	80°FDB 67°FWB	56.93°FDB 56.18°FWB	10	1	36.2	60° FDB	79.3° FDB	480/3/60	13.5	20.0	450	1,2
AHU-2	MECHANICAL ROOM	CARRIER	FV4C	4.0	1.00	1,200	250	47.6	34.9	80°FDB 67°FWB	56.93°FDB 56.18°FWB	10	1	36.2	60° FDB	79.3 °FDB	208/1/60	53.8	60.0	200	1,2

NOTES:

1. MOUNTING-VERTICAL, PROVIDE FILTER 2" PLEATED-30% EFF., CFC FREE REFERIGERANT, SINGLE POINT ELECTRICAL CONNECTION, FACTORY MOUNTED DISCONNECT.
2. SUPPLY FAN WITH (2-SPEED)

KITCHEN AIR BALANCE

EQUIPMENT	SUPPLY AIR	RETURN AIR (CFM)	EXHAUST AIR FLOW (CFM)	KITCHEN AIR BALANCE
AHU-1	1340	-1000		340
MUA-1	1200			1200
KEF-1			-1500	-1500
TOTALS	2540	-1000	-1500	40

AHU-1 AIR BALANCE

EQUIPMENT	OUTDOOR AIR	SUPPLY AIR	RETURN AIR (CFM)	EXHAUST AIR FLOW (CFM)	BUILDING PRESSURE (CFM)
AHU-1	1080	2180	-1000	-710	390
MUA-1	1280	1280			1280
KEF-1				-1500	-1500
TOTALS		3300	-1000	-2210	90

AHU-2 AIR BALANCE

EQUIPMENT	OUTDOOR AIR	SUPPLY AIR	RETURN AIR (CFM)	EXHAUST AIR FLOW (CFM)	BUILDING PRESSURE (CFM)
AHU-2	300	1200	-900	0	300
TOTALS		1200	-900	0	300

CONDENSING UNIT SCHEDULE

TAG	LOCATION	MANUFACTURER	MODEL	TONAGE	AMBIENT °F	TOTAL CAPACITY MBH	COMP. FLA	COND. FAN FLA	EER / IEER	ELECTRICAL DATA			UNIT WEIGHT LBS	NOTES
										V/PH/HZ	MCA	MOCP		
CU-1	ON ROOF	CARRIER	38 AUZ	6.0	105	72.0	8.4	2.0	14.0	480/3/60	13.0	20.0	390	1,2
CU-2	ON ROOF	CARRIER	24ACB	4.0	105	48.0	21.2	1.3	13.0	208/1/60	27.8	40.0	250	1,2

NOTES:

1. AL/CU WITH LOUVERED HAIL GUARD. MOUNTING SEE SHEET M3.0 FOR DETAILS.
2. 2- STAGE COMPRESSOR.

AIR DEVICE SCHEDULE

MARK	SERVICE	MFG.	MODEL	NECK SIZE	MODULE SIZE	AIRFLOW (CFM)	MAX. PD (IN WG.).	THROW	MAX NC	PATTERN	THROW DIRECTION	MATERIAL	BORDER	NOTES
CD1	SUPPLY	TITUS	TMSA	6"ø	12X12	50-100	0.07	5	14	2-WAY	HORIZONTAL	STEEL	LAY IN	
CD2	SUPPLY	TITUS	TMSA	10"ø	24X24	101-350	0.07	10	28	4-WAY	HORIZONTAL	STEEL	LAY IN	
RG1	RETURN	TITUS	350RL	10X8	12X10	0-100	0.01	-	10	-	-	STEEL	SURFACE MOUNT	
RG2	RETURN	TITUS	350RL	14X14	16X16	101-350	0.09	-	23	-	-	STEEL	SURFACE MOUNT	
RG3	RETURN	TITUS	350RL	18X18	20X20	1000	0.05	-	13	-	-	STEEL	SURFACE MOUNT	

EXHAUST FAN SCHEDULE

TAG	LOCATION	INTERLOCK	CFM	S.P. (IN WG)	RPM	DRIVE TYPE	V/PH/HZ	WATTS	HP	SONES	MANUFACTURER MODEL	MOUNTING	WEIGHT LBS	NOTES
EF-1	CONCESSION ROOF	WITH ROOM LIGHT SWITCH	560	0.5	1725	DIRECT	120/1/60	-	1/4	1.0	GREENHECK G-095-VG	ROOF	10	
EF-2	CONCESSION BATHROOM	WITH ROOM LIGHT SWITCH	200	.25	950	DIRECT	120/1/60	100	-	21	GREENHECK CSP B110	CEILING MOUNT	11	1,2
EF-3	CONCESSION STORAGE	AIR HANDLERS 1&2	200	.25	950	DIRECT	120/1/60	100	-	21	GREENHECK CSP B110	CEILING MOUNT	11	1,2,3
EF-4/ EF-5	BATTING CAGE	NONE	7500	0.25	958	BELT	208/1/60	-	3/4	21	GREENHECK SBCE-3H30-7	WALL MOUNT	304	
EF-6	BATTING CAGE TOILETS	ROOM LIGHT SWITCH	200	.25	950	DIRECT	120/1/60	100	-	21	GREENHECK CSP B110	CEILING MOUNT	11	1,2

NOTES:

1. PROVIDE WALL CAP, DISCONNECT SWITCH FACTORY MOUNTED, BACKDRAFT DAMPER.
2. HANGER RODS WITH VIBRATION ISOLATION, AND REQUIRED NUTS AND WASHERS (4), CEILING SHALL NOT SUPPORT THE CEILING FAN.
3. INTERLOCK FAN H-O-A SWITCH WITH AIR HANDLERS TO ENABLE FAN TO OPERATE WHENEVER EITHER AIR HANDLER IS OPERATING.
4. PROVIDE WALL MOUNTED FAN H-O-A SWITCH WITH TIMER.

ELECTRIC UNIT HEATER SCHEDULE

MARK	MANUFACTURER MODEL	LOCATION	UNIT TYPE	HEATER DATA					MOTOR TYPE	MOTOR HP	MOTOR RPM	UNIT WEIGHT	REMARKS
				HEATER KW	AIRFLOW	THROW	TEMP RISE (°F)	MOUNTING HEIGHT (FT)					
UH1, THROUGH UH9	MODINE VE 50C 3301	UNIT HEATER	VERTICAL DISCHARGE	5.0	380	21	21.0	108	PSC	1/15	1625	100	

1. PROVIDE HEATER CONTROL WITH MINIMUM OF TWO CIRCUITS.
2. PROVIDE

WALL LOUVER SCHEDULE

MARK	SERVICE	MFG.	MODEL	FREE AREA %	WIDTH	HEIGHT	FREE AREA VELOCITY (FPM)	AIRFLOW (CFM)	MAX. PD (IN WG.)	NOTES
LVR-1	INTAKE	GREENHECK	EVH302	57	60"	36"	400	200-400	0.07	1,2,3
LVR-2	INTAKE	GREENHECK	EVH302	57	24"	12"	400	800	0.07	1,2,3

NOTES:

1. DRAINABLE STATIONARY LOUVER WITH GALV. INSECT SCREEN SECURED TO LOUVER.
2. LOUVERS SHALL BE RATED TO MEET REQUIREMENTS OF AMCA 540 AND AMCA 550.
3. SEE ARCHITECTURAL PLANS FOR INSTALLATION DETAILS.

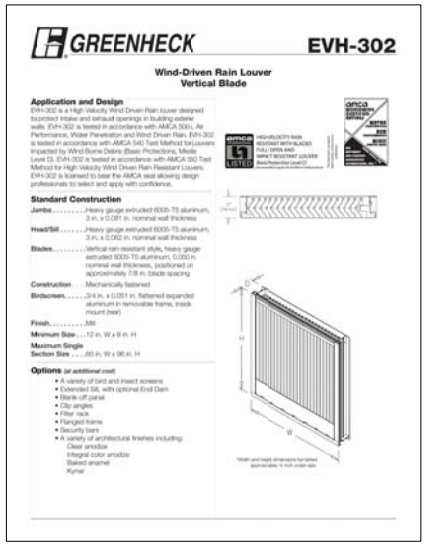
HIGH VOLUME LOW SPEED FAN SCHEDULE

TAG	MANUFACTURER	MODEL	DIAMETER (FT)	# OF AIRFOILS	WEIGHT (LBS)	SOUND LEVEL (DBA)	MOTOR (HP)	RPM	CONTROL	VOLT/PH	FULL LOAD CURRENT (AMPS)	MOCP (AMPS)	NOTES
HVLS1,HVLS2 HVLS3	BIG ASS FANS	ESSENCE	12	8	88	35	2	76	STANDARD CONTROL (WSC)	200-240/1	10.0	20	1-7

NOTES:
1. VERIFY EXTENSION TUBE LENGTH AND MOUNTING METHODS WITH MANUFACTURER PRIOR TO ORDERING
2. FAN(S) TO BE INSTALLED TO MEET ALL BAF FAN CLEARANCE GUIDELINES
3. FAN SHALL BE CAPABLE OF CONTINUOUS OPERATION IN 5F – 104F AMBIENT CONDITIONS

MINISPLIT AIR CONDITIONING UNIT SCHEDULE

UNIT MARK	MANUFACTURER	MODEL #	TOTAL COOLING CAPACITY (BTUH)	TOTAL HEATING CAPACITY (BTUH)	COMP RESSOR RLA (A)	AIRFLOW (CFM) H/M/L	OUTDOOR FAN FLA (A)	ELEC SERVICE	MCA	MOCP	HSPF	EER	SEER	OUTDOOR UNIT WT. (lbs)	REMARKS
ACU-3/ CU-3	LG	LG LSU090H SV5, LSN090H SV5	1023-9000	1023-10900	7.4	459-194	0.4	230/1	10	15	11.3	14.5	23.5	100	PROVIDE WITH FACTORY CONDENSATE PUMP



IDG+ ARCHITECTS
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Project No: 6001-02

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date: 09/09/2021
Drawn: PM,CTM
Checked: CTM
Scale:
ACAD File:
Revisions:

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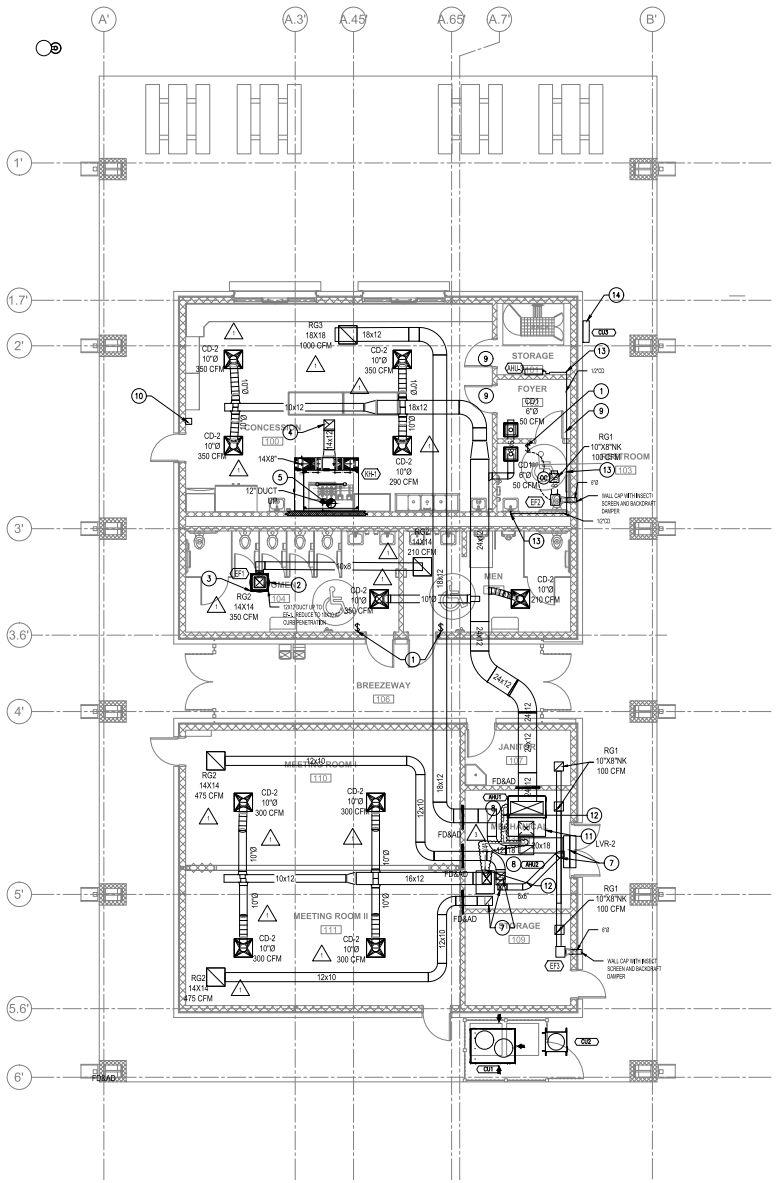
MECHANICAL SCHEDULES

M003



1 FLOOR PLAN
1/4"=1'-0"

SCALE: 1/4" = 1'-0"

KEY NOTES:

1. EXHAUST FAN TO BE CONTROLLED BY LIGHT SWITCH. SEE ELECTRICAL LIGHTING PLAN.
2. 12x12 DUCT UP TO EF2 ON ROOF. SEE DETAILS ON M002.
3. PROVIDE EXHAUST GRILLE AT CEILING.
4. DUCT UP TO MUA-1
5. DUCT UP TO KEF-1
6. 1" MIN. DOOR UNDERCUT.
7. ROUTE RETURN, OUTSIDE AIR DUCTS TO UNIT RETURN AIR PLENUM WITH FLEX DUCT CONNECTORS. PROVIDE BALANCING DAMPER AT EACH DUCT CONNECTION TO UNIT RETURN AIR PLENUM.
8. ROUTE UNIT FULL SIZE CONDENSATE DRAIN WITH TRAP TO FLOOR DRAIN. SEE DETAILS ON M002.
9. 1" MIN. DOOR UNDERCUT.
10. HOOD ANSUL EMERGENCY ACTIVATION BUTTON.
11. ECONOMIZER.
12. P-TRAP FOR CONDENSATE
13. ROUTE 1/2" CONDENSATE DRAIN ABOVE CEILING TO LAVATORY TAILPIECE.
14. MOUNT CONDENSING UNIT AS HIGH AS POSSIBLE ON WALL.

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND MECHANICAL GENERAL NOTES, SEE SHEET M001.
2. PROVIDE FLEX DUCT CONNECTOR AT UNIT SUPPLY AIR OUTLET, AND AT EACT RETURN AND OUTSIDE AIR DUCT CONNECTION TO UNIT RETURN AIR PLENUM.

IDG+ ARCHITECTS

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STATE OF TEXAS · CLIFFORD TONY MARSHALL · 117701 · LICENSED PROFESSIONAL ENGINEER
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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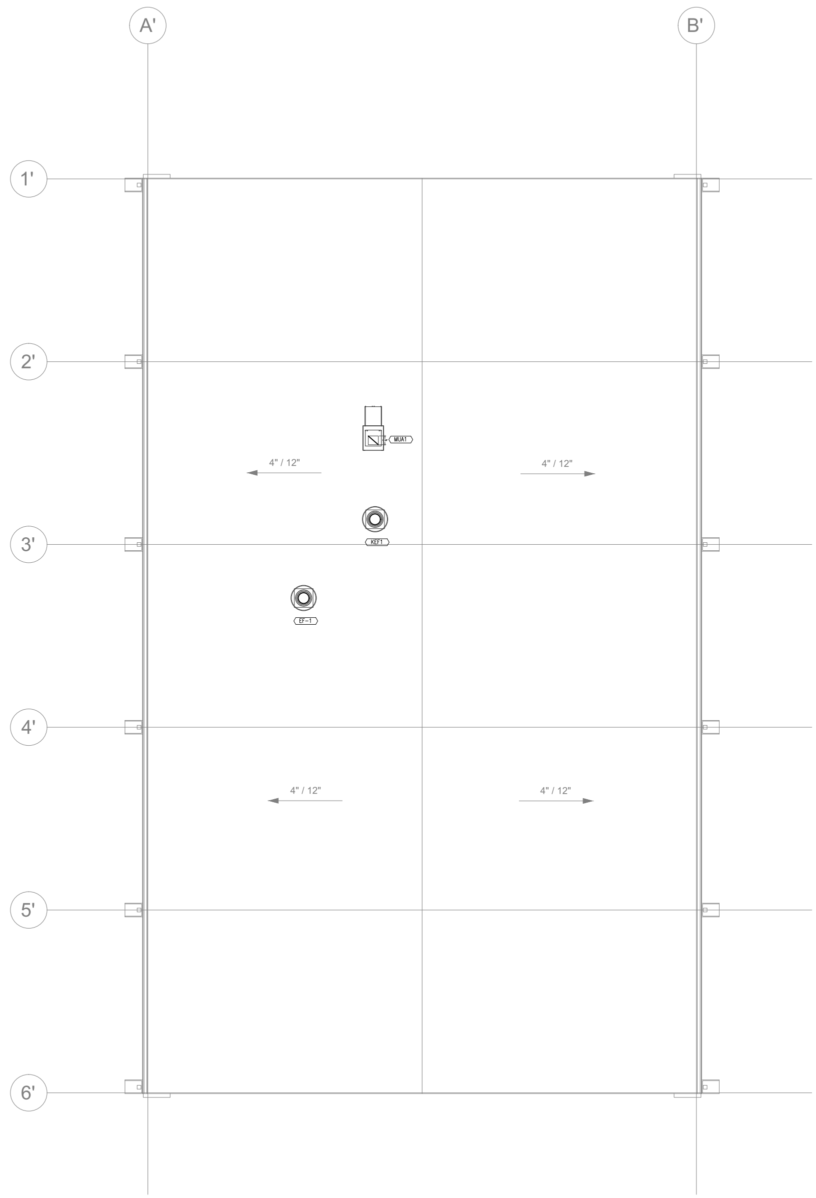
CONCESSION FLOOR PLAN MECHANICAL

M-100



1 ROOF PLAN
3/16"=1'-0"

SCALE: 3/16" = 1'-0"

KEY NOTES:

1. -

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND MECHANICAL GENERAL NOTES, SEE SHEET M001.

IDG+ ARCHITECTS

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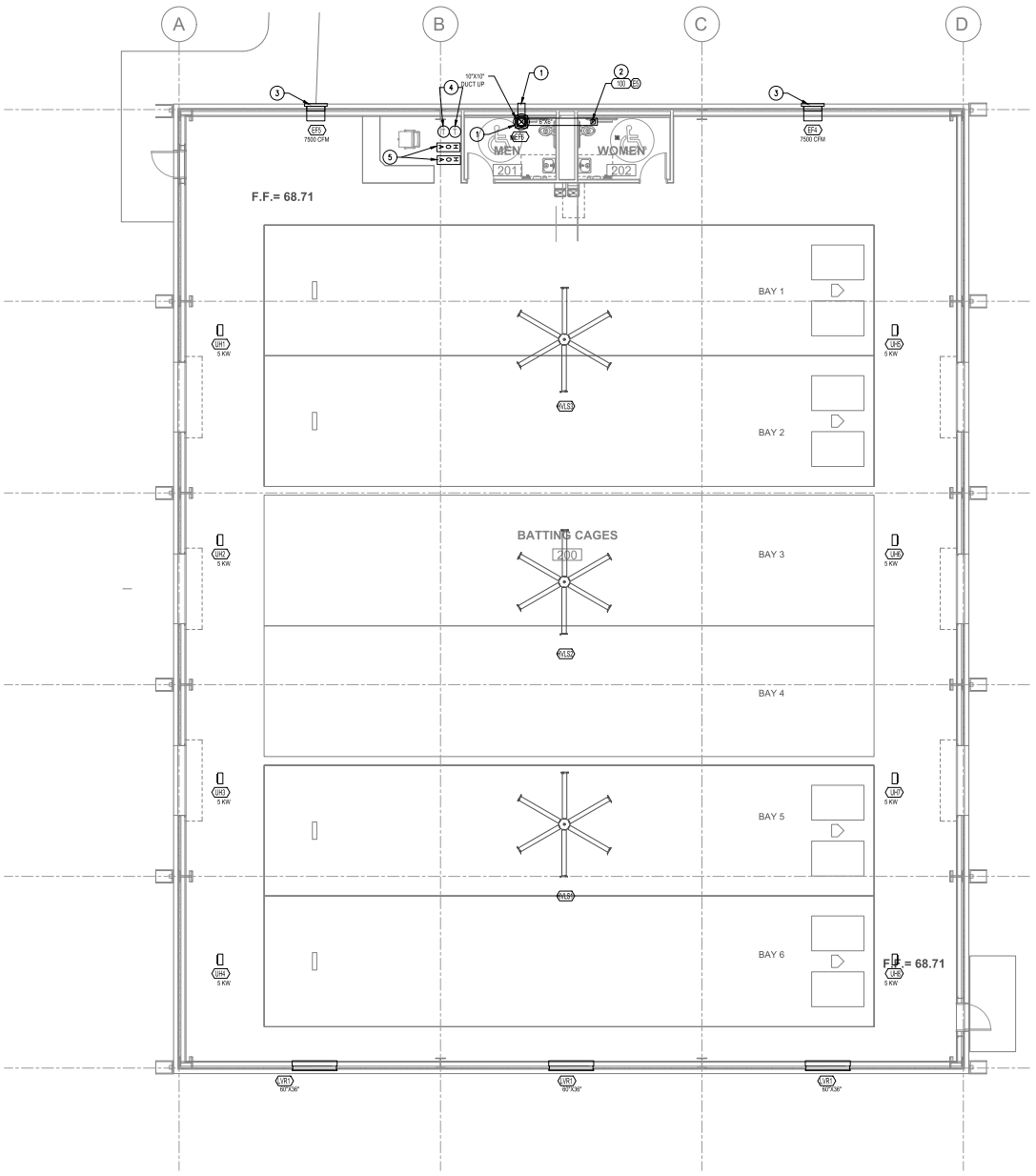
CONCESSION
ROOF PLAN
MECHANICAL

M-101



1 FLOOR PLAN
3/16"=1'-0"

SCALE: 3/16" = 1'-0"

KEY NOTES:

1. SIDEWALL FAN EXHAUST WITH INSECT SCREEN.
2. PROVIDE EXHAUST GRILLE AT INTERIOR CEILING.
3. MOUNT BOTTOM OF FAN 12' A.F.F.
4. WALL MOUNTED THERMOSTAT. PROVIDE LOCKING ENCLOSURE.
5. EXHAUST FAN CONTROLLER. PROVIDE WITH 2 HOUR TIMER.

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND MECHANICAL GENERAL NOTES, SEE SHEET M001.

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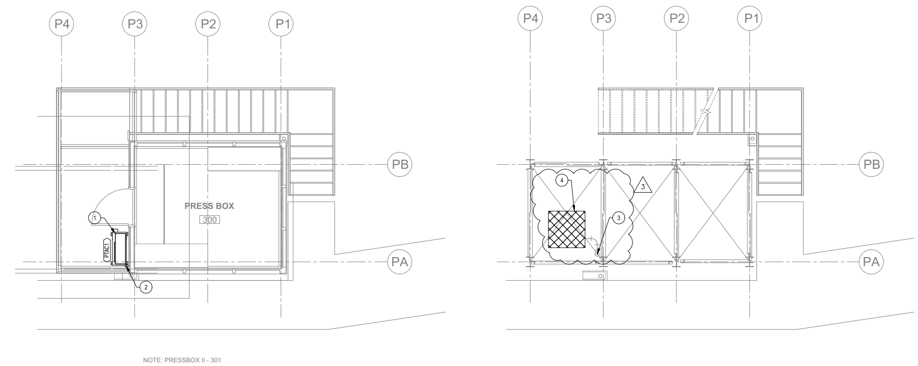
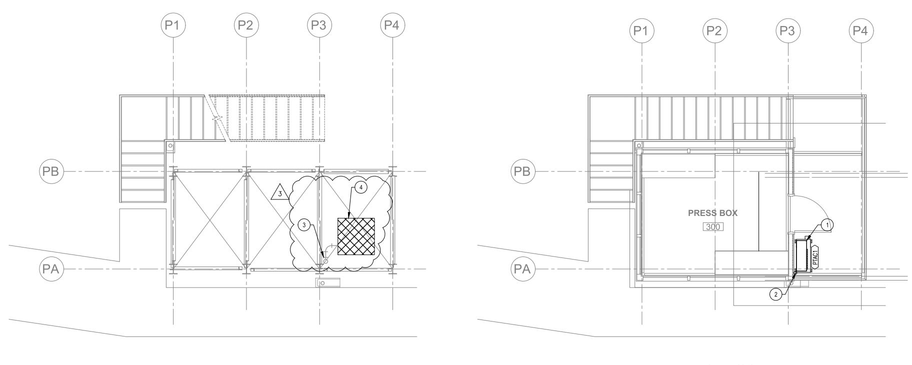
BATTING CAGE
FLOOR PLAN
MECHANICAL

M-200



1 FLOOR PLAN– PRESS BOX C
1/4"=1'-0"



1 FLOOR PLAN PRESS BOX D
1/4"=1'-0"

SCALE: 1/4" = 1'-0"

KEY NOTES:

1. PTAC AIR CONDTIONER. AMANA MODEL NO. AE123G35AX OR EQUAL. SLEEVE H 15 3/8" X W 22-3/8" OR EQUAL. UNIT TO BE PROVIDED WITH PRE-FABRICATED PRESS BOX.
2. ROUTE CONDENSATE DRAIN PIPING TO BELOW. TERMINATE AT SPLASH BLOCK.

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND MECHANICAL GENERAL NOTES, SEE SHEET M0.1.
2. THE AIR CONDITIONER SHOWN ON THIS PLAN TO BE PROVIDED BY THE PRESS BOX SUPPLIER.
3. 3/4" CONDENSATE PIPE UP.
4. 36"X36" X36" DEEP FRENCH DRAIN.

3

IDG+ ARCHITECTS

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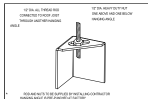
PRESS BOX
FLOOR PLAN
MECHANICAL

M-300



HANGING ANGLE DETAILS

HOOD STYLE / MODEL	450 DEGREES cfm/ft.	600 DEGREES cfm/ft.	700 DEGREES cfm/ft.
CANOPY ND2	150	200	250
WITH END PANELS (15% reduction)	127.5	170	212.5
SLOPED SND-2	228	294	-
ISLAND ND-2WI	269	300	350
NDI	346	422	475

ETL HOOD LISTING DETAIL

EXHAUST CFM=LENGTH OF HOOD X CFM/LIN.FT. (LOAD)

SUPPLY CFM=EXHAUST CFM X PERCENTAGE REQUIRED

TOTAL DUCT AREA=144 X CFM / FPM(*)

DUCT LENGTH= TOTAL DUCT AREA / DUCT DEPTH

*CAPTIVE-AIRE VENTILATOR DUCT SIZES ARE CALCULATED USING AN EXHAUST VELOCITY OF 1500-1800 FPM AND A SUPPLY VELOCITY OF 1000 FPM.

CALCULATIONS UTILIZED

CAPTIVE-AIRE HOODS ARE BUILT IN COMPLIANCE WITH:

#3054804-001 & #3054804-002 STANDARD 710 Intertek BUILT IN ACCORDANCE WITH NFPA No. 96

Listed under ETL File number 3054804-001/002

BUILDING CODES

CAPTIVE-AIRE HOODS HAVE OPTIONAL CLEARANCE REDUCTION SYSTEMS AVAILABLE AS FOLLOWS:

MATERIAL	CLEARANCE REDUCTION SYSTEM
NON-COMBUSTIBLE	NONE REQUIRED
LIMITED-COMBUSTIBLE	3" UNINSULATED STANDOFF
COMBUSTIBLE	1" INSULATED STANDOFF

CLEARANCE TO COMBUSTIBLES

INSTALLATION

1. ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTORS.
2. ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTORS.
3. HANGING BRACKETS LOCATED AND WELDED AS SHOWN ON PLANS. ALL OTHER HANGER MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
4. ALL CONNECTIONS FROM CAPTIVE-AIRE DUCT PER MECHANICAL CONTRACTORS'S PLANS.
5. COOKING EQUIPMENT TO SHUTOFF IN EVENT OF FIRE.
6. EXHAUST FANS TO TURN ON IN EVENT OF FIRE.
7. ALL LIGHTS FIXTURE SHOWN INSTALLED BY CAPTIVE-AIRE ARE FACTORY PREWIRED. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES BY ELECTRICAL CONTRACTORS.
8. LAMPS FOR LIGHT FIXTURES BY INSTALLING CONTRACTORS.
9. SEISMIC RESTAINTS ARE RESPONSIBILITY OF INSTALLING CONTRACTOR.
10. INSTALLING CONTRACTORS ASSUME ALL RELATED REPONSIBILITY FOR VERIFICATION OF DIMENSIONAL DATA CONTAINED ON THESE DOCUMENTS FOR ACCURACY, INTEGRATION, AND ADMINISTRATION OF CODE REQUIREMENTS IN EFFECT PRIOR TO ANY RELEASE FOR PRODUCTION OF EQUIPMENT SHOWN.

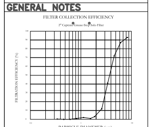
BALANCE

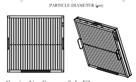
11. KITCHEN HOODS MUST BE BALANCED WITH KITCHEN.
12. KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DINING AREA.
13. RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.

ADDITIONAL

14. WRITTEN HOOD DIMENSIONS HAVE PRECEDENCE OVER SCALE.
15. SIGNED AND "APPROVED" COPIES OF THIS DOCUMENT MUST BE RECEIVED BY THE FACTORY PRIOR TO COMMENCEMENT OF FABRICATION.

GENERAL NOTES





CaptiveAire Captrate Solo Filter
ETL Listed Grease Extracting Filters
Made From 430 Stainless Steel

FILTER DETAIL

FOR QUESTIONS, CALL THE
Houston Mechanical
REGION 126
PHONE: (346) 330-2007
EMAIL: reg126@thermotek.com

HOOD INFORMATION – JOB#5185926

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S) WIDTH	LENG	HEIGHT	DIA	CFM	VEL	SP	TOTAL SUPPLY CFM	HOOD CONSTRUCTION	HOOD CONFIG END TO END	ROW
1	Hood -1	5424 T-ND-2-PSP-F	THERMOTEK	6' 0"	600 DEG	I	HEAVY	250	1500			4"	12"	1500	1910	-0.394"	1200	430 SS WHERE EXPOSED	ALONE	ALONE

PATENT NUMBERS

AC-PSP (UNITED STATES) - US PATENT 7963830 B2.
AC-PSP WALL (CANADA) - CA PATENT 2820509.
AC-PSP ISLAND (CANADA) - CA PATENT 2520330.

HOOD INFORMATION

HOOD NO	TAG	FILTER(S) TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	LIGHT(S) QTY	TYPE	WIRE GUARD	UTILITY CABINET(S) LOCATION	SIZE	FIRE SYSTEM TYPE	SIZE	ELECTRICAL MODEL #	SWITCHES QUANTITY	FIRE SYSTEM PIPING	HOOD HANGING WEIGHT
1	Hood -1	SS BAFFLE WITH HANDLES	4	20"	16"	30%	2	L55 SERIES E26	NO	RIGHT	12"x54"x24"	ANSUL R102	3.0	SC-111110MA	1 LIGHT 1 FAN	YES	504 LBS

HOOD OPTIONS

HOOD NO	TAG	OPTION
1	Hood -1	FIELD WRAPPER 18.00" HIGH FRONT, LEFT, RIGHT.
		RISER SENSOR INSTALL 6IN PLEN.

PERFORATED SUPPLY PLENUM(S)

HOOD NO	TAG	POS	LENGTH	WIDTH	HEIGHT	TYPE	RISER(S) WIDTH	LENG	DIA	CFM	SP
1	Hood -1	Front	84"	16"	6"	MUA	12"	20"		600	0.194"
						MUA	12"	20"		600	0.194"

FIRE SYSTEM INFORMATION – JOB#5185926

FIRE SYSTEM NO	TAG	TYPE	SIZE	FLOW POINTS	INSTALLATION SYSTEM	LOCATION ON HOOD
1	FS-1	ANSUL R102	3.0		FIRE CABINET RIGHT	RIGHT, HOOD 1

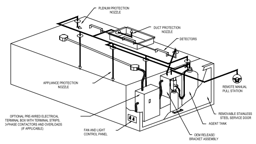
SPECIFICATIONS

THE RESTAURANT FIRE SUPPRESSION SYSTEM SHALL BE THE PRE-ENGINEERED TYPE WITH A FIXED NOZZLE AGENT DISTRIBUTION NETWORK. IT SHALL BE LISTED WITH UNDERWRITERS LABORATORIES, INC. (UL)

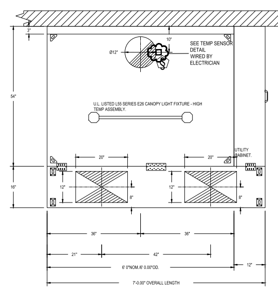
THE SYSTEM SHALL BE CAPABLE OF AUTOMATIC DETECTION AND ACTUATION WITH LOCAL OR REMOTE MANUAL ACTUATION. ACCESSORIES SHALL BE AVAILABLE FOR MECHANICAL OR ELECTRICAL GAS LINE SHUT-OFF APPLICATIONS.

THE EXTINGUISHING AGENT SHALL BE A POTASSIUM CARBONATE, POTASSIUM ACETATE-BASED FORMULATION DESIGNED FOR FLAME KNOCKDOWN AND SECUREMENT OF GREASE RELATED FIRES. IT SHALL BE AVAILABLE IN PLASTIC CONTAINERS WITH INSTRUCTIONS FOR LIQUID AGENT HANDLING AND USAGE.

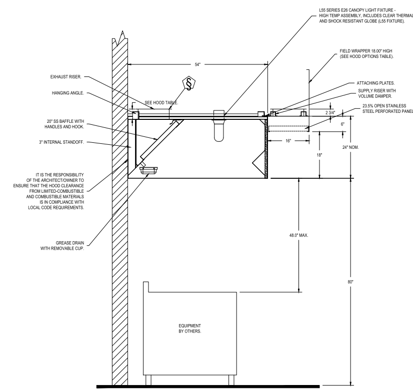
THE REGULATED RELEASE MECHANISM SHALL BE COMPATIBLE WITH A FUSIBLE LINK DETECTION SYSTEM. THE FUSIBLE LINK SHALL BE SELECTED AND INSTALLED ACCORDING TO THE OPERATING TEMPERATURE IN THE VENTILATING SYSTEM. THE FUSIBLE LINK SHALL BE SUPPORTED BY A DETECTOR BRACKET/ LINKAGE ASSEMBLY.



TYPICAL ANSUL R-102 SYSTEM LAYOUT



PLAN VIEW – HOOD #1 (Hood -1)
6' 0.00" LONG 5424T-ND-2-PSP-F



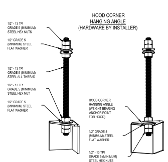
SECTION VIEW – MODEL 5424T-ND-2-PSP-F
HOOD – #1 (Hood -1)

ND HAS BEEN E.T.L. TESTED, LISTED, AND APPROVED TO EXHAUST A MINIMUM OF 150/200/250 CFM PER LINEAR FOOT OVER 450/600/700 DEGREE COOKING EQUIPMENT

*** NOTE ***
ALL WALLS AND STRUCTURES THAT COME WITHIN 18" OF HOOD MUST BE METAL STUDS AND SHEETROCK. WOOD STUDS OR ANY OTHER COMBUSTIBLE MATERIAL WITHIN 18" OF HOOD NOT ALLOWED

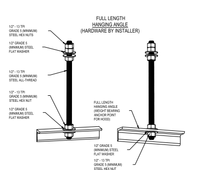
*** NOTE ***
HOOD MANUFACTURER RECOMMENDS NO RETURNS OR 4-WAY DIFFUSERS WITHIN 10 FEET OF HOOD IN ALL DIRECTIONS.

*** NOTE ***
MAKE-UP AIR SHALL BE DELIVERED INTO SPACE IN MANNER THAT WILL NOT DISRUPT HOODS ABILITY TO CAPTURE AND CONTAIN.



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION BENEATH HOOD HANGING ANGLES AND ABOVE CEILING ANCHORS. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.



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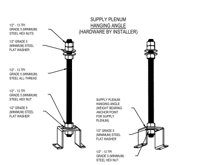

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REVISIONS

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REV1 - Baseball Fields - South Post OAK

DATE: 11/12/2021
DWG.#: 5185926
DRAWN BY:
SCALE: 3/4" = 1'-0"
MASTER DRAWING
SHEET NO. 1

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Project No: 6001-02

CONSULTANTS:

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STATE OF TEXAS CLIFFORD TONY MARSHALL 127321 LICENSED PROFESSIONAL ENGINEER
09/07/22
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	09/09/2021
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Revisions:

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BID PACKAGE #2	09/07/2022

CONCESSION HOOD DETAILS SHEET 1

M400

EXHAUST FAN INFORMATION – JOB#5185926

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	MANUFACTURER	CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS)	SONES
1	EF-1	1	DU85HTH	THERMOTEK	1500	1.000	1276	TEAO-ECM	0.750	0.3750	1	115	8.9	475 FPM	88	11.2

MUA FAN INFORMATION – JOB#5185926

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	BLOWER	HOUSING	MIN CFM	DESIGN CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	MCA	MOCP	WEIGHT (LBS)	SONES
2	SF-1	1	T-A1-G10	G10D	A1	-	1200	0.500	863	TEAO-ECM	1.000	0.4860	1	115	11.6	14.5A	25A	202	18

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	EF-1	1	GREASE BOX.
		1	ECM WIRING PACKAGE - MANUAL OR 0-10VDC REFERENCE SPEED CONTROL (TELCO MOTOR), CCW ROTATION.
		1	2 YEAR PARTS WARRANTY.
2	SF-1	1	GRAVITY BACKDRAFT DAMPER FOR SIZE 1 HOUSING.
		1	ECM WIRING PACKAGE-SUPPLY - MANUAL OR 0-10VDC REFERENCE SPEED CONTROL (TELCO MOTOR), CW ROTATION.
		1	2 YEAR PARTS WARRANTY.

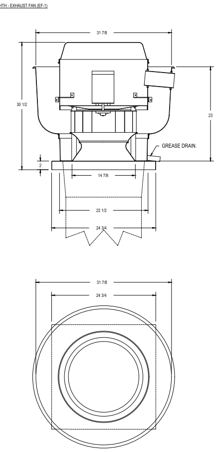
FAN ACCESSORIES

FAN UNIT NO	TAG	EXHAUST			SUPPLY			
		GREASE CUP	GRAVITY DAMPER	WALL MOUNT	SIDE DISCHARGE	GRAVITY DAMPER	MOTORIZED DAMPER	WALL MOUNT
1	EF-1	YES						
2	SF-1					YES		

CURB ASSEMBLIES

NO	ON FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	EF-1	20 LBS	CURB	23.000"W X 23.000"L X 15.000"H ALONG LENGTH, RIGHT HINGED.
2	# 2	SF-1	29 LBS	CURB	21.000"W X 21.000"L X 15.000"H ALONG LENGTH, RIGHT.

FAN #1 DU85HTH - EXHAUST FAN (EF-1)



TOP VIEW

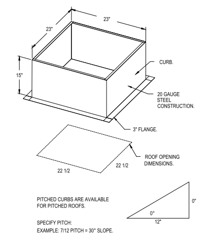
FEATURES:

- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 AND ULC-S645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT SWITCH.

NORMAL TEMPERATURE TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

ABNORMAL FLARE-UP TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600°F (316°C) FOR A PERIOD OF 15 MINUTES WITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

OPTIONS
GREASE BOX.
ECM WIRING PACKAGE - MANUAL OR 0-10VDC REFERENCE SPEED CONTROL (TELCO MOTOR), CCW ROTATION.
2 YEAR PARTS WARRANTY.

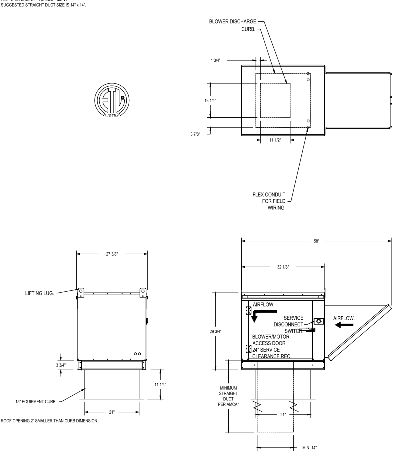


PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.

SPECIFY PITCH:
EXAMPLE: 7/12 PITCH = 30° SLOPE.

FAN #2 T-A1-G10D - SUPPLY FAN (SF-1)
1. DIRECT DRIVE UNTEMPERED SUPPLY UNIT WITH 10" BLOWER IN SIZE #1 HOUSING WITH SPEED CONTROL, DISCONNECT SWITCH.
2. INTAKE HOOD WITH EZ FILTERS-LOW CFM.
3. DOWN DISCHARGE - AIR FLOW RIGHT -> LEFT.
4. GRAVITY BACK DRAFT DAMPER, 16" WIDE X 18" HIGH, STANDARD GALVANIZED CONSTRUCTION, 1 1/4" REAR FLANGE, FOR SIZE 1 UNTEMPERED FAN HOUSING (5181).
5. ECM WIRING PACKAGE AND MANUAL OR 0-10VDC CONTROL FOR SUPPLY EC MOTORS. RTC CONTROLLER. **DO NOT ORDER UNDER WARRANTY, SEE PART NUMBER "ECM-VCU-RTC"**.
6. HINGED DOUBLE WALL INSULATED DOOR ASSEMBLY (BURNER/BLOWER SECTION).
7. 2 YEAR PARTS WARRANTY.

*NOTE: SUPPLY DUCT MUST BE INSTALLED TO MEET SMACNA STANDARDS. A MINIMUM STRAIGHT DUCT LENGTH MUST BE MAINTAINED DOWNSTREAM OF UNIT DISCHARGE AS OUTLINED IN AMCA PUBLICATION 201. WHEN USING RECTANGULAR DUCTWORK, ELBOWS MUST BE RADIUS THROAT, RADIUS BACK WITH TURNING VANES. FLEXIBLE DUCTWORK AND SQUARE THROAT/SQUARE BACK ELBOWS SHOULD NOT BE USED. ANY TRANSITION AND/OR TURNS IN THE DUCTWORK WILL CAUSE SYSTEM EFFECT. SYSTEM EFFECT WILL DRASTICALLY INCREASE STATIC PRESSURE AND REDUCE AIRFLOW. DO NOT RELY ON UNIT TO SUPPORT DUCT IN ANY WAY. FAILURE TO PROPERLY SIZE DUCTWORK MAY CAUSE SYSTEM EFFECTS AND REDUCE PERFORMANCE OF THE EQUIPMENT.
SUGGESTED STRAIGHT DUCT SIZE IS 14" x 14".



ROOF OPENING 2" SMALLER THAN CURB DIMENSION.

System Design Verification (SDV)

If ordered, CAS Service will perform a System Design Verification (SDV) once all equipment has had a complete start up per the Operation and Installation Manual. Typically, the SDV will be performed after all inspections are complete.

Any field related discrepancies that are discovered during the SDV will be brought to the attention of the general contractor and corresponding trades on site. These issues will be documented and forwarded to the appropriate sales office. If CAS Service has to resolve a discrepancy that is a field issue, the general contractor will be notified and billed for the work. Should a return trip be required due to any field related discrepancy that cannot be resolved during the SDV, there will be additional trip charges.

During the SDV, CAS Service will address any discrepancy that is the fault of the manufacturer. Should a return trip be required, the general contractor and appropriate sales office will be notified. There will be no additional charges for manufacturer discrepancies.

REVISIONS

DESCRIPTION	DATE

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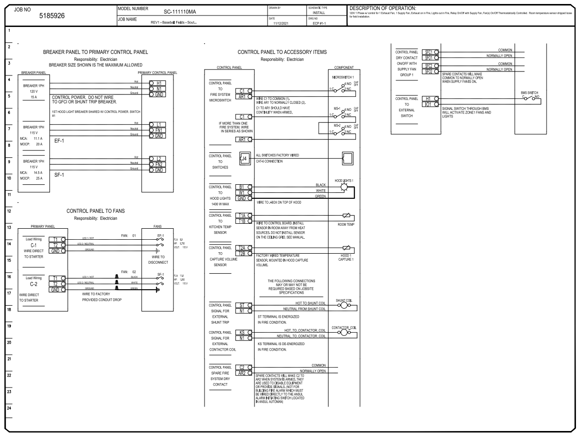
CONCESSION HOOD DETAILS SHEET 2

M401

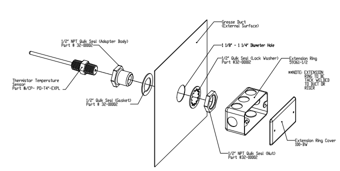
ELECTRICAL PACKAGE – JOB#5185926

NO	TAG	PACKAGE #	LOCATION	SWITCHES: LOCATION	SWITCHES: QUANTITY	OPTION	FANS CONTROLLED: FAN TAG	TYPE	Φ	HP	VOLT	FLA
1		SC-111110MA	UTILITY CABINET RIGHT	04 - UTILITY CABINET RIGHT	1 LIGHT	SMART CONTROLS THERMOSTATIC CONTROL W/ RELAY ON/OFF WITH SUPPLY	EF-1	EXHAUST	1	0.750	115	8.9
				HOOD # 1	1 FAN		SF-1	SUPPLY	1	1.000	115	11.6

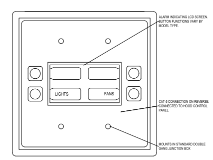


DUCT THERMISTOR SENSOR INSTALLATION

NOTE: Thermistor has 2 wires that connect to control cabinet



ELECTRICAL PACKAGE INTERFACE



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CONCESSION HOOD DETAILS SHEET 3

M402

DUCTWORK #1 PARTS – JOB#5185926

TAG	PART #	CFM	GPM	ZONE	COVEREDBY	SP	WEIGHT	VELOCITY	QTY	DESCRIPTION
P1	RDW1229LT	1500				-0.0181	11.69	1909.86	1	SINGLE WALL DUCT 12" DIAMETER, 29" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
P2	RDW1230AJDKIT	1500				-0.0119	15.04	1909.86	1	SINGLE WALL DUCT ADJUSTABLE, 12" DIAMETER, 29.5" LONG, FLANGE AT ONE END WITH A 12" ADJUSTABLE COLLAR - STAINLESS STEEL.
P3	RDW1245ASY	1500				-0.0408	5.86	1909.86	1	SINGLE WALL DUCT 45 DEGREE ELBOW, 12" DUCT, ASSEMBLY.
P4	RDW1223LT	1500				-0.0145	9.41	1909.86	1	SINGLE WALL DUCT 12" DIAMETER, 23" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
P5	RDW1204LT	1500				-0.0025	1.93	1909.86	1	SINGLE WALL DUCT 12" DIAMETER, 4" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
P6	RDW12SUBRASY						2.76		1	DUCT SUPPORT BRACKET KIT, 12" DUCT, USED FOR HANGING DUCT. 12 GA STEEL, CLEAR ZINC COATING. - 2 RINGS, 4 BRACKETS, & HARDWARE BAG 2.
P7	RDW1245ASY	1500				-0.068	5.86	1909.86	1	SINGLE WALL DUCT 45 DEGREE ELBOW, 12" DUCT, ASSEMBLY.
P8	RDW1235LT	1500				-0.0223	14.03	1909.86	1	SINGLE WALL DUCT 12" DIAMETER, 35" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
P9 ASSEMBLED W/P10	RDW1248AJDKIT	1500				-0.0147	22.74	1909.86	1	SINGLE WALL DUCT ADJUSTABLE, 12" DIAMETER, 47.5" LONG, FLANGE AT ONE END WITH A 12" ADJUSTABLE COLLAR - STAINLESS STEEL.
P10 ASSEMBLED W/P9	RDW2312TPDBEX	1500					8.00	1909.86	1	DUCT TO CURB TRANSITION 3/4" DOWN TURN, 23" CURB TO 12" DUCT, 16 GA ALUMINIZED. USED ON NCA14FA & NCA14HPFA. TRANSITION PLATE OD IS 23.5" DESIGNED FOR USE WITH EXHAUST FAN. NON-STANDARD PART.
SYSTEM AT P10						-0.5866	0.00			
	R3M-2000PLUS						0.80		2	DUCT - 3M FIRE BARRIER 2000 PLUS SILICONE - USED AS SEALANT TO SEAL DUCT JOINTS.
	R834680600587XL						52.00		4	DUCT - DUCT INSULATION FOR ZERO CLEARANCE TO COMBUSTIBLES - 300" X 24" X 1-1/2" ROLL. PYROSCAT WRAP.
	RBANDING.5						5.00		1	DUCT - FIRE BARRIER WRAP STAINLESS STEEL BANDING .5" WIDTH - 200 FT PER ROLL.
	RDW12CLASY						0.94		8	DUCT "V" CLAMP WITH NEW DESIGN 14 GA BRACKETS, 12" DUCT, ASSEMBLY.
	RSEAL.50-50						0.50		2	DUCT - FIRE BARRIER WRAP STAINLESS STEEL BANDING SEAL .5" WIDTH. QUANTITY OF 50.
	RTAPEALUM						0.25		1	DUCT - FIRE BARRIER WRAP ALUMINUM FOIL TAPE - 3" X 150' ROLL.
TOTAL WEIGHT							320.69			

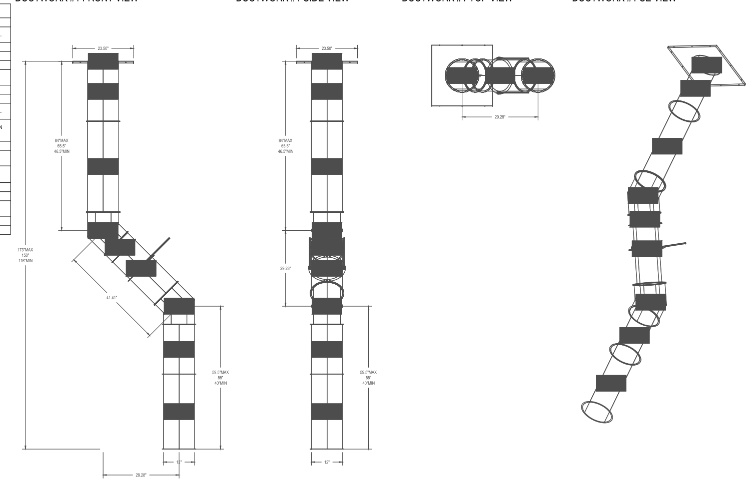
SINGLE WALL FACTORY BUILT DUCTWORK

- ALL DUCTWORK IS REQUIRED TO BE INSTALLED WITH THE MAXIMUM SUPPORT SPACING LISTED BELOW.
- FOR A COMPLETE LIST OF APPROVED SUPPORT METHODS, SEE THE INSTALLATION AND OPERATION MANUAL.
- DUCTWORK SHALL SLOPE NOT LESS THAN 1/16" PER LINEAR FOOT TOWARDS THE HOOD OR AN APPROVED GREASE COLLECTION RESERVOIR.
- WHERE HORIZONTAL DUCTS EXCEED 75 FEET IN LENGTH, THE SLOPE SHALL NOT BE LESS THAN 3/16" PER LINEAR FOOT.

DUCT DIAMETER	HORIZONTAL SUPPORT (FT)	VERTICAL WALL SUPPORT (FT)	VERTICAL CURB SUPPORT (FT)
5"	10'	10'	24'
6"	10'	10'	24'
7"	10'	10'	24'
8"	10'	10'	24'
10"	10'	10'	24'
12"	10'	10'	24'
14"	10'	10'	24'
16"	10'	10'	24'
18"	10'	10'	24'
20"	10'	10'	24'
22"	10'	10'	24'
24"	10'	10'	24'
26"	10'	10'	24'
28"	10'	10'	24'
30"	10'	10'	24'
32"	10'	10'	24'
34"	10'	10'	24'
36"	10'	10'	24'

DO NOT LEAK TEST USING SMOKE BOMBS CONTAINING CHLORINES/CHLORIDES. CONSULT WITH CAPTIVEAIRE FOR PROPER LEAK TESTING METHODS.

DUCTWORK #1 FRONT VIEW | DUCTWORK #1 SIDE VIEW | DUCTWORK #1 TOP VIEW | DUCTWORK #1 SE VIEW



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CONCESSION HOOD DETAILS SHEET 4

M403

PLUMBING GENERAL NOTES

1. ALL WORK SHALL BE NEW UNLESS OTHERWISE NOTED.
2. PLUMBING CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS WHICH WILL AFFECT THE WORK AND/OR CONSTRUCTION PROCEDURES AND SHALL NOTIFY THE ENGINEER OF ANY CONFLICTS NOT SHOWN OR NOTED ON THE DRAWINGS.
3. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR METHODS AND MEANS AND ALL CONSTRUCTION PROCEDURES AND SEQUENCES REQUIRED TO CONSTRUCT THE PROPOSED WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR AND SHALL INCLUDE THE COSTS THEREOF FOR ADDITIONAL MATERIALS AND LABOR REQUIRED TO ACCOMMODATE THE CONSTRUCTION PROCEDURES AND SEQUENCES SELECTED TO EXECUTE THE CONSTRUCTION OF THE WORK.
4. ALL THE CONTRACTOR'S PROPOSED SUBSTITUTIONS MUST BE EQUAL TO OR BETTER THAN THOSE SPECIFIED. ALL PROPOSED SUBSTITUTIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO THE AWARD OF THE CONTRACT.
5. PLUMBING CONTRACTOR TO COORDINATE ALL WORK WITH OTHER TRADES. FIELD VERIFY THE EXACT LOCATION OF ALL CHASES, INSERTS, OPENINGS, SLEEVES, AND RELATED PIPING SPECIALTIES.
6. DRAWINGS ARE DIAGRAMMATIC. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE WORK WITH ACTUAL FIELD CONDITIONS AND OTHER TRADES.
14. THE PLUMBING CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS NECESSARY TO INSTALL HIS WORK. ALL WORK SHALL BE PERFORMED BY LICENSED PLUMBERS.
15. CONTRACTOR SHALL VISIT SITE TO ASCERTAIN CONDITIONS WHICH MAY EFFECT HIS BID, AND HE SHALL BE RESPONSIBLE FOR INCLUDING ALL REQUIRED WORK NECESSARY FOR A COMPLETE AND USEABLE FACILITY.
16. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES BEFORE COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONTRACT DOCUMENTS SHALL BE REPORTED TO THE ARCHITECT.
17. SLEEVES, OPENINGS, CUTTING AND DRILLING: PLUMBING CONTRACTOR SHALL PROVIDE AND PATCH ALL OPENINGS REQUIRED FOR NEW CONSTRUCTION. COORDINATE WITH GENERAL CONTRACTOR FOR SPECIAL SLEEVES, FRAMING SPACING AND CHASES.
18. PLUMBING CONTRACTOR SHALL THOROUGHLY CLEAN HIS WORK AREA DAILY.
19. TEST AND DISINFECT DOMESTIC WATER SYSTEMS IN ACCORDANCE WITH APPLICABLE CODES.
20. ALL PIPING SHALL BE RUN CONCEALED ABOVE CEILING, IN WALLS, OR IN WALL CHASES UNLESS OTHERWISE INDICATED. EXPOSED PIPING SHALL BE 3/4 INCH MINIMUM FROM ANY WALL SURFACE.
21. PROVIDE STOP VALVES AT ALL FIXTURE AND EQUIPMENT SUPPLIES. ALL EXPOSED FIXTURE CONNECTIONS SHALL BE CHROME PLATED. PROVIDE NECESSARY HANGERS FOR SUPPORTS OF HORIZONTAL AN VERTICAL PIPING IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS.
22. PROVIDE NECESSARY UNIONS TO ALLOW REPAIR AND REPLACEMENT OF EQUIPMENT. PROVIDE DIELECTRIC UNIONS AT ALL DISSIMILAR METALS.
23. PROVIDE ESCUTCHEON PLATES WHERE PIPES PASS THROUGH WALLS, FLOORS, OR CEILINGS. OUTSIDE DIAMETER TO COVER COMPLETELY PIPE PENETRATION HOLE OR PIPE SLEEVE. NICKEL OR CHROME FINISH FOR EXPOSED AREAS. PRIME PAIN FINISH FOR CONCEALED AREAS.
24. IDENTIFY ALL PLUMBING PIPING WITH COMMERCIALLY AVAILABLE ADHESIVE LABELS.
25. PROVIDE ADA COMPLIANT UNDER SINK PIPING COVERS ON ALL EXPOSED LAVATORY PIPING.

PLUMBING FIXTURE SCHEDULE

ITEM	DESCRIPTION
WC1	WATER CLOSET- WALL MOUNTED ELONGATED BOWL, BACK OUTLET, AMERICAN STANDARD AFWALL-# 3351.001 (TOP SPUD); CARRIER SUPPORT JOSAM MFG. # 11001 SERIES CLOSET CARRIER; TOUCHLESS HIGH EFFICIENCY FLUSH VALVE-SLOAN ROYAL FLUSHOMETER, MODEL #111-1.28ES-S QUIET, EXPOSED, DIAPHRAGM TYPE, CHROME PLATED CLOSET FLUSHOMETER W/ VANDAL RESISTANT STOP CAP; TOILET SEAT AMERICAN STANDARD #5901.100.
WC2	ADA WATER CLOSET- WALL MOUNTED ELONGATED BOWL, BACK OUTLET, AMERICAN STANDARD AFWALL-# 3351.001 (TOP SPUD); CARRIER SUPPORT JOSAM MFG. # 11001 SERIES CLOSET CARRIER; TOUCHLESS HIGH EFFICIENCY FLUSH VALVE-SLOAN ROYAL FLUSHOMETER MODEL #111-1.28ES-S QUIET, EXPOSED, DIAPHRAGM TYPE, CHROME PLATED CLOSET FLUSHOMETER W/ VANDAL RESISTANT STOP CAP; TOILET SEAT AMERICAN STANDARD #5901.100. FIXTURE MOUNTING HEIGHT- TOP OF SEAT AT 17-19"MAX, FLUSH CONTROLS AT 44"MAX
WC3	WATER CLOSET, MADERA FLOWISE ADA, MODEL 3461.001. 1.28 GPF. FLOOR MOUNTED, ELONGATED BOWL, PROVIDE WITH OPEN FRONT SEAT MODEL 5901.00; TOUCHLESS HIGH EFFICIENCY FLUSH VALVE-SLOAN ROYAL FLUSHOMETER MODEL #111-1.28ES-S QUIET, EXPOSED, DIAPHRAGM TYPE, CHROME PLATED CLOSET FLUSHOMETER W/ VANDAL RESISTANT STOP CAP;
UR1	WALL MOUNTED URINAL -AMERICAN STANDARD WASHBROOK #6590.001. FLUSH CYCLE 0.125GPF TOP SPUD, BACK OUTLET, CARRIER SUPPORT JOSAM MFG. #17550-UR SERIES; TOUCHLESS HIGH EFFICIENCY FLUSH VALVE-SLOAN ROYAL FLUSHOMETER MODEL #186-0.25ES-S 0.125 QUIET, EXPOSED, DIAPHRAGM TYPE, CHROME PLATED FLUSHOMETER VALVE.
UR2	ADA WALL MOUNTED URINAL -AMERICAN STANDARD WASHBROOK #6590.001. FLUSH CYCLE 0.125GPF TOP SPUD, BACK OUTLET, CARRIER SUPPORT JOSAM MFG. #17550-UR SERIES, ; TOUCHLESS HIGH EFFICIENCY FLUSH VALVE-SLOAN ROYAL FLUSHOMETER MODEL #186-0.25ES-S 0.125 QUIET, EXPOSED, DIAPHRAGM TYPE, CHROME PLATED FLUSHOMETER VALVE. FIXTURE MOUNTING HEIGHT WITH TOP OF RIM AT 17" MAX. TO MEET ADA REQUIREMENTS
LV1	WALL HUNG LAVATORY - AMERICAN STANDARD, MURRO UNIVERSAL DESIGN# 0954.004, ADA COMPLIANT, SELF DRAINING DECKS; AMERICAN STANDARD INNSBROOK SELECTRONIC, ELECTRONIC PROXIMITY CENTERSET FAUCET# 605B.205-PK00.HAC , WITH 0.5GPM FLOW. CARRIER SUPPORT JOSAM MFG #17120 SERIES CONCEALED ARM SUPPORT. MOUNT WITH TOP OF RIM AT 34" A.F.F. TO MEET ADA REQUIREMENTS
3CS	3 COMPARTMENT SINK ADVANCE TABCO, MODEL #93, 16GA. BOWL SIZE 16"X20". BOWL DEPTH =14" PROVIDE 18" DRAIN BOARDS ON BOTH SIDES. PROVIDE WITH ADVANCE TABCO K-208 DECK MOUNTED FAUCET. FAUCET SHALL REACH ALL COMPARTMENTS OF SINK.
MS1	SERVICE SINK- ENAMELED CAST IRON SERVICE SINK, AMERICAN STANDARD FLORWELL-#7745.811, FAUCET-AMERICAN STANDARD COMMERICAL MODEL# 8344.112
DF1	(2) WATER FOUNTAINS: ONE MOUNTED TO ADA COMPLIANT. OASIS # F140REE. WATER SAVER BUBBLER, ROUND BOWL, HANDS FREE SENSOR
FD1	FLOOR DRAIN WITH TRAP GUARD - PROSET MODEL# T35630-F-P-SQ, 5" SQUARE NICKEL BRONZE GRATE, 3"PIPE SIZE. TRAP GUARD INSERT REMOVES THE NEED FOR TRAP PRIMER.
TMV1	THERMOSTATIC MIXING VALVE - WATTS MFG, GUARDIAN MODEL# LFUSG-B, ASSE 1070 POINT OF USE. (PROVIDE AT ALL HEATED WATER FIXTURES, LAVATORY, SINKS, SHOWERS, ETC.) 1
WHA	WATER HAMMER ARRESTOR JOSAM MODEL # 7500 SERIES, SIZE AS REQUIRED.
HB1	HOSE BIBB- ZURN ECOLOTROL. MODEL# Z-1320. ENCASED, NON-FREEZE, ANTI-SIPHON, AUTOMATIC DRAINING. SIZE AS PER WALL THICKNESS.
HS1	HAND SINK, ADVANCE TABCO MODEL 7PS-66W. BOWL SIZE 10" X14"X5" PROVIDE WITH K-316 WRIST HANDLE FAUCET.
FS1	FLOOR SINK, ZURN MODEL Z1900 OR EQUAL. 12"X12"X6" DEEP. PROVIDE WITH 50% OPEN GRATE. 3" OUTLET.
GT1	GREASE INTERCEPTOR - 750 GALLON - PARK #GT-750; TOP W/FRAME AND M.H. COVERS, BODY W/BAFFLES AND 4" PVC INLET AND OUTLET (FIELD LOCATE TO MISS ALL EXISTING UNDERGROUND UTILITIES)
SW1	SAMPLE WELL - 2' I.D. x 2' I.D. x 2' I.D. - PARKUSA SWB 154, 4" INLET AND OUTLET, OLDCASTLE MODEL #STD-SAMPLE WELL: TOP W/FRAME AND M.H. COVER; MATCH INVERTS ON INLET AND OUTLET (FIELD LOCATE IN CONJUNCTION WITH GREASE TRAP)
WH1	ELECTRIC TANK TYPE WATER HEATER, RHEEM PROPE40 T2, 5500 W, 56 GALLON FIRST HOUR DELIVERY, 25 GPH AT 90° RISE. 93%UEF.
BFP1	WATTS LF7R DUAL CHECK BACKFLOW PREVENTOR, ASSE 1024.

NOTE: 1. EQUIPMENT SHALL BE AS SPECIFIED ABOVE OR APPROVED EQUAL.
*TAS: TEXAS ACCESSIBILITY STANDARDS, ** ADA: AMERICANS WITH DISABILITIES ACT

INSTANT ELECTRIC WATER HEATER SCHEDULE

MARK	QTY	MFR. & MODEL NO.	OPTIONS	SERVICE	KW	MOCP	TURN ON FLOW	DIMENSION (HXWXD)"	WT. (LBS.)	REMARKS
IWH1	2	EEMAX SPEX1812T	SINGLE LAV	120/1/60	1.8	20A	0.3 GPM	9.88"HX5.3"WX4"D	4.5	THERMOSTATIC CTRL

PIPING MATERIAL SCHEDULE

SERVICE	INSIDE ABOVE GRADE			INSIDE, BELOW GRADE			OUTSIDE BUILDING			COMMENTS
	PIPE	CONNECTION	INSULATION	PIPE NOTE 1	CONNECTION	INSULATION	PIPE	CONNECTION	INSU	
SANITARY WASTE AND VENT	SCHEDULE 40 PVC	SOLVENT 1	NOTE 1	SCHEDULE 40 PVC	SOLVENT WELD 1	2	SCHEDULE 40 PVC/	SOLVENT WELD		* SANITARY DRAIN PIPE INSIDE BUILDING: PIPE 4" AND SMALLER - PVC SCH 40 1
DOMESTIC COLD WATER	SCHEDULE 40 CPVC	SOLVENT WELD	CLOSED CELL FOAM	TYPE K NOTE 1 COPPER	SOLVENT WELD	1" ARMAFLEX	SCHEDULE 40 PVC	SOLVENT WELD		* PIPE SLOPE NOT LESS THAN 1/4"FT, 2% U.N.O.
DOMESTIC HOT WATER	SCHEDULE 40 CPVC	SOLVENT WELD	CLOSED CELL FOAM	TYPE K NOTE 1 COPPER	2	1" ARMAFLEX				NOTE 1: PROVIDE SOFT COPPER TUBING WITH NO UNDERGROUND JOINTS. PROVIDE WITH PLASTIC SLEEVING. 2

WATER RECIRCULATING PUMP

MARK	TYPE	GPM	TOTAL HEAD FT OF H2O	RPM	SERVICE	MFG	MODEL	REMARKS
CP1	INLINE	5	20	2650	115/1/60	TACO	IL112	PROVIDE WITH HAND-OFF-AUTO MANUAL CONTROLLER

DOMESTIC WATER CALC

BUILDING WATER SUPPLY SIZE PER IPC 2012, APPENDIX "E"

TOTAL DEVELOPED LENGTH:	2500'
FIXTURE UNITS:	257 FU
GPM DEMAND:	105
AVG. SUPPLY PRESSURE, AT MAIN	50 PSIG
PRESSURE REQ. HIGHEST FIXTURE	-8 PSIG
WATER METER LOSS	-5.30 PSIG
ELEV. LOSS (20')	-3.44 PSIG
EXCESS AVAILABLE PRESSURE	24.3 PSIG
FRICTION LOSS/100 AVAIL (24.3/2,494)X100	0.97 PSI
FLUID VELOCITY	4.8 FPS

INSTALL NEW 3" METER AND SUPPLY PIPE

PLUMBING SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A.F.F.	ABOVE FINISHED FLOOR		FLOOR DRAIN
U.N.O.	UNLESS OTHERWISE NOTED	C0	FLOOR CLEAN OUT
V	SANITARY VENT PIPE	WCO	WALL CLEAN OUT
SAN (S)	SANITARY PIPE	BCO	BUILDING CLEAN OUT
STM	STORM WATER PIPE		HOSE BIB, FREEZE-PROOF WITH INTEGRAL VACUUM BREAKER
DHW	DOMESTIC HOT WATER		POINT OF CONNECTION NEW TO EXISTING WORK
DHC	DOMESTIC HOT WATER RECIRC		POINT OF DISCONNECTION
DCW	DOMESTIC COLD WATER	XX	INDICATES PLAN NOTE
DTW	DOMESTIC TEMPERED WATER	(N)	NEW WORK
	GATE VALVE	(E)	EXISTING WORK
	ELBOW TURNED DOWN	(D)	DEMOLITION WORK
	ELBOW TURNED UP		
	RISE OR DROP		
	CAP ON END OF PIPE		

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Project No: 6001-02

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STATE OF TEXAS — CLIFFORD TONY MARSHALL — 127321 — REGISTERED PROFESSIONAL ENGINEER
09/07/22
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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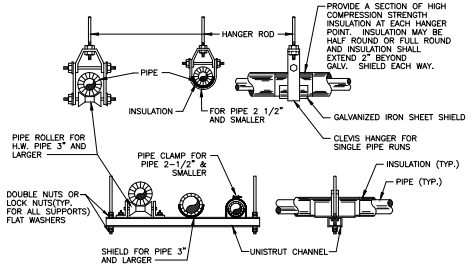
PLUMBING LEGEND, NOTES AND SCHEDULES

P001

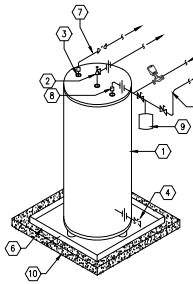


WATER PIPING HANGER AND SUPPORT DETAILS 9

SCALE: N.T.S.

WATER HEATER GENERAL NOTES:

1. WATER HEATER SHALL COMPLY WITH MINIMUM EFFICIENCY VALUES AS SPECIFIED IN 2015 IECC, AND HOUSTON COMMERCIAL ENERGY CONSERVATION CODE.
2. WATER HEATER TO BE PROVIDED WITH HEAT TRAP FITTINGS ON SUPPLY AND RETURN.
3. PROVIDE 1" INSULATION ON THE FIRST 8 FEET OF DOMESTIC WATER SUPPLY AND ALL HOT WATER PIPING. INSULATION CONDUCTIVITY SHALL NOT EXCEED 0.27 BTU PER IN/HR FT SQUARED X DEGREE F.

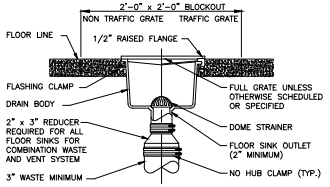


LEGEND

1. WATER HEATER
2. T & P RELIEF. TO OUTSIDE LOW
3. HOT WATER DISCHARGE
4. DRAIN VALVE
5. COLD WATER SUPPLY
6. DRAIN PAN, ROUTE OUTSIDE LOW
7. INSULATE WITH 1" INSUL.
8. HEAT TRAP
9. EXPANSION TANK
10. 3" CONCRETE SERVICE PAD
11. 1" HOT WATER RETURN PIPING

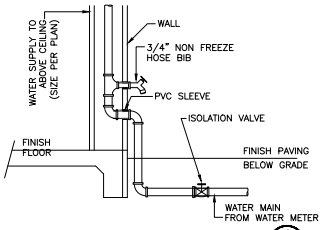
WATER HEATER DETAIL 10

SCALE: N.T.S.



FLOOR SINK DETAIL 6

SCALE: N.T.S.



WATER ENTRY DETAIL 1

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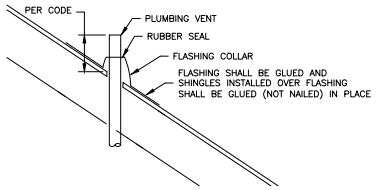
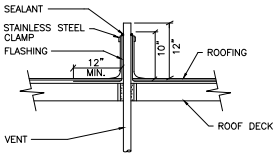
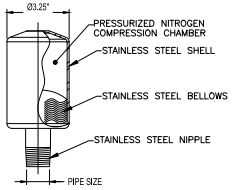




VENT THROUGH ROOF 7

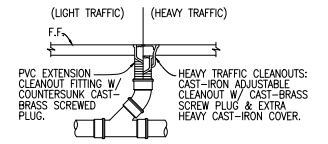
SCALE: N.T.S.



REFER TO PLUMBING FIXTURE SCHEDULE FOR TYPE

WATER HAMMER ARRESTOR 8

SCALE: N.T.S.



FLOOR CLEANOUT DETAIL 2

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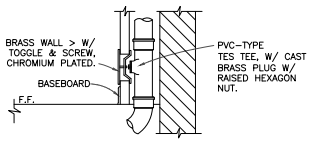

WALL CLEANOUT DETAIL 3

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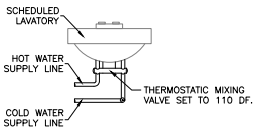
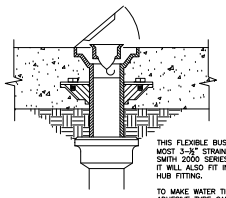


* INSTALL THERMOSTATIC MIXING VALVE TO ALL FIXTURES SUPPLYING HOT WATER INTENDED FOR HUMAN CONTACT.

THERMOSTATIC MIXING VALVE 4

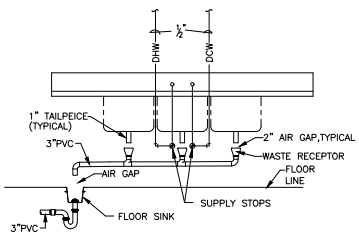
SCALE: N.T.S.



TRAP GUARD - DRAIN INSERT 5

SCALE: N.T.S.

NOTE:
STAINLESS STEEL 3 COMPARTMENT SINK, SEE SCHEDULE FOR SPECIFICATION



3 COMPARTMENT SINK DETAIL 11

SCALE: N.T.S.

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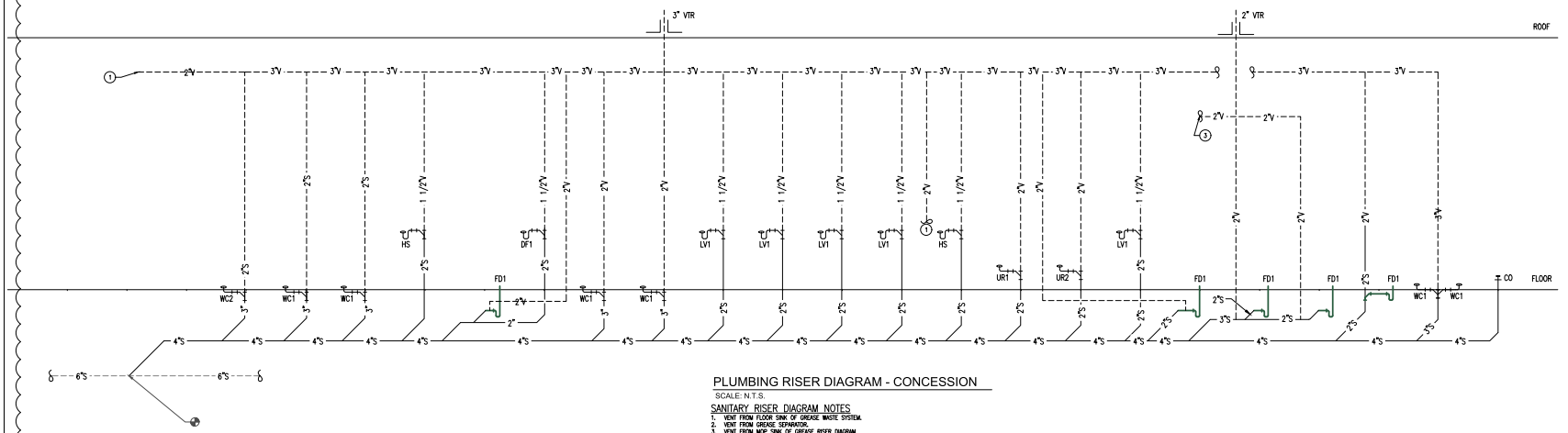
PLUMBING DETAILS

P002

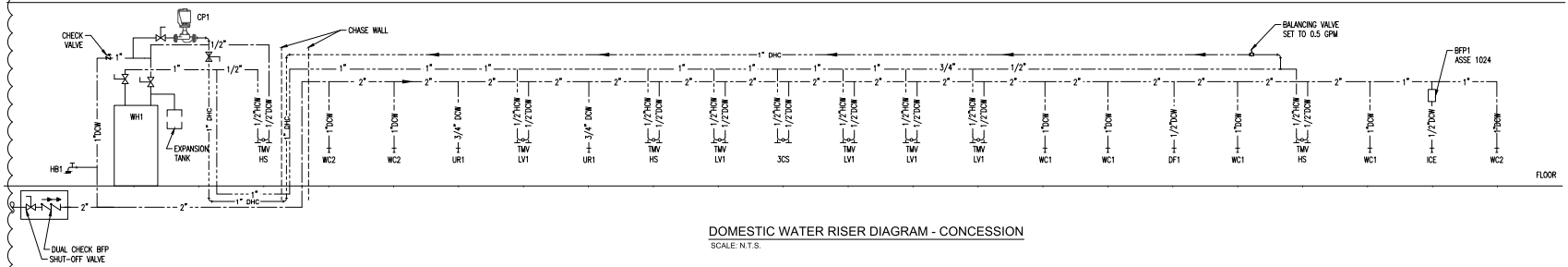


PLUMBING RISER DIAGRAM - CONCESSION

SCALE: N.T.S.

SANITARY RISER DIAGRAM NOTES

1. VENT FROM FLOOR SINK OF GREASE WASTE SYSTEM.
2. VENT FROM GREASE SEPARATOR.
3. VENT FROM MOP SINK OF GREASE RISER DIAGRAM



DOMESTIC WATER RISER DIAGRAM - CONCESSION

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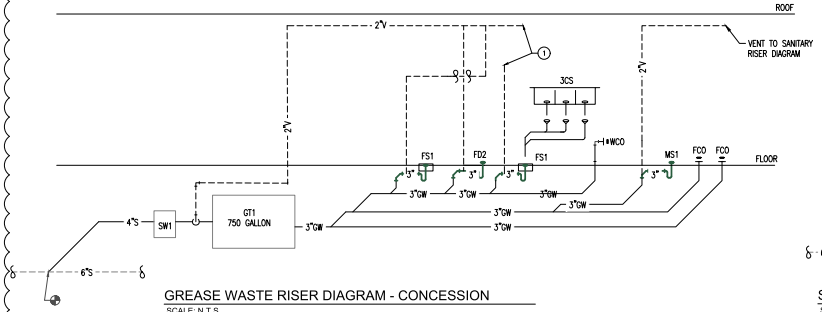
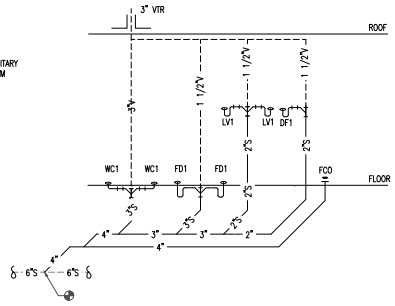


GREASE WASTE RISER DIAGRAM - CONCESSION

SCALE: N.T.S.

GREASE WASET RISER DIAGRAM NOTES

1. VENT TO SANITARY RISER DIAGRAM VENT.



SANITARY RISER DIAGRAM - BATTING CAGE

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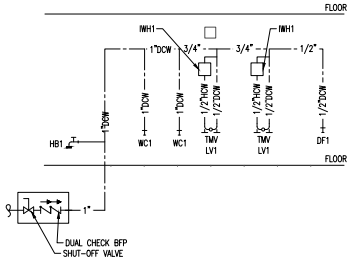

DOMESTIC WATER RISER DIAGRAM

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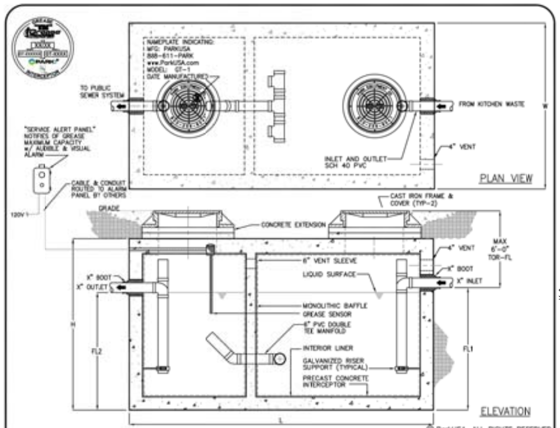
3 CITY OF HOUSTON COMMENTS	05/19/2022
BID PACKAGE #2	09/07/2022

PLUMBING
RISER DIAGRAMS

P003



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SELECTED UNIT

GREASE INTERCEPTOR SCHEDULE								
MODEL NO.	CAPACITY USGal	GREASE CAP. (LBS)	EMPTY WT (LBS)	LENGTH L	WIDTH W	HEIGHT H	INLET FL1	OUTLET FL2
GT-500	500	1,200	9,500	7'-10"	4'-4"	4'-6"	3'-3"	3'-0"
GT-750	750	1,700	9,900	7'-10"	4'-4"	6'-0"	4'-5"	4'-2"
GT-1000	1,000	2,300	13,350	8'-8"	5'-0"	6'-0"	4'-9"	4'-6"
GT-1250	1,250	2,900	14,650	9'-2"	5'-8"	6'-0"	4'-9"	4'-6"
GT-1500	1,500	3,500	16,050	9'-2"	5'-8"	7'-0"	5'-9"	5'-6"
GT-2000	2,000	4,600	21,250	9'-0"	6'-0"	8'-0"	6'-9"	6'-6"
GT-2500	2,500	5,700	27,050	13'-0"	7'-0"	7'-0"	5'-9"	5'-6"
GT-3000	3,000	6,900	33,150	13'-0"	7'-0"	8'-0"	6'-9"	6'-6"
GT-3500	3,500	8,000	38,550	13'-0"	7'-0"	8'-6"	7'-3"	7'-0"
GT-4000	4,000	9,300	38,100	16'-0"	8'-6"	7'-0"	5'-9"	5'-6"

OTHER SIZES ARE AVAILABLE. CONTACT US FOR MORE INFORMATION.

ENGINEERING DATA

THE GREASE INTERCEPTOR IS STRUCTURALLY & HYDRAULICALLY ENGINEERED TO CONFORM TO UPC/IPC AND REGIONAL PLUMBING CODES RECOMMENDED IN MOST CITIES. CONSULT WITH LOCAL AUTHORITIES FOR SPECIFIC APPLICATION REQUIREMENTS.

SHOP DRAWINGS SHALL INCLUDE COMPLETE STRUCTURAL & BOUYANCY CALCULATIONS CERTIFIED BY A LICENSED PROFESSIONAL ENGINEER UPON REQUEST.

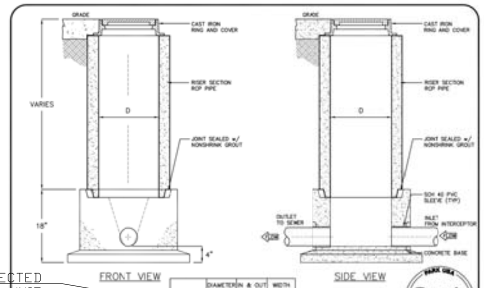
CONSULT WITH PARKUSA COMPANY FOR EXACT EXCAVATION DIMENSIONS & SHIPPING INFORMATION.

SPECIFICATIONS

888.611.PARK
www.parkusa.com
PARK USA DESIGN FOR WATER

GREASE INTERCEPTOR SERIES GT 500 THRU 4000 GALLON CAPACITY

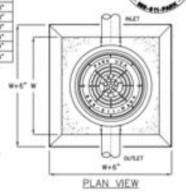
PM | DRN | ENG | DWG. NO. GT-1 | REV. A
DATE 06/18



SELECTED UNIT

MODEL	DIAMETER "D"	IN & OUT PIPE SIZE	WIDTH "W"
SWB-154	15"	4"	24"
SWB-156	15"	6"	24"
SWB-158	15"	8"	24"
SWB-184	18"	4"	28"
SWB-186	18"	6"	28"
SWB-188	18"	8"	28"
SWB-244	24"	4"	34"
SWB-246	24"	6"	34"
SWB-248	24"	8"	34"

NOTES



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SPECIFICATIONS

888.611.PARK
www.parkusa.com
PARK USA DESIGN FOR WATER

SAMPLE WELL BASIN

SCALE NONE | DWG. NO. SWB-1 | REV. A
DATE 2018

ES-LF7R

For Light Commercial and Residential Applications

Job Name ______ Contractor ______
Job Location ______ Approval ______
Engineer ______ Contractor's P.O. No. ______
Approval ______ Representative ______

LEAD FREE*

Series LF7R
Dual Check Valves

LF7R Sizes: ½" – 1" (15 – 25mm)

Series LF7R Dual Check Valves are designed for non-health hazard residential water system containment and continuous pressure applications, such as the drinking water supply service entrance or individual outlets. Series LF7R uses two compact replaceable check modules and is installed immediately downstream of the residential water meter. The LF7R features Lead Free* construction to comply with Lead Free* installation requirements.

Features
- Can be installed vertically or horizontally
- Available with combination of inlet/outlet sizes, types or thread and end connection

Specifications
The dual check backflow preventer shall meet the domestic requirements of ANSI/ASSE Standard 1024, and bear the seal of approval. It shall be lead free* brass bodied and include not less than one union. An identification tag indicating direction of flow shall be securely attached to the valve body. The Lead Free* Dual Check Valve shall comply with state codes and standards, where applicable, requiring reduced lead content. The dual check shall be Watts Regulator Company Series LF7R. (Please select the model best suited to your application.)

Pressure - Temperature
Temperature Range: 33°F – 180°F (0.5°C-82°C) continuous
Maximum Working Pressure: 175psi (12.07 bar)

Approvals
1024

LF7R

Series LF7R: Inlet/Outlet Connections – Types available, ordering code, sizes available.

CONNECTION TYPE	CONNECTION CODE	SIZES AVAILABLE	
		in	mm
National Pipe Thread Female	2	½, ¾, 1	15, 20, 25
National Pipe Thread Male	3	½, ¾, 1	15, 20, 25
Female Meter Thread (Swivel)	10	¾, 1	20, 25

Union (U) Connections available on all inlet/outlet types and sizes.

When ordering Series LF7R Valves with Meter Thread Connections, be sure to order connection size one size larger than meter thread. Examples:

Meter Size	Order
⅝" (16mm) x ½" (15mm)	¾" (20mm)
⅝" (16mm) x ¾" (20mm)	1" (25mm)
¾" (20mm) x ¾" (20mm)	1" (25mm)

WATTS

Grease Interceptor Sizing Worksheet - City of Houston					Expert-Design ver 1.1 UPC-COH
Project:	South Post Oak Fields				
Location:					
Engineer (or Name):					
Firm:					
Date:					
Fixture Type	Trap Arm Size	Fixture Units FU	Quantity	Other Factors (if applicable)	Extended
3-Compartment Sink - 1.5" arm	1-1/2"	3	0		0
3-Compartment Sink - 2" arm	2"	4	0		0
2-Compartment Sink - 1.5" arm	1-1/2"	3	0		0
Dishwasher	2"	4	0		0
Mop Sink	1-1/2"	3	1		3
Mop Sink	2"	4	0		0
Mop Sink	3"	6	0		0
Mop Sink	4"	8	0		0
Pot Sink (pre-rinse sink)	1-1/2"	3	0		0
Pot Sink (pre-rinse sink)	2"	4	0		0
Hand Sink	1-1/4"	2	0		0
Hand Sink	1-1/2"	3	0		0
Floor Drain - 2"	2"	4	0		0
Floor Drain - 3"	1	6	3		18
Floor Drain - 4"	4"	8	0		0
Trench Drain	4	4	0		0
Ice Machine Discharge	3"	2	0		0
Other			0		0
Grease Trooper				Total Fixture Units	21
		GreaseTrooper Size			GT-750
City of Houston Gravity Grease Interceptor Sizing (2009 UPC)					
DFUs (1, 3)		Interceptor Volume (2)			Park Model

3

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466
Project No: 6001-02

CONSULTANTS:
MARSHALL ENGINEERING CORPORATION
T.B.P.E. FIRM REG. # F-5988
715 N. HOUSTON AVENUE
HUMBLE TEXAS 77338
PHONE: 281-852-4131
FAX: 281-852-4631
marshallengineeringco.com
STATE OF TEXAS — CLIFFORD TONY MARSHALL — 127321 — LICENSED PROFESSIONAL ENGINEER
09/07/22
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	09/09/2021
Drawn:	PM,CTM
Checked:	CTM
Scale:	
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
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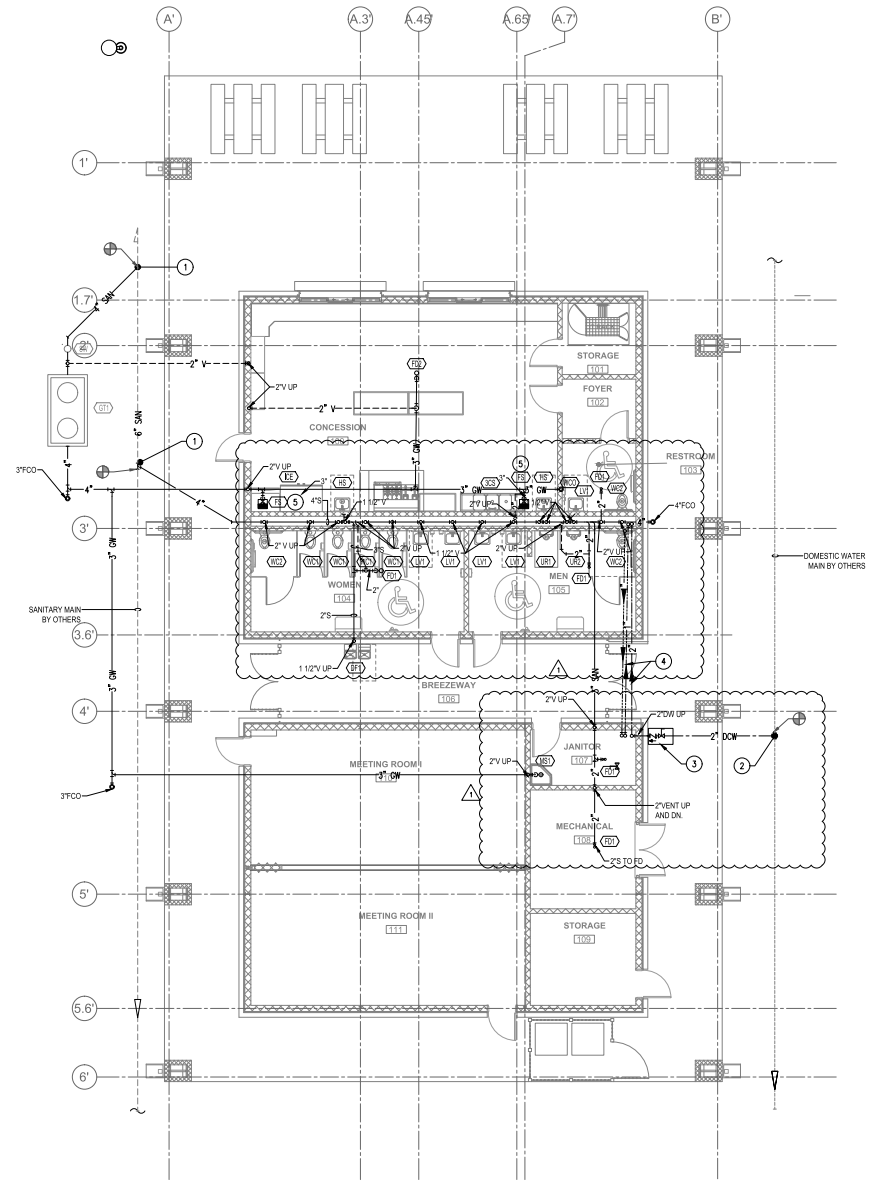
BID PACKAGE #2	09/07/2022

GREASE TRAP DETAILS

1

P004



1 FLOOR PLAN
3/16"=1'-0"

SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND PLUMBING GENERAL NOTES, SEE SHEET P0.1

KEY NOTES:

1. SANITARY TIE-IN LOCATION. FIELD VERIFY EXACT LOCATION AND INVERT.
2. DOMESTIC WATER TIE-IN LOCATION. FIELD VERIFY EXACT LOCATION AND ELEVATION.
3. DOMESTIC WATER SHUT-OFF VALVE AND DOUBLE CHECK VALVE IN GROUND BOX.
4. ROUTE HOT WATER AND COLD WATER PIPING UNDERGROUND.
5. PROVIDE 3" P-TRAP AT FLOOR SINK.

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
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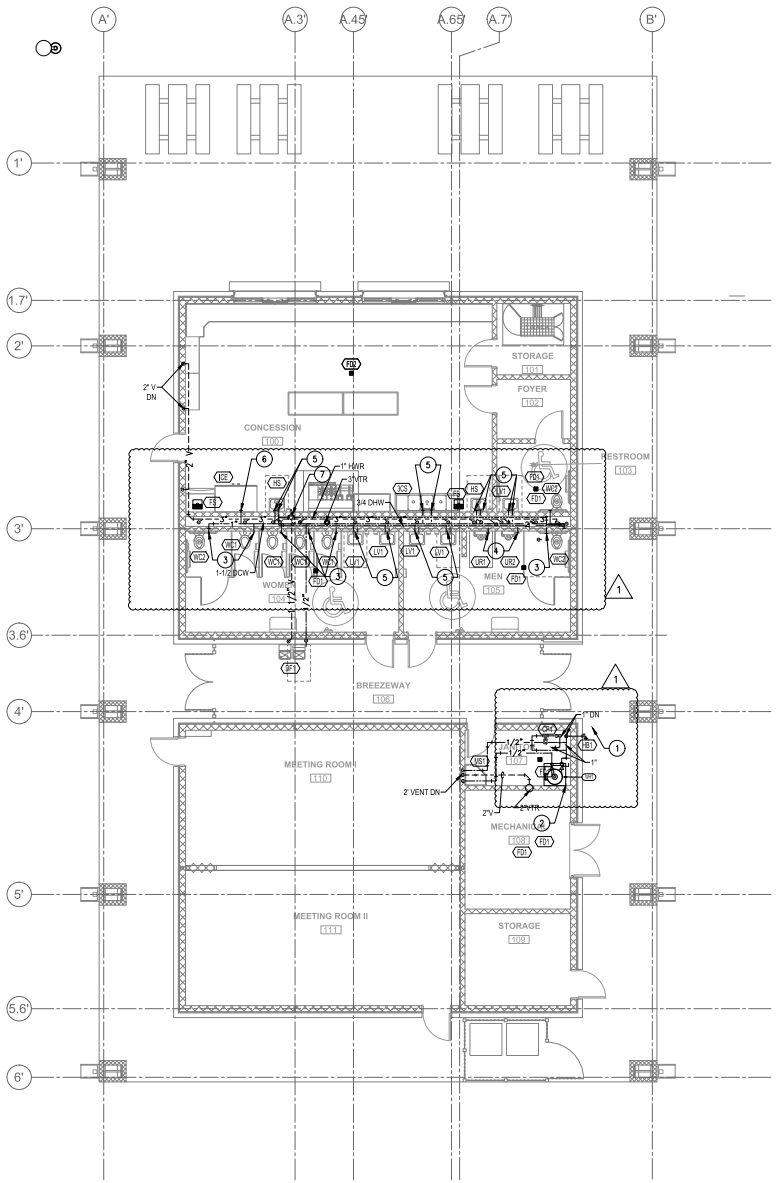
CONCESSION SUB-FLOOR PLAN
PLUMBING

P-100A



GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND PLUMBING GENERAL NOTES, SEE SHEET P0.1

KEY NOTES:

1. SEE SHEET P-100MAIN SHUT OFF AND FOR BACKFLOW PREVENTOR.
2. PROVIDE 3" CONCRETE HOUSEKEEPING PAD FOR WATER HEATER.
3. 1" DCW TO WATER CLOSET.
4. 3/4" DCW TO URINAL.
5. 1/2" DCW AND 1/2" DHW TO FIXTURE.
6. PROVIDE BFP1, ASSE 1024 BACKFLOW PREVENTOR AT ICE MACHINE DOMESTIC WATER SUPPLY.
7. BALANCING VALVE FOR HOT WATER RECIRCULATING SYSTEM. SET AT 1.5 GPM.

SCALE: 1/4" = 1'-0"

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

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CLIFFORD TONY MARSHALL
117701
LICENSED
PROFESSIONAL ENGINEER
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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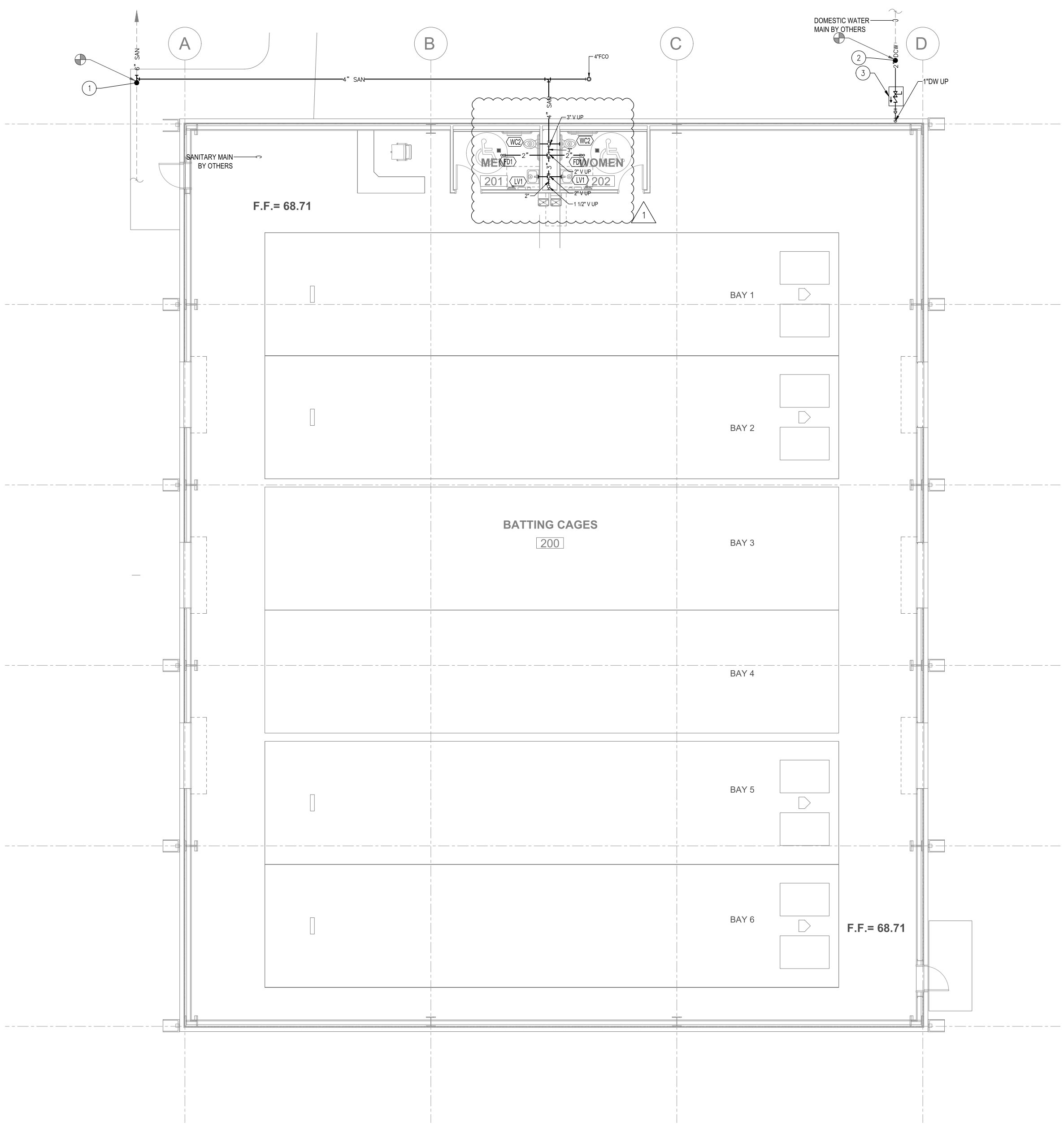
CONCESSION
FLOOR PLAN
PLUMBING

P-100B



1 FLOOR PLAN
3/16"=1'-0"

SCALE: 3/16" = 1'-0"

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND PLUMBING GENERAL NOTES, SEE SHEET P0.1

KEY NOTES:

1. SANITARY TIE-IN LOCATION. FIELD VERIFY EXACT LOCATION AND ELEVATION.
2. DOMESTIC WATER TIE-IN LOCATION. FIELD VERIFY EXACT LOCATION AND ELEVATION.
3. DOMESTIC WATER SHUT-OFF VALVE AND DOUBLE CHECK VALVE IN GROUND BOX.

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
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Project No: 6001-02

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marshallengineeringco.com

STATE OF TEXAS
CLIFFORD TONY MARSHALL
127321
REGISTERED PROFESSIONAL ENGINEER
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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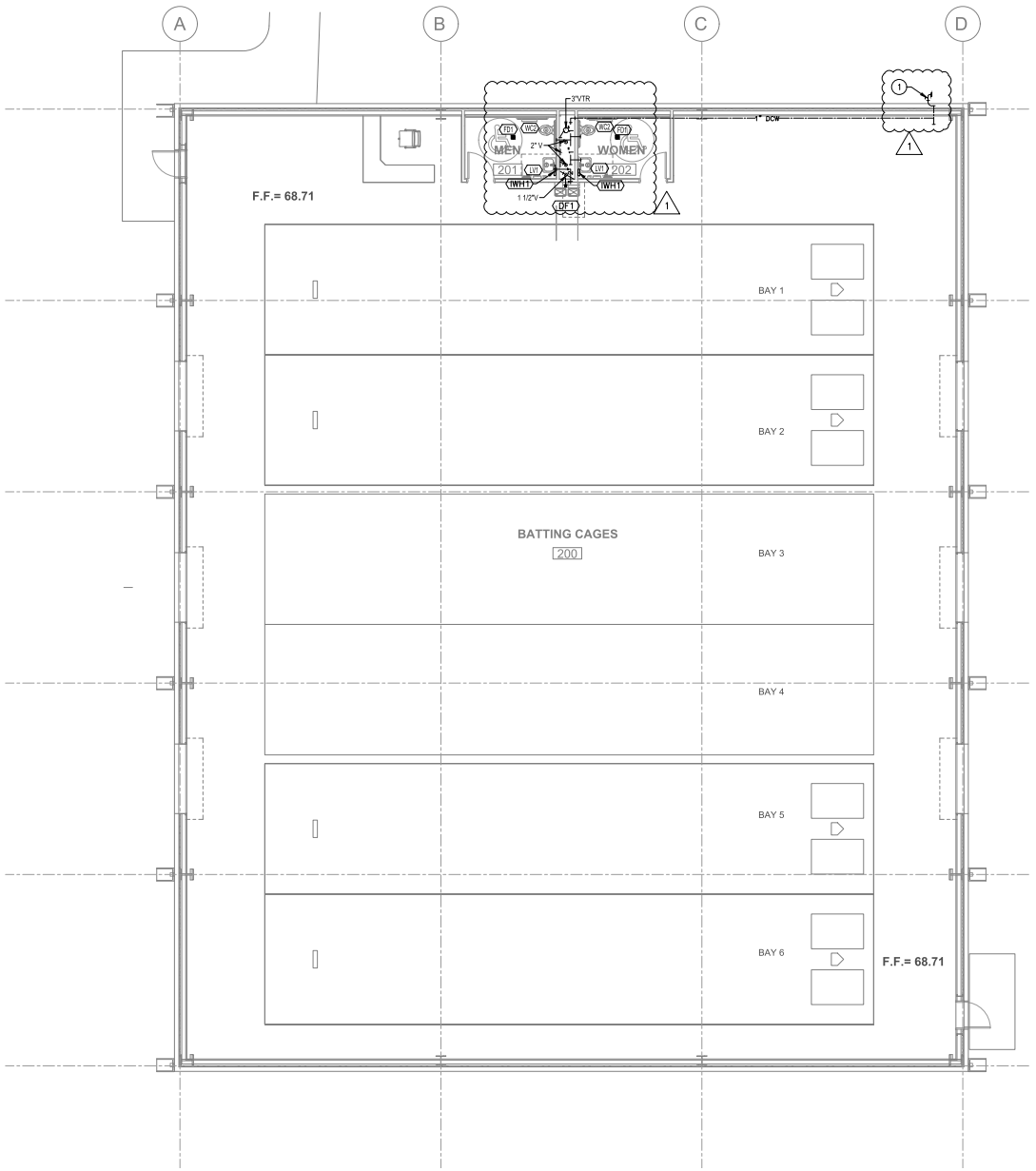
BATTING CAGE
FLOOR PLAN
PLUMBING UNDERGROUND

P-200A



1 FLOOR PLAN
3/16"=1'-0"

SCALE: 3/16" = 1'-0"

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND PLUMBING GENERAL NOTES, SEE SHEET P0.1
2. SEE PLUMBING RISER DIAGRAMS FOR FINAL CONNECTION SIZES TO FIXTURES

KEY NOTES:

1. DOMESTIC WATER DRAIN VALVE.

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

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FLOOR PLAN
PLUMBING ABOVE-GRADE

P-200B

SYMBOLS AND ABBREVIATIONS

SYMBOLS	DESCRIPTION
	EXISTING WORK TO REMAIN
	REMOVE WORK
	NEW WORK
	HOMERUN TO PANELBOARD. NO. OF ARROWHEADS INDICATES NO. OF CIRCUITS IN THE CONDUIT RUN. NO. OF HASHMARKS INDICATES NO. OF WIRES IN THE CONDUIT RUN INCLUDING THE GROUND WIRE.
	CONCEALED CONDUIT; IN WALLS, CEILING, SLAB OR UNDERGROUND.
	SINGLE POLE TOGGLE SWITCH, 20A, 120-277V, MH = 48" AFF UNLESS NOTED OTHERWISE. MEASUREMENTS ARE TO CENTER OF SWITCHES.
3	THREE WAY LIGHT SWITCH, 20A, 120-277V, MH = 48" AFF UON
OC	LIGHT SWITCH WITH OCCUPANCY SENSOR. 20A, 120-277V, MH = 48" AFF UON.
TM DIM	LIGHT SWITCH COMPLIANT WITH IECC SECTION C405.2.2.1-C450.2.2.2, SWITCH WITH TIMER, 2 HR MANUAL OVERRIDE, 50% MIN DIMMER, 7 DAY PROGRAMMABLE TIMER, AND BATTERY BACK-UP. 20A, 120-277V, MH = 48" AFF UON.
DIM	LIGHT SWITCH WITH DIMMER CAPABLE OF NOT LESS THAN 50% REDUCTION 20A, 120-277V, MH = 48" AFF UON.
	DUPLEX RECEPTACLE 2P,3W,125V NEMA 5-20R MH=18" AFF UNLESS OTHERWISE NOTED
GFCI	DUPLEX RECEPTACLE 2P,3W,125V NEMA 5-20R EQUIPPED WITH GROUND FAULT CIRCUIT INTERRUPTER, MH=42" AFF UNLESS OTHERWISE NOTED
	QUADPLEX RECEPTACLE
	DUPLEX CEILING RECEPTACLE
	SINGLE CEILING RECEPTACLE
	DUPLEX FLOOR RECEPTACLE
	SAFETY DISCONNECT SWITCH, RATING AS INDICATED, MH=48" AFF UNLESS OTHERWISE NOTED
	DIST PANEL. SEE PANEL SCHEDULES.
	MOTOR CONNECTION
AFF	ABOVE FINISHED FLOOR
OC	CEILING MOUNTED OCCUPANCY SENSOR
GND	ELECTRICAL GROUND
X?	INDICATES DETAIL/ LOCATION NUMBER
X?.?	INDICATES DRAWING TO REFERENCE
	FUSED DISCONNECT
J	JUNCTION BOX
	PHONE OUTLET
	COMBO DATA/PHONE OUTLET
	CAT 6 DATA OUTLET
GFCI	GROUND FAULT CURRENT INTERRUPT
WP	WEATHER PROOF
UON	UNLESS OTHERWISE NOTED.

*ALL DEVICES TO BE INSTALLED AS PER A.D.A/T.A.S REQUIREMENTS.

ELECTRICAL GENERAL NOTES

1. ALL WORK IS NEW UNLESS OTHERWISE INDICATED.
2. IT IS THE INTENT OF THESE DRAWINGS AND OTHER RELATED DOCUMENTS TO PRODUCE A COMPLETE AND FUNCTIONING ELECTRICAL SYSTEM. PROVIDE ALL LABOR, MATERIALS AND OTHER SERVICES AS MAY BE NECESSARY TO ACHIEVE THIS OBJECTIVE.
3. DO NOT DISTURB ANY WIRING WHOSE ORIGIN, FUNCTION OR UTILITY ARE UNKNOWN WITHOUT PRIOR APPROVAL FROM THE OWNER.
4. CONTRACTOR SHALL REPAIR OR REPLACE ANY DAMAGE TO EXISTING CONDITIONS CAUSED BY HIS ACTIONS. REPAIR AND REPLACEMENT OF DAMAGED CONDITIONS SHALL MATCH THE INTEGRITY OF THE ADJACENT AREA. ALL REQUIRED WORK SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
5. DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL OFFSETS, BENDS, ELBOWS, BOXES, OR OTHER SPECIFIC ELEMENTS WHICH MAY BE REQUIRED BY THE LATEST VERSION OF THE NEC FOR PROPER INSTALLATION OF THE WORK. SUCH WORK SHALL BE ACCOMPLISHED AT THIS SITE. ADDITIONAL BENDS, OFF-SETS, AND CONDUIT AS REQUIRED BY VERTICAL AND HORIZONTAL EQUIPMENT LOCATIONS OR OTHER JOB CONDITIONS SHALL BE PROVIDED TO COMPLETE THE WORK AT NO ADDITIONAL COST TO THE OWNER.
6. EQUIPMENT SIZES SHOWN ON THE DRAWINGS ARE MINIMUM, UNLESS OTHERWISE INDICATED. BEFORE INSTALLING ANY WIRING OR CONDUIT, THE CONTRACTOR SHALL OBTAIN THE EXACT EQUIPMENT REQUIREMENT AND INSTALL WIRE, CONDUIT, AND OTHER ITEMS OF THE CORRECT SIZE FOR THE EQUIPMENT ACTUALLY BEING INSTALLED. WIRE AND CONDUIT SIZES SHOWN ON THE DRAWINGS SHALL BE TAKEN AS A MINIMUM AND SHALL NOT BE REDUCED WITHOUT PRIOR WRITTEN APPROVAL FROM THE OWNER.
7. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE CODES AND AUTHORITIES HAVING JURISDICTION. IN ADDITION, SYSTEMS AND EQUIPMENT HALL CONFORM TO THE LATEST VERSION OF THE NATIONAL ELECTRICAL SAFETY CODE. NATIONAL ELECTRICAL CODE, AND NATIONAL FIRE PROTECTION ASSOCIATION.
8. ALL MATERIAL AND EQUIPMENT SHALL BE U.L. LISTED.
9. ALL WIRE SHALL BE COPPER.
10. PROVIDE PULL-STRING FOR ALL EMPTY CONDUITS.
11. THE LOCATION OF SWITCHES, LIGHTING FIXTURES, OUTLETS AND OTHER EQUIPMENT SHOWN ON PLANS ARE APPROXIMATE, SUCH ITEMS SHALL BE LOCATED SO AS TO ELIMINATE INTERFERENCE WITH EQUIPMENT. ALL DOOR SWINGS SHALL BE VERIFIED AND COORDINATED WITH ARCHITECTURAL DRAWINGS SO THAT LIGHT SWITCHES AND FIRE ALARM PULL STATIONS ARE PROPERLY LOCATED ON THE LATCH SIDE.
12. PERFORM LOAD BALANCING ON ALL PHASES OF NEW PANELBOARDS.
13. CABLES IN CONDUITS SHALL BE STRANDED COPPER. WIRE NO. 8 AWG AND LARGER SHALL BE TYPE XHHW, THWN OR THHN. WIRE SMALLER THAN NO. 8 AWG SHALL BE TYPE THHN, OR THWN. RING OUT AND TAG WIRES AT BOTH ENDS. SPLICES FOR WIRES NO. 10 AND SMALLER SHALL BE WIRE NUTS WITH INTERNAL SPRING. SPLICES FOR LARGER WIRES SHALL BE CRIMPED SLEEVE. BURNDY WITH OVERALL TAPE INSULATION AND HEAT SHRINK JACKET. PROVIDED CRIMPED ON LUGS FOR TERMINATIONS. COLOR CODING TO BE AS FOLLOWS

	208/120 VOLT	480/277 VOLT
• PHASE A OR L1	BLACK	BROWN
• PHASE B OR L2	RED	ORANGE
• PHASE C OR L3	BLUE	YELLOW
• GROUND	GREEN	GREEN (YELLOW STRIPE)
• NEUTRAL	WHITE	GRAY

14. ALL CONTROL DEVICES FOR LIGHT, POWER, ETC. SHALL BE MOUNTED NO HIGHER THAN 48" FROM THE FLOOR.
15. CONDUITS INSIDE BUILDING INSTALLED CONCEALED IN INTERIOR WALLS OR ABOVE CEILING: ELECTRICAL TUBING (EMT). ALL CONDUIT TO BE U.L. LISTED. ALL CONDUIT SHALL HAVE U.L. LABEL, GALVANIZING SHALL NOT CRACK OR FLAKE WHEN CONDUIT IS BENT. ALL FITTINGS SHALL BE U.L. LISTED. INSULATED-THROAT TYPE. ALL CONDUIT SHALL BE SUPPORTED BY PIPE STRAPS OR SUITABLE CLAMPS OR HANGERS ATTACHED TO THE ELEMENTS OF THE STRUCTURE TO PROVIDE RIGID INSTALLATION. IN NO CASE SHALL CONDUIT BE ATTACHED TO OR SUPPORTED FROM ADJOINING DUCTWORK, PIPE OR CEILING SYSTEMS. OR INSTALLED IN SUCH MANNER AS TO PREVENT THE READY REMOVAL OF OTHER PIPE OR REPAIRS.
16. WHERE CUTTING OF EXISTING SURFACES OR REMOVAL OF EXISTING FINISHES IS REQUIRED TO PERFORM THE WORK UNDER THIS CONTRACT, FILL RESULTING OPENINGS, PATCH THE SURFACE AND FINISH TO MATCH ADJACENT EXISTING SURFACES.
17. ALL CONDUIT/CIRCUITRY SHALL BE CONCEALED IN WALLS AND/OR CEILING OR FLOOR SPACES. UNLESS OTHERWISE NOTED.
18. CONTRACTOR SHALL ENSURE THAT LOADING ON 20 AMPERE BRANCH CIRCUITS DOES NOT EXCEED 1800 W AT 120V.
19. CONTRACTOR SHALL PROVIDE TEMPORARY LIGHTING AND POWER DURING CONSTRUCTION.
20. CONTRACTOR SHALL VERIFY PANEL SCHEDULE AND CIRCUITING IN FIELD. PROVIDE REVISED PANEL SCHEDULE AT FINAL INSPECTION.
21. ELECTRICAL PERMIT SHALL BE APPLIED FOR BY A LICENSED ELECTRICAL CONTRACTOR.
22. ELECTRICAL CONTRACTOR SHALL PROVIDE STARTERS AND DISCONNECTS FOR ALL MECHANICAL EQUIPMENT. ALL FINAL ELECTRICAL CONNECTIONS OF MECHANICAL EQUIPMENT SHALL BE MADE BY ELECTRICAL CONTRACTOR.

SITE / SPORT LIGHTING CONTROLLER

CONTROLS SPECIFICATION

Wireless Controls and Remote Monit

Base Station

SPECIFICATIONS

The Base Station is a centralized, designed to manage and enable r area network of up to 500 Wirele Communication to and from back through CDMA (digital cellular) o in a Tier One Data Center. Comm is supported through 900 MHz IS

REPORTING

PARAMETER BASED - Parameters sets based on specific date range,

ON DEMAND - Any data set is ava login credentials.

SCHEDULED - Reports can be expo

HOSTING AND SECURITY

DATA CENTER - Tier One Dat Cent backup.

SSL - Secure Socket Layer (SSL) 12

STORAGE - Data stored for a mini if requested.

BENEFITS AND FEATURES

GLOBALIZATION - Developed for

APPROVALS - FCC Part 15, cETLus,

CUSTOMIZATION - Ask for details or special connectivity into your lig package

ALERT NOTIFICATIONS - Power Lo per device

LOCAL OVERRIDE SWITCH - 4-pos mode(s). These are : Maintenance a photocell control option) - ALL C AUTOMATIC which enables the sy

LED INDICATORS - System status l GSM/CDMA signal strength - Gree

TIME CLOCK - Astronomical time c and automatic network synchroni

SCHEDULER AND CONFIGURATIO

INPUT POWER & CONSUMPTION

ENCLOSURE TYPE - Gray Fiberglas lockable clasp latches

DIMENSIONS/WEIGHT - 13.35" L

OPERATING TEMPERATURE - -20

OPERATING HUMIDITY RANGE - 1

Wireless Controls and Remote Monit

Node

SPECIFICATIONS

The Node is a switch/relay that a information wirelessly to and fro This control system can be install lighting projects. The system ope network configuration, supportin between the Node and the Base Actual distance will vary due to t and site Condition.

RADIO FREQUENCY COMMS.

FREQUENCY - 900 MHz ISM Band

MODULATION - IEEE 802.15.4 Sp

OPEN AIR, LINE OF SITE RANGE - greater distances).

BENEFITS AND FEATURES

GLOBALIZATION - Developed for

APPROVALS - FCC Part 15, cETLus

ALERT NOTIFICATIONS - Power Lo

RELAY DRIVE OUTPUT - Up to (4) for Wall Mount versions.

AUXILIARY INPUT AND OUTPUT -

EXPANDABLE I/O - Future use.

LED INDICATOR (EXTERNAL) - Blu Red (No communication) Dark (No

MANUAL OVERRIDE - All nodes c so they can control 4 poles, 4 flash (A, B, C, D) has its own toggle swi Position, will override that chann NOTE: This option is standard for special offerings may require othe Check with your local Techline rep

INPUT POWER & CONSUMPTION

ENCLOSURE TYPE - Gray Fiberglas lockable clasp latches

DIMENSIONS/WEIGHT - 11.35" L

OPERATING TEMPERATURE - -20

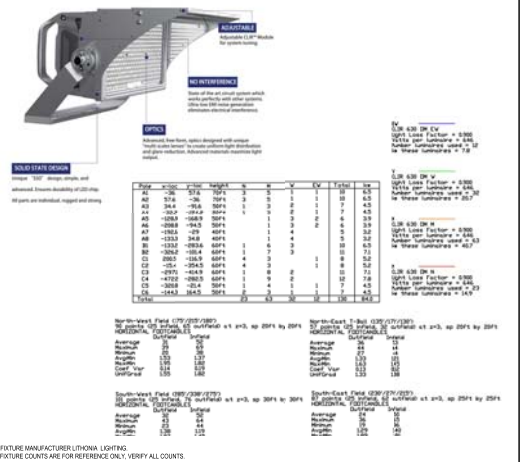
OPERATING HUMIDITY RANGE -

LIGHT FIXTURE SCHEDULES

Symbol	Label	Catalog Number	Description	Lamp	Lumens Per Lamp	Light Loss Factor	Wattage
	A1	FEM L48 4000LM LPPL MD MVOLT GZ10-40K 80CRI XX(FITTING LOCATION) NLTAIR2 RSBOR10	SURFACE MOUNT - LED LINEAR - 4000 LM PROVIDE MOTION SENSOR , SEE PLAN FOR APPLICABLE FIXTURES.	LED	4257	.9	29.78
	A1E	FEM L48 4000LM LPPL MD MVOLT GZ10-40K 80CRI XX(FITTING LOCATION) BSLS20 XX NLTAIR2 RSBOR10	SURFACE MOUNT - LED LINEAR - 4000 LM PROVIDE MOTION SENSOR WIRELESS SWITCH, SEE PLAN FOR APPLICABLE FIXTURES.	LED	4257	.9	29.78
	A2	FEM L48 6000LM LPPL MD MVOLT GZ10-40K 80CRI XX(FITTING LOCATION) NLTAIR2 RSBOR10	SURFACE MOUNT - LED LINEAR - 6000 LM PROVIDE MOTION SENSOR WIRELESS SWITCH, SEE PLAN FOR APPLICABLE FIXTURES.	LED	6275	0.9	44.58
	A2E	FEM L48 6000LM LPPL MD MVOLT GZ10-40K 80CRI XX(FITTING LOCATION) BSLS20 XX NLTAIR2 RSBOR10	SURFACE MOUNT - LED LINEAR - 6000 LUMEN PROVIDE WITH MOTION SENSOR , SEE PLAN FOR APPLICABLE FIXTURES.	LED	6275	0.9	44.58
	A3	2BLT4 30L ADP MVOLT LP835	2x4 RECESSED - LED , PROVIDE WITH MOTION SENSOR , SEE PLAN FOR APPLICABLE FIXTURES.	LED	3000	0.9	34
	A3E	2BLT4 30L ADP MVOLT LP835 EL14L	2x4 RECESSED - LED , PROVIDE WITH MOTION SENSOR , SEE PLAN FOR APPLICABLE FIXTURES.	LED	3000	0.9	34
	FF12	(12) KMSP-600-4000K-SDDEG SF RK XX(VOLTAGE) XX(ACCESSORIES) - TENON MOUNT TO VALMONT SPORT LIGHTING STRUCTURE - 60' POLE WITH 2 CROSS BARS, EACH PREPARED FOR 6 FIXTURES. ANCHOR BOLT TO 3' CONCRETE PAD - BLACK FINISH - STRUCTURE SHALL MEET FORT BEND COUNTY WIND LOAD RECOMMENDATIONS. PROVIDE SAFETY CABLES.	SPORT LIGHTING STRUCTURE - ANCHOR BOLT - 60' WITH TWO CROSS BARS EACH FOR 6 FIXTURES - CONTROLLED BY LIGHTING RELAY PANEL TIME SCHEDULE AND WIRELESS SWITCH	LED	92173	0.9	602
	W1	WST LED P1 40K VW MVOLT VG PIR1FC3V WG XX(FINISH)	SURFACE WALL MOUNT - 1659 LUMENS MOTION/AMBIENT SENSOR	LED	1527	0.9	12
	W1E	WST LED P1 40K VW MVOLT VG WG PIR1FC3V E7WHR XX (FINISH)	SURFACE WALL MOUNT - 1659 LUMENS MOTION/AMBIENT SENSOR	LED	1527	0.9	12
	B	LITHONIA CLX LED LINEAR 48" 5000 LUMEN STANDARD EFFICIENCY SBLGV VOL	PENDANT MOUNT	LED	5000	0.9	12
	C	LUMENPULSE P1U1-S1E-5 SINGLE POLE TOP MOUNTING FOR 5" POLE . DARK SKY RATED.	PROVIDE WITH 12' 5" ROUND POLE, WITH MODEL WB BASE COVER.	LED	11,800	0.9	92

SPORT LIGHT FIXTURE SCHEDULES

Symbol	Label	Catalog Number	Description	Lamp	Lumens Per Lamp	VOLTAGE	Wattage
	PER POLE	TECHLINE SPORTS LIGHTING ELITE SERIES - CLR 630W	SURFACE MOUNT - LED LINEAR - 4000 LM PROVIDE MOTION SENSOR , SEE PLAN FOR APPLICABLE FIXTURES.	LED	80K	208 - 480V	648



* FIXTURE MANUFACTURER LITHONIA LIGHTING
- FIXTURE COUNTS ARE FOR REFERENCE ONLY, VERIFY ALL COUNTS.

TIME CLOCK SCHEDULE

SYMBOL	MFG	MODEL	ENCLOSURE	# CIRCUITS	BALLAST	VOLTAGE	TYPE	COM. TYPE	AMPS IN CLOSED/ OPEN	CONTACTS RATING
TC-1	INTERMATIC	ET8015CE	INDOOR	2	MAGNETIC	120-277 VAC	ASTRONOMIC, 365 DAY, DAYLIGHT	USB, ETHERNET	20A / 3 A	30A
TC-2	INTERMATIC	ET8215CE	INDOOR	2	MAGNETIC	120-277 VAC	ASTRONOMIC, 365 DAY, DAYLIGHT	USB, ETHERNET	20A / 3 A	30A
TC-3	INTERMATIC	ET8121SCR	WEATHER TIGHT	2	MAGNETIC	120-277 VAC	ASTRONOMIC, 365 DAY, DAYLIGHT	USB, ETHERNET	20A / 3 A	30A

* EQUIPMENT AS SPECIFIED OR EQUAL

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FAX: 832-448-2466
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CLIFFORD TONY MARSHALL
REGISTERED PROFESSIONAL ENGINEER
8/27/2021
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	09/09/2021
Drawn:	PM,CTM
Checked:	CTM
Scale:	
ACAD File:	

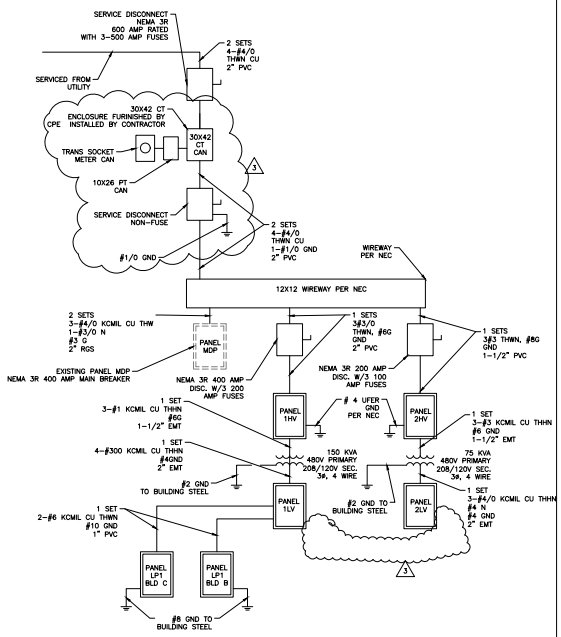
Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
1 CITY OF HOUSTON COMMENTS	02/24/2022
2 CITY OF HOUSTON COMMENTS	03/22/2022
3 CITY OF HOUSTON COMMENTS	05/19/2022
BID PACKAGE #2	09/07/2022

ELECTRICAL SYMBOLS, SCHEDULES AND NOTES

E001

ONE-LINE DIAGRAM



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ELECTRICAL
ONE-LINE AND PANEL SCHEDULES

E002

LOAD ANALYSIS

	L1	L2	L3	NEUTRAL
CALCULATED LOAD (NEC 215.5)	89,445 VA	104,605 VA	93,240 VA	104,605 VA
CALCULATED LOAD WITH DEMAND FACTORS (NEC 215.5)				
GENERAL LOAD	23,385 VA	30,690 VA	31,895 VA	30,690 VA
RECEPTACLE LOAD (NEC TABLE 220.44)				
1ST 10,000W	3,231 VA	4,392 VA	2,378 VA	4,392 VA
REMAINDER @ 50%	2,475 VA	3,364 VA	1,821 VA	3,364 VA
CONTINUOUS LOAD (NEC 215.2)	56,895 VA	52,600 VA	43,570 VA	52,600 VA
PLUS 25% (L1, L2, L3)	14,224 VA	13,150 VA	10,893 VA	
PLUS 0% (NEUTRAL) NEC 215.2(A) EX NO 2				0 VA
MOTOR LOAD (NEC 430.24)	3,140 VA	2,900 VA	4,040 VA	2,900 VA
PLUS 25% OF LARGEST MOTOR	260 VA	225 VA	260 VA	225 VA
KITCHEN LOADS (NEC 220.56)				
L1 (7,845 X 1) =	7,845 VA			
L2 (7,295 X 1) =		7,295 VA		7,295 VA
L3 (7,615 X 1) =			7,615 VA	
TOTAL BALANCED LOAD (3-PHASE)	102,572 VA	102,572 VA	102,572 VA	
TOTAL BALANCED LOAD (1-PHASE)	8,883 VA	8,883 VA	0 VA	
TOTAL UNBALANCED LOAD (1-PHASE)	0 VA	3,161 VA	0 VA	
				101,466 VA
LINE AMPS BALANCED (3-PHASE)	370.1 A	370.1 A	370.1 A	
LINE AMPS BALANCED (1-PHASE)	37.0 A	37.0 A	0.0 A	
LINE AMPS UNBALANCED (1-PHASE)	0.0 A	11.4 A	0.0 A	
TOTALS	407.1 A	418.5 A	370.1 A	366.3 A
ADJUSTMENT FACTOR	40.7 A	41.9 A	37.0 A	36.6 A
TOTAL DESIGN LOAD	447.8 A	460.4 A	407.1 A	402.9 A

CONDUIT & WIRE SIZE SCHEDULE

(UNLESS OTHERWISE NOTED)

CIRCUIT BREAKER TRIP SIZE	1 OR 2 POLE			3 POLE		
	WIRE	GRND	CONDUIT	WIRE	GRND	CONDUIT
15A	2#12	1#12	1/2"	4 #12	1#12	3/4"
20A	2#12	1#12	1/2"	4 #12	1#12	3/4"
25–35A	2#10	1#10	3/4"	4 #10	1#10	3/4"
40–50A	2#8	1#10	3/4"	4 #8	1#10	1"
55A–65A	2#6	1#8	1"	4 #6	1#8	1"
70A–85A	2#4	1#8	1–1/4"	4 #4	1#8	1–1/4"
90A–100A	2#2	1#8	1–1/4"	4 #2	1#8	1–1/4"
105A–130A	2#1	1#6	1–1/2"	4 #1	1#6	1–1/2"

1. ALL SIZES PER COPPER CABLE THHN.
2. DELETE THE NEUTRAL WIRE FOR THREE POLE EQUIPMENT THAT DO NOT REQUIRE NEUTRAL.
3. PROVIDE GROUND CONDUCTOR FOR ALL CIRCUITS.
4. INCREASE WIRE SIZE AS NECESSARY TO MAINTAIN VOLTAGE DROP TO LESS THAN 5%

PANEL 2HV (BUILDING E)

PANEL	2HV	FEEDER	
FED FROM	EXISTING	NUMBER OF CONDUITS	1
# CIRCUITS	24	FEEDER CONDUIT	1 1/4"
HI VOLTAGE	480	WIRE SIZE L1	#3
LOW VOLTAGE	277	WIRE SIZE L2	#3
PHASE	3Y	WIRE SIZE L3	#3
DESIGN LOAD AMPS	99	WIRE SIZE NEUTRAL	#3
NEUTRAL BUS	YES	WIRE SIZE GROUND	#8
GROUND BUS	YES	SURFACE MOUNTED, NEMA 1	
AVAILABLE FAULT CURRENT AT THIS PANEL	8	PANEL BRACING RATED	30 KAIC
MAIN BREAKER SIZE AMPS	100	CIRCUIT BREAKERS RATED	30 KAIC

#	BKR	CIRCUIT DESCRIPTION	H	I	VA		VA	I	H	CIRCUIT DESCRIPTION	BKR	#
1	X X X	SUB PANEL			8,374	L1	925	C		LIGHTS INDOOR	20/1	2
3	125A-3P	2LV			8,294	L2	120	C		LIGHTS OUTDOOR	20/1	4
5	X X X	SUB PANEL			7,983	L3		C		SPARE	20/1	6
7	50/3	HEATER PANEL		G	13,300	L1		G		SPARE	20/1	8
9	^	^		G	13,300	L2		G		SPARE	20/1	10
11	^	^		G	13,300	L3		G		SPARE	20/1	12
13	20/1	SPARE		G		L1		G		SPARE	20/1	14
15	20/1	SPARE		G		L2		G		SPARE	20/1	16
17		SPACE		G		L3		G		SPACE		18
19		SPACE		G		L1		G		SPACE		20
21		SPACE		G		L2		G		SPACE		22
23		SPACE		G		L3		G		SPACE		24

PANEL 2LV (BUILDING E)

SUB PANEL	2LV	SECONDARY FEEDER FROM TRANSFORMER	
FED FROM	TRANSFORMER (3-PHASE) KVA > 75	NUMBER OF CONDUITS	1
# CIRCUITS	48	CONDUIT SIZE	2"
HI VOLTAGE	208	WIRE SIZE L1	#4/0
LOW VOLTAGE	120	WIRE SIZE L2	#4/0
PHASE	3Y	WIRE SIZE L3	#4/0
DESIGN LOAD AMPS	208	WIRE SIZE NEUTRAL	#4
NEUTRAL BUS	YES	WIRE SIZE GROUND	#4
GROUND BUS	YES		
		PRIMARY FEEDER TO TRANSFORMER	
MAIN BREAKER SIZE AMPS	225	PRIMARY VOLTAGE	480
SURFACE MOUNTED, NEMA 1		NUMBER OF CONDUITS	1
PANEL BRACING RATED	30 KAIC	CONDUIT SIZE	1 1/4"
CIRCUIT BREAKERS RATED	30 KAIC	WIRE SIZE L1 L2 & L3	#3
		WIRE SIZE GROUND	#6
		TRANSFORMER KVA	75
		TRANSFORMER GROUND WIRE	#2

#	BKR	CIRCUIT DESCRIPTION	H	I	VA		VA	I	H	CIRCUIT DESCRIPTION	BKR	#
1	20/1	RECPT		D	900	L1	500	M		HVLS 1	10/2	2
3	20/1	RECPT		D	900	L2	500	M		^	^	4
5	20/1	RECPT		D	1,080	L3	500	D		HVLS 1	10/2	6
7	20/1	IWH1		D	1,800	L1	500	D		^	^	8
9	20/1	IWH1		D	1,800	L2	500	D		HVLS 1	10/2	10
11	20/1	RECPT PITCHING MACH 1		D	1,800	L3	500	M		^	^	12
13	20/1	RECPT PITCHING MACH 1		D	1,800	L1		M		SPACE		14
15	20/1	RECPT PITCHING MACH 1		D	1,800	L2		M		SPACE		16
17	15/3	BC1 - 2HP		M	500	L3	500	M		BC4 - 2HP	15/3	18
19	^	^		M	500	L1	500	G		^	^	20
21	^	^		M	500	L2	500	G		^	^	22
23	15/3	BC2 - 2HP		M	500	L3	500	G		BC5 - 2HP	15/3	24
25	^	^		M	500	L1	500	G		^	^	26
27	^	^		M	500	L2	500	G		^	^	28
29	15/3	BC3 - 2HP		M	500	L3	500	G		BC6 - 2HP	15/3	30
31	^	^		M	500	L1	500	G		^	^	32
33	^	^		M	500	L2	500	G		^	^	34
35		SPACE		M	500	L3	280	G		EF5 - 3/4HP	20/2	36
37	20/1	HEATER CONTROLER		M	100	L1	280	G		^	^	38
39	20/1	SURV. CAMERAS		G	300	L2		G		EF4 - 3/4HP	20/2	40
41	20/1	LIGHTING FOR BUILDING E		C	500	L3		G		^	^	42

PANEL 2HV CALCULATIONS

	L1	L2	L3	NEUTRAL
CALCULATED LOAD (NEC 215.5)	23,105 VA	22,220 VA	21,460 VA	23,105 VA
CALCULATED LOAD WITH DEMAND FACTORS (NEC 215.5)				
GENERAL LOAD	15,080 VA	15,100 VA	14,580 VA	15,080 VA
RECEPTACLE LOAD (NEC TABLE 220.44)				
1ST 10,000W	3,737 VA	3,737 VA	2,526 VA	3,737 VA
REMAINDER @ 50%	632 VA	632 VA	427 VA	632 VA
CONTINUOUS LOAD (NEC 215.2)	925 VA	120 VA	500 VA	925 VA
PLUS 25% (L1, L2, L3)	231 VA	30 VA	125 VA	
0% (NEUTRAL) NEC 215.2(A) EX NO 2				0 VA
MOTOR LOAD (NEC 430.24)	2,100 VA	2,000 VA	3,000 VA	2,100 VA
PLUS 25% OF LARGEST MOTOR	125 VA	125 VA	125 VA	125 VA
KITCHEN LOADS (NEC 220.56)				
L1 (0 X 1) =	0 VA			0 VA
L2 (0 X 1) =		0 VA		
L3 (0 X 1) =			0 VA	
TOTAL BALANCED LOAD (3-PHASE)	21,283 VA	21,283 VA	21,283 VA	
TOTAL BALANCED LOAD (1-PHASE)	461 VA	461 VA	0 VA	
TOTAL UNBALANCED LOAD (1-PHASE)	1,088 VA	0 VA	0 VA	
NEUTRAL LOAD				22,599 VA
LINE AMPS BALANCED (3-PHASE)	76.8 A	76.8 A	76.8 A	
LINE AMPS BALANCED (1-PHASE)	1.9 A	1.9 A	0.0 A	
LINE AMPS UNBALANCED (1-PHASE)	3.9 A	0.0 A	0.0 A	
TOTALS	82.6 A	78.7 A	76.8 A	81.6 A
ADJUSTMENT FACTOR	16.5 A	15.7 A	15.4 A	16.3 A
TOTAL DESIGN LOAD	99.1 A	94.4 A	92.2 A	97.9 A

PANEL 2LV CALCULATIONS

	L1	L2	L3	NEUTRAL
CALCULATED LOAD (NEC 215.5)	8,880 VA	8,800 VA	8,160 VA	8,374 VA
CALCULATED LOAD WITH DEMAND FACTORS (NEC 215.5)				
GENERAL LOAD	1,780 VA	1,800 VA	1,280 VA	1,780 VA
RECEPTACLE LOAD (NEC TABLE 220.44)				
1ST 10,000W	3,737 VA	3,737 VA	2,526 VA	3,737 VA
REMAINDER @ 50%	632 VA	632 VA	427 VA	632 VA
CONTINUOUS LOAD (NEC 215.2)	0 VA	0 VA	500 VA	0 VA
PLUS 25% (L1, L2, L3)	0 VA	0 VA	125 VA	
0% (NEUTRAL) NEC 215.2(A) EX NO 2				0 VA
MOTOR LOAD (NEC 430.24)	2,100 VA	2,000 VA	3,000 VA	2,100 VA
PLUS 25% OF LARGEST MOTOR	125 VA	125 VA	125 VA	125 VA
KITCHEN LOADS (NEC 220.56)				
L1 (0 X 1) =	0 VA			0 VA
L2 (0 X 1) =		0 VA		
L3 (0 X 1) =			0 VA	
TOTAL BALANCED LOAD (3-PHASE)	7,893 VA	7,893 VA	7,893 VA	
TOTAL BALANCED LOAD (1-PHASE)	311 VA	311 VA	0 VA	
TOTAL UNBALANCED LOAD (1-PHASE)	80 VA	0 VA	0 VA	
NEUTRAL LOAD				8,374 VA
LINE AMPS BALANCED (3-PHASE)	66.5 A	66.5 A	66.5 A	
LINE AMPS BALANCED (1-PHASE)	3.0 A	3.0 A	0.0 A	
LINE AMPS UNBALANCED (1-PHASE)	0.7 A	0.0 A	0.0 A	
TOTALS	70.2 A	69.5 A	66.5 A	69.8 A
ADJUSTMENT FACTOR	7.0 A	7.0 A	6.7 A	7.0 A
TOTAL DESIGN LOAD	77.2 A	76.5 A	73.2 A	76.8 A

PANEL 1HV (BUILDING A)

PANEL	1HV	FEEDER	
FED FROM	EXISTING WIREWAY	NUMBER OF CONDUITS	1
# CIRCUITS	20	FEEDER CONDUIT	1-2" PVC
HI VOLTAGE	480	WIRE SIZE L1	#3/0
LOW VOLTAGE	277	WIRE SIZE L2	#3/0
PHASE	3Y	WIRE SIZE L3	#3/0
DESIGN LOAD AMPS	200	WIRE SIZE NEUTRAL	#3/0
NEUTRAL BUS	YES	WIRE SIZE GROUND	#6
GROUND BUS	YES	SURFACE MOUNTED, NEMA 1	
AVAILABLE FAULT CURRENT AT THIS PANEL	16	PANEL BRACING RATED	30 KAIC
MAIN BREAKER SIZE AMPS	200	CIRCUIT BREAKERS RATED	30 KAIC

#	BKR	CIRCUIT DESCRIPTION	H	I	VA		VA	I	H	CIRCUIT DESCRIPTION	BKR	#
1	X X X	SUB PANEL			20,372	L1	8,000	C		FRYER	40/3	2
3	175A-3P	1LV			32,446	L2	8,000	C		^	^	4
5	X X X	SUB PANEL			23,569	L3	8,000	G		^	^	6
7	20/1	LIGHTS INTERIOR		C	930	L1		G		SHUNT TRIP		8
9	20/1	LIGHTS EXTERIOR		C	810	L2		G		SPARE	20/1	10
11	20/1	SPARE		C		L3		G		SPARE	20/1	12
13	20/1	SPARE		M		L1		G		SPACE		14
15	20/1	SPARE		M		L2		G		SPACE		16
17		SPACE		M		L3		G		SPACE		18
19		SPACE		M		L1		G		SPACE		20

PANEL 1LV (BUILDING A)

SUB PANEL	1LV	SECONDARY FEEDER FROM TRANSFORMER	
FED FROM	TRANSFORMER (3-PHASE) KVA > AUTO	NUMBER OF CONDUITS	1
# CIRCUITS	60	CONDUIT SIZE	2 1/2"
HI VOLTAGE	208	WIRE SIZE L1	#400
LOW VOLTAGE	120	WIRE SIZE L2	#400
PHASE	3Y	WIRE SIZE L3	#400
DESIGN LOAD AMPS	312	WIRE SIZE NEUTRAL	#350
NEUTRAL BUS	YES	WIRE SIZE GROUND	#3
GROUND BUS	YES		
		PRIMARY FEEDER TO TRANSFORMER	
MAIN BREAKER SIZE AMPS	350	PRIMARY VOLTAGE	480
SURFACE MOUNTED, NEMA 1		NUMBER OF CONDUITS	1
PANEL BRACING RATED	30 KAIC	CONDUIT SIZE	1 1/2"
CIRCUIT BREAKERS RATED	30 KAIC	WIRE SIZE L1 L2 & L3	#1/0
		WIRE SIZE GROUND	#6
		TRANSFORMER KVA	112.5
		TRANSFORMER GROUND WIRE	#1/0

#	BKR	CIRCUIT DESCRIPTION	H	I	VA		VA	I	H	CIRCUIT DESCRIPTION	BKR	#
1	20/1	RECEPT		D	900	L1	370	G		EDF RECPT	20/1	2
3	20/1	RECEPT		D	1,080	L2	1,800	G		SERVICE RECPT.	20/1	4
5	20/1	RECPT		D	540	L3	820	G		EF-1	20/1	6
7	20/1	RECPT		G	540	L1	1,330	K		KEF1	20/1	8
9	20/1	DED. RECPT		D	900	L2	1,740	K		MUA1	25/1	10
11	20/1	DED. RECPT		D	900	L3	900	K		HOOD CONTROLS	15/1	12
13	20/1	GFCI RECPT		D	1,080	L1	600	G		SURV. CAMERAS	20/1	14
15	20/1	COUNTER RECPT.		D	540	L2	5,555	K		RANGE	60/3	16
17	15/1	FREEZER		K	960	L3	5,555	K		^	60/3	18
19	15/1	ICE MACHINE		K	960	L1	5,555	K		^	60/3	20
21	15/1	HOT WATER RECIRC. PUMP		M	900	L2		G		SHUNT		22
23	20/1	SPARE		G		L3	200	K		FRYER CONTROL	15/1	24
25	20/1	SPARE		G		L1		G		SHUNT		26
27	30/2	TANK WATER HEATER		C	2,250	L2	1,800	G		WOMEN'S HAND DRYER	20/1	28
29	^	^		C	2,250	L3	1,800	G		MEN'S HAND DRYER	20/1	30
31	60/2	AHU-1		G	5,595	L1		G		SPARE	20/1	32
33	^	^		G	5,595	L2	5,595	G		AHU-2	60/2	34
35	40/2	CU-1		M		L3	5,595	G		^	^	36
37	^	^		M		L1		M		CU-2	40/2	38
39	20/1	STREET SIGN		G	800	L2		M		^	^	40
41	20/1	SPARE		G		L3		G		SPARE	20/1	42
43	60A/2P	PANEL LP BUILDING B		G	0	L1	0	G		PANEL LP BUILDING C	60A/2P	44
45	60A/2P	PANEL LP BUILDING B		G	0	L2	0	G		PANEL LP BUILDING C	60A/2P	46
47	30/2	IT RACK		D	1,200	L3	1,040	M		ACU-3/CU3	15/2	48
49	30/2	IT RACK		D	1,200	L1	1,040	M		^	^	50
51	20/1	DED. RECPT		D	1,800	L2	1,800	D		DED. RECPT.	20/1	52
53	30/2	IT RACK 2		G	1,200	L3		G				54
55	30/2	IT RACK 2		G	1,200	L1		G				56
57				G		L2		G				58
59				G		L3		G				60

PANEL 1HV CALCULATIONS

	L1	L2	L3	NEUTRAL
CALCULATED LOAD (NEC 215.5)	29,300 VA	40,965 VA	30,960 VA	40,965 VA
CALCULATED LOAD WITH DEMAND FACTORS (NEC 215.5)				
GENERAL LOAD	8,305 VA	15,590 VA	17,415 VA	15,590 VA
RECEPTACLE LOAD (NEC TABLE 220.44)				
1ST 10,000W	2,663 VA	5,126 VA	2,211 VA	5,126 VA
REMAINDER @ 50%	259 VA	497 VA	215 VA	497 VA
CONTINUOUS LOAD (NEC 215.2)	8,630 VA	11,060 VA	2,250 VA	11,060 VA
PLUS 25% (L1, L2, L3)	2,233 VA	2,765 VA	563 VA	
0% (NEUTRAL) NEC 215.2(A) EX NO 2				0 VA
MOTOR LOAD (NEC 430.24)	1,040 VA	900 VA	1,040 VA	900 VA
PLUS 25% OF LARGEST MOTOR	260 VA	225 VA	260 VA	225 VA
KITCHEN LOADS (NEC 220.56)				
L1 (7,845 X 1) =	7,845 VA			
L2 (7,295 X 1) =		7,295 VA		7,295 VA
L3 (7,615 X 1) =			7,615 VA	
TOTAL BALANCED LOAD (3-PHASE)	31,535 VA	31,535 VA	31,535 VA	
TOTAL BALANCED LOAD (1-PHASE)	0 VA	34 VA	34 VA	
TOTAL UNBALANCED LOAD (1-PHASE)	0 VA	11,689 VA	0 VA	
NEUTRAL LOAD				40,693 VA
LINE AMPS BALANCED (3-PHASE)	113.8 A	113.8 A	113.8 A	
LINE AMPS BALANCED (1-PHASE)	0.0 A	0.1 A	0.1 A	
LINE AMPS UNBALANCED (1-PHASE)	0.0 A	42.9 A	0.0 A	
TOTALS	113.8 A	156.8 A	113.8 A	146.8 A
ADJUSTMENT FACTOR	22.8 A	31.4 A	22.8 A	29.4 A
TOTAL DESIGN LOAD	136.6 A	188.2 A	136.7 A	176.2 A

PANEL 1LV CALCULATIONS

	L1	L2	L3	NEUTRAL
CALCULATED LOAD (NEC 215.5)	20,370 VA	32,195 VA	22,960 VA	31,883 VA
CALCULATED LOAD WITH DEMAND FACTORS (NEC 215.5)				
GENERAL LOAD	8,305 VA	15,590 VA	8,415 VA	15,590 VA
RECEPTACLE LOAD (NEC TABLE 220.44)				
1ST 10,000W	2,663 VA	5,126 VA	2,211 VA	5,126 VA
REMAINDER @ 50%	259 VA	497 VA	215 VA	497 VA
CONTINUOUS LOAD (NEC 215.2)	0 VA	2,250 VA	2,250 VA	2,250 VA
PLUS 25% (L1, L2, L3)	0 VA	563 VA	563 VA	
0% (NEUTRAL) NEC 215.2(A) EX NO 2				0 VA
MOTOR LOAD (NEC 430.24)	1,040 VA	900 VA	1,040 VA	900 VA
PLUS 25% OF LARGEST MOTOR	260 VA	225 VA	260 VA	225 VA
KITCHEN LOADS (NEC 220.56)				
L1 (7,845 X 1) =	7,845 VA			
L2 (7,295 X 1) =		7,295 VA		7,295 VA
L3 (7,615 X 1) =			7,615 VA	
TOTAL BALANCED LOAD (3-PHASE)	20,372 VA	20,372 VA	20,372 VA	
TOTAL BALANCED LOAD (1-PHASE)	0 VA	3,197 VA	3,197 VA	
TOTAL UNBALANCED LOAD (1-PHASE)	0 VA	8,677 VA	0 VA	
NEUTRAL LOAD				31,883 VA
LINE AMPS BALANCED (3-PHASE)	169.8 A	169.8 A	169.8 A	
LINE AMPS BALANCED (1-PHASE)	0.0 A	30.7 A	30.7 A	
LINE AMPS UNBALANCED (1-PHASE)	0.0 A	74.0 A	0.0 A	
TOTALS	169.8 A	274.5 A	200.5 A	265.7 A
ADJUSTMENT FACTOR	17.0 A	27.4 A	20.0 A	26.6 A
TOTAL DESIGN LOAD	186.8 A	301.7 A	220.5 A	292.3 A

EXISTING PANEL MDP (SERVICE ENTRANCE)

PANEL	MDP	FEEDER	
FED FROM	EXISTING	NUMBER OF CONDUITS	2
# CIRCUITS	42	FEEDER CONDUIT	2"
HI VOLTAGE	480	WIRE SIZE L1	#4/0
LOW VOLTAGE	277	WIRE SIZE L2	#4/0
PHASE	3Y	WIRE SIZE L3	#4/0
DESIGN LOAD AMPS	400	WIRE SIZE NEUTRAL	#3/0
NEUTRAL BUS	YES	WIRE SIZE GROUND	#3
GROUND BUS	YES	SURFACE MOUNTED, NEMA 3R	
AVAILABLE FAULT CURRENT AT THIS PANEL	0	PANEL BRACING RATED	30 KAIC
MAIN BREAKER SIZE AMPS	400	CIRCUIT BREAKERS RATED	30 KAIC

#	BKR	CIRCUIT DESCRIPTION	H	I	VA		VA	I	H	CIRCUIT DESCRIPTION	BKR	#
1	15/3	FIELD 1 (MUSTANG)		C	2,600	L1	2,600	C		FIELD 1 (MUSTANG)	15/3	2
3	^	POLES A7,C8		C	2,600	L2	2,600	C		POLES A8,C8	^	4
5	^	^		C	2,600	L3	2,600	C		^	^	6
7	15/3	FIELD 8 A3,C1 (BRONCO)		C	3,250	L1	3,250	C		FIELD 8 (BRONCO)	15/3	8
9	^	POLES A3,C1		C	3,250	L2	3,250	C		POLES A4,C2	^	10
11	^	^		C	3,250	L3	3,250	C		^	^	12
13	20/3	FIELD 2 (COLT)		C	3,700	L1	3,500	C		FIELD 8 (COLT)	20/3	14
15	^	POLES A6,B2		C	3,700	L2	3,500	C		POLES A5,B1	^	16
17	^	^		C	3,700	L3	3,500	C		^	^	18
19	20/2	EXPARKING LOT LIGHTS		C	4,420	L1	5,000	C		FIELD 8 (COLT)	25/3	20
21	^	^		C	4,420	L2	5,000	C		^	^	22
23	20/3	FIELD 4		C	4,400	L3	5,000	C		^	^	24
25	20/3	^		C	4,400	L1	1,800	C		WALKWAY LIGHTS	20/2	26
27	^	^		C	4,400	L2	1,800	C		WALKWAY LIGHTS	20/2	28
29	20/2	CONTROL TRANSFORMER		C	4,420	L3	1,200	C		SCOREBOARD, FLD I AND II	15/1	30
31	^	^		C	4,420	L1	1,200	C		SCOREBOARD FLD I AND IV	15/1	32
33		SPACE		G		L2	6,800	C		PRACTICE FIELD POLES P1,P2	30/3	34
35		SPACE		G		L3	6,800	C		^	^	36
37		SPACE		G		L1	6,800	C		^	^	38
39		SPACE		C		L2		G		SPACE		40
41		SPACE		C		L3		G		SPACE		42

	L1	L2	L3	NEUTRAL
CALCULATED LOAD (NEC 215.5)	47,040 VA	41,420 VA	40,820 VA	47,040 VA
CALCULATED LOAD WITH DEMAND FACTORS (NEC 215.5)				
GENERAL LOAD	0 VA	0 VA	0 VA	0 VA
RECEPTACLE LOAD (NEC TABLE 220.44)				
1ST 10,000W	0 VA	0 VA	0 VA	0 VA
CONTINUOUS LOAD (NEC 215.2)	47,040 VA	41,420 VA	40,820 VA	47,040 VA
PLUS 25% (L1, L2, L3)	11,760 VA	10,355 VA	10,205 VA	
0% (NEUTRAL) NEC 215.2(A) EX NO 2				0 VA
MOTOR LOAD (NEC 430.24)	0 VA	0 VA	0 VA	0 VA
PLUS 25% OF LARGEST MOTOR	0 VA	0 VA	0 VA	0 VA
KITCHEN LOADS (NEC 220.56)				
L1 (0 X 1) =	0 VA			0 VA
L2 (0 X 1) =		0 VA		
L3 (0 X 1) =			0 VA	
TOTAL BALANCED LOAD (3-PHASE)	51,025 VA	51,025 VA	51,025 VA	
TOTAL BALANCED LOAD (1-PHASE)	750 VA	750 VA	0 VA	
TOTAL UNBALANCED LOAD (1-PHASE)	7,025 VA	0 VA	0 VA	
NEUTRAL LOAD				47,040 VA
LINE AMPS BALANCED (3-PHASE)	184.1 A	184.1 A	184.1 A	
LINE AMPS BALANCED (1-PHASE)	3.1 A	3.1 A	0.0 A	
LINE AMPS UNBALANCED (1-PHASE)	25.4 A	0.0 A	0.0 A	
TOTALS	212.6 A	187.2 A	184.1 A	169.8 A
ADJUSTMENT FACTOR	31.9 A	28.1 A	27.6 A	25.5 A
TOTAL DESIGN LOAD	244.5 A	215.3 A	211.7 A	195.3 A

IDG+ ARCHITECTS

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Project No: 6001-02

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STATE OF TEXAS
CLIFFORD TONY MARSHALL
127321
LICENSED PROFESSIONAL ENGINEER

DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	09/09/2021
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ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
△ CITY OF HOUSTON COMMENTS 02/24/2022	
△ CITY OF HOUSTON COMMENTS 03/22/2022	
△ CITY OF HOUSTON COMMENTS 05/19/2022	
BID PACKAGE #2	09/07/2022

ELECTRICAL PANEL SCHEDULES

E003

COMMUNICATION CONDUIT DATA TABLE

COND. ID	PIPE SIZE DIA INCH	ORIGIN	DESTINATION	NOTES
CC.1.1	1 1/2	CONCESSION BLDG - A	PRESS BOX EAST BLDG C	
CC.2.1	1 1/2	CONCESSION BLDG - A	PRESS BOX EAST BLDG B	
CC.3.1	2	CONCESSION BLDG - A	COM PULL BOX	
CC.3.2	2	COM PULL BOX	BATTING BLDG D	
CC3.3	1	PRESS BOX C	SCOREBOARD FIELD IV	PROVIDE WITH PULL STRING
CC3.4	1	PRESS BOX B	SCOREBOARD FIELD I	PROVIDE WITH PULL STRING
CC3.5	1	PRESS BOX B	SCOREBOARD FIELD II	PROVIDE WITH PULLSTRING
CC3.6	1	PRESS BOX C	SCOREBOARD FIELD III	PROVIDE WITH PULLSTRING

(XX) SITE FEEDER CABLE SCHEDULE

DESIGNATION	DESCRIPTION	FEED FROM	OCP	VOLTAGE	PHASE	WIRE	REMARKS
A	SCOREBOARD FIELD 1	MDP 32	20 AMP	277	1	2#8,THWN,#12 G	
B	SPORTS LIGHTS FIELD I POLE A7,C5	MDP 1,3,5	15 AMP	480	3	3#8,THWN,#12G	
C	SPORTS LIGHTS FIELD II POLES B2,A6	MDP 13,15,17	15 AMP	480	3	3#8,THWN,#12G	
D	SPORTS LIGHTS FIELD II POLE C3,C4	MDP 20,22,24	15 AMP	480	3	3#8,THWN,#12G	
E	SCOREBOARD FIELD II, FIELD III	MDP,30	15 AMP	277	1	3#8,THWN,#12G	
F	STREET SIGN	1LV,39	20 AMP	120	1	2#4THWN,#12G	
G	SCOREBOARD FIELD IV	MDP,32	15 AMP	277	1	2#10THWN,#12G	
H	SPORTS LIGHTS FIELD IV POLE A1,A2	MDP 23,25,27	15 AMP	480	3	3#8,THWN,#12G	
J	SPORTS LIGHTS FIELD 3 POLE A3, C1	MDP 7,9,11	15 AMP	480	3	3#8,THWN,#12G	
K	WALKWAY LIGHTS	MDP, 26,28	20 AMP	480	1	3#8,THWN,#12G	
L	BUILDING D FEEDER	SERVICE	100 AMP	480	3	3#3 THWN, #8G	PROVIDE DISCONNECT FROM SERVICE
M	BUILDING A FEEDER	SERVICE	200 AMP	480	3	3#3/0,#6g	PROVIDE DISCONNECT FROM SERVICE
N	SPORTS LIGHTING FIELD, POLES A8, C6	MDP 2,4,6	15 AMP	480	3	3#8,THWN,#12G	
P	SPORTS LIGHTS FIELD II POLES A5, B1	MDP 14,16,18	15 AMP	480	3	3#8,THWN,#12G	
Q	SPORTS LIGHTS FIELD III POLES A4, C2	MDP 8,10,12	15 AMP	480	3	3#10, THWN #12G	
R	FEEDER TO BUILDING C	1LV, 44,46	60 AMP	208	1	2#6 THWN, #10 G	SUBFEED FROM BUILDING A
S	FEEDER TO BUILDING B	1LV,43,45	60 AMP	208	1	2#6, THWN, #10G	SUBFEED FROM BUILDING A
T	SPORTS LIGHTING POLES P1,P2	MDP, 32,34,36	35 AMP	480	3	3#3/0,THWN, #10G	
U	FEED TO BUILDING E	2LV, 41	20 AMP	120	1	3#10,#10G	SUBFEED FROM BUILDING E

1

IDG+ ARCHITECTS

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5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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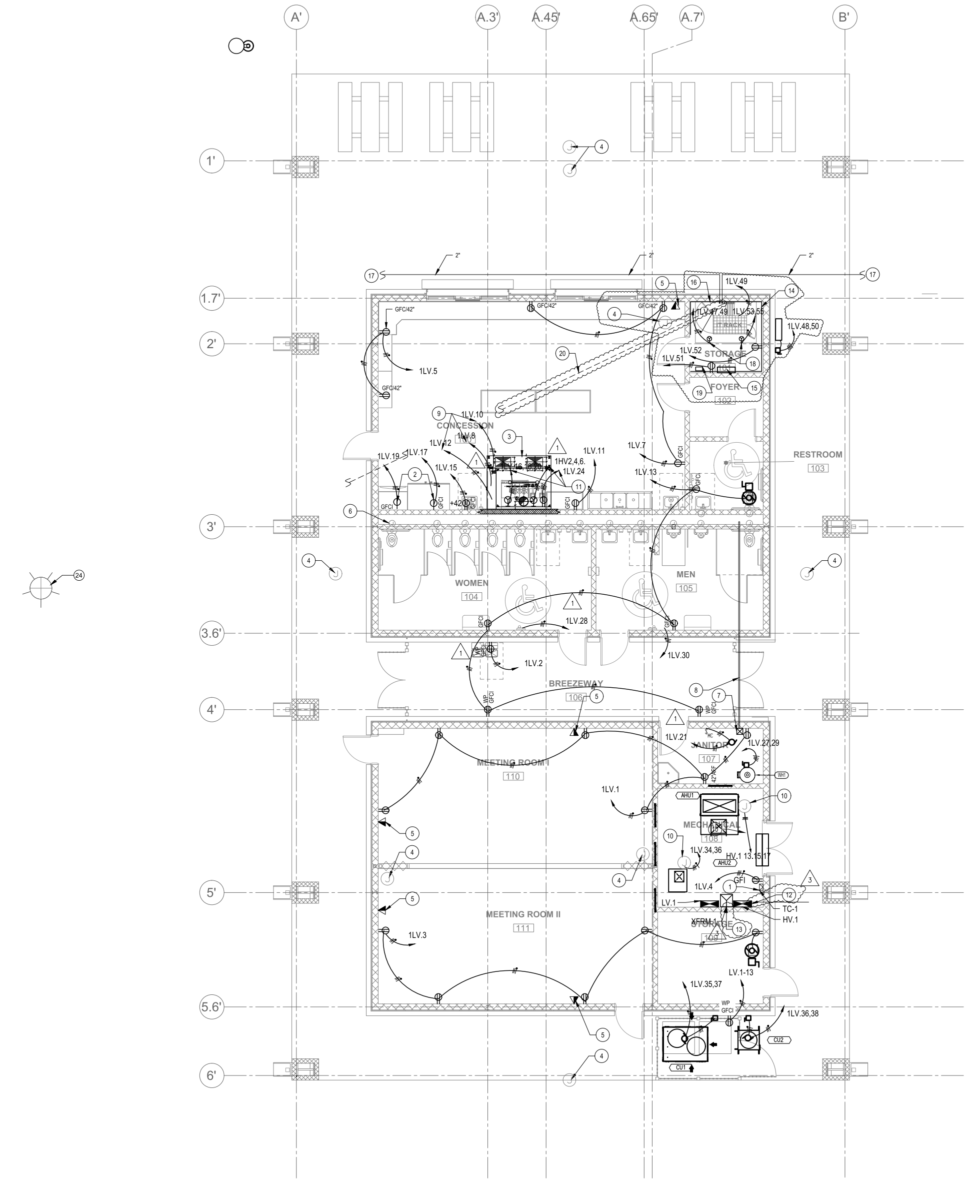
3 CITY OF HOUSTON COMMENTS	05/19/2022
BID PACKAGE #2	09/07/2022

ELECTRICAL CONDUIT SCHEDULES

E004



1 FLOOR PLAN
3/16"=1'-0"

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND ELECTRICAL GENERAL NOTES, SEE SHEET E001.

KEY NOTES:

1. TIME CLOCK TC-1.
2. PROVIDE NEMA 5-15P RECEPTACLE FOR KITCHEN EQUIPMENT.
3. ELECTRICAL CONTRACTOR SHALL REVIEW MECHANICAL HOOD DRAWINGS AND PROVIDE ALL REQUIRED ELECTRICAL WIRING, INTERLOCKS, AND CIRCUITING REQUIRED TO MAKE HOODS OPERATIONAL.
4. PROVIDE 4X4 JUNCTION BOX FOR SURVEILLANCE CAMERA. PROVIDE 1/2" EMT CONDUIT AND PULLSTRING. HOME RUN TO IT ROOM 101.
5. TELE-DATA RECEPTACLE.
6. JUNCTION BOX FOR HARD WIRED PLUMBING FIXTURE. COORDINATE INSTALLATION AND PLACING OF BOX WITH PLUMBING CONTRACTOR. TYPICAL OF 14 LOCATIONS.
7. PROVIDE 150 VA TRANSFORMER WITH PLUG IN CORD FOR TOILET FIXTURES. 120V/P/24VSEC.
8. PROVIDE 3/4" EMT CONDUIT AND PULL WIRE FROM TRANSFORMER TO PLUMBING CHASE. LOW VOLTAGE WIRING TO BE PROVIDED BY PLUMBER.+
9. CONNECT CIRCUIT TO PANEL CONTROL PANEL.
10. PROVIDE JUNCTION BOX TO CONNECT BRANCH CONDUCTORS. BREAKERS IN PANEL TO BE USED AS SERVICE DISCONNECT. (1)
11. COORDINATE WITH MECHANICAL HOOD CONTROL PANEL TO SHUT DOWN CIRCUIT VIA ELECTRICAL PANEL SHUNT TRIP WHEN THE ANSUL SYSTEM IS ACTIVATED.
12. PROVIDE #4 UFER GROUND TERMINATION FROM UFER GROUND AT PANEL. UFER GROUND TO BE CONSTRUCTED ACCORDING TO NEC REQUIREMENTS.
13. PROVIDE # 2 GROUNDING TO BUILDING STEEL FOR TRANSFORMER. GROUND AND BOND GROUNDED CONDUCTOR PER NEC REQUIREMENTS FOR SEPARATELY DERIVED SYSTEMS. (3)
14. PROVIDE CONTINUED GROUND.
15. ACU FEED FROM OUTDOOR UNIT.
16. PROVIDE #4 GND CONDUCTOR TO BLDG GROUND.
17. PROVIDE 2" PVC CONDUIT WITH PULL STRING TO BLDG B AND BLDG C.
18. PROVIDE NEMA L6-30R RECEPTACLE. COORDINATE FINAL LOCATION WITH IT RACK SUPPLIER.
19. LOCATE WIRELESS SPORTS LIGHTING CONTROLLER IN IT CLOSET.
20. 4" CONDUIT WITH MAXCELL INTERDUCT. COORDINATE FINAL TERMINATION LOCATION WITH OWNER I.T. REPRESENTATIVE.

IDG+ ARCHITECTS

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STATE OF TEXAS — CLIFFORD TONY MARSHALL — 127321 — REGISTERED PROFESSIONAL ENGINEER
09/07/22
DATE

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FLOOR PLAN
ELECTRICAL POWER

EP-100

GENERAL NOTES:

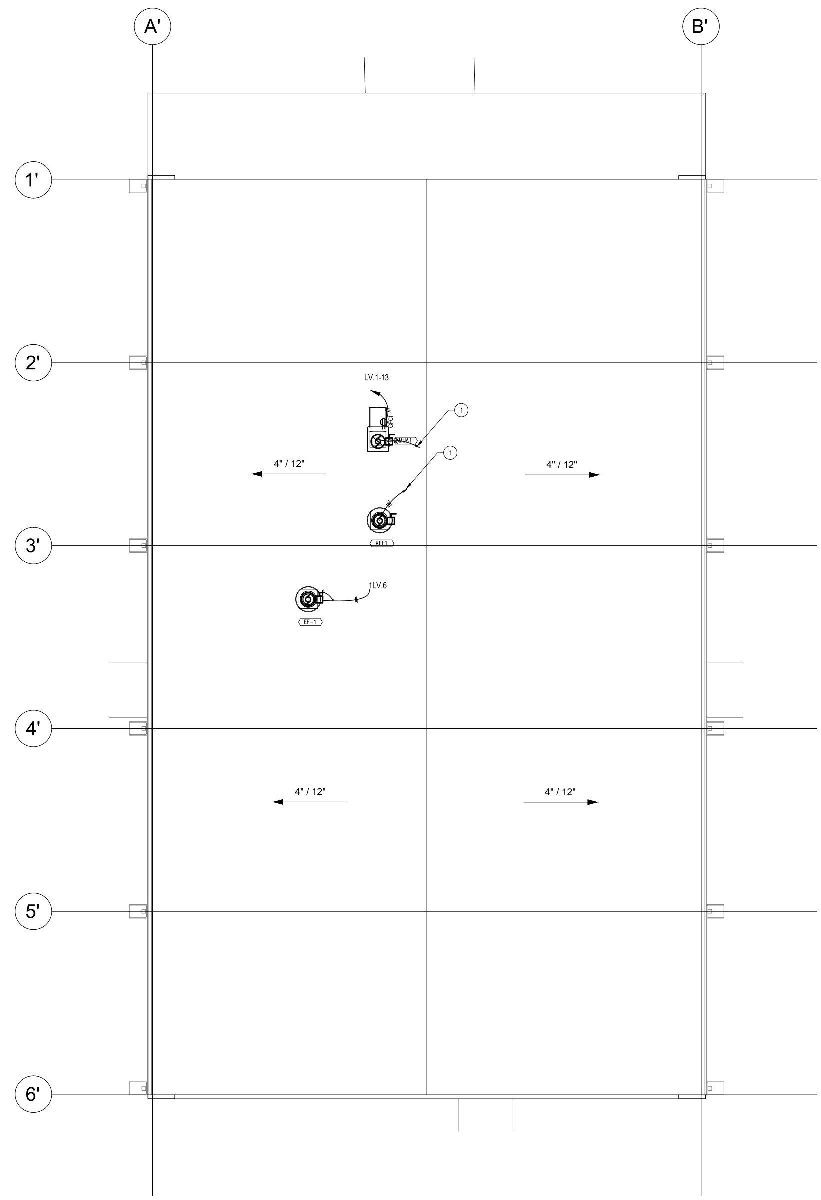
1. FOR SYMBOLS, ABBREVIATIONS, AND ELECTRICAL GENERAL NOTES, SEE SHEET E001

KEY NOTES:

1. ROUTE HOME RUN POWER SUPPLY FOR DEVICE TO HOOD CONTROL PANEL. SEE MECHANICAL HOOD PLANS FOR WIRING DIAGRAMS AND ELECTRICAL REQUIREMENTS.

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND MECHANICAL GENERAL NOTES, SEE SHEET M001.



1 FLOOR PLAN
1/4"=1'-0"

SCALE: 1/4" = 1'-0"

IDG+ ARCHITECTS

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STATE OF TEXAS
CLIFFORD TONY MARSHALL
127321
LICENSED
PROFESSIONAL ENGINEER

09/07/22
DATE

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	09/09/2021
Drawn:	PM,CTM
Checked:	CTM
Scale:	
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
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2 CITY OF HOUSTON COMMENTS	03/22/2022
3 CITY OF HOUSTON COMMENTS	05/19/2022
BID PACKAGE #2	09/07/2022

ROOF PLAN
ELECTRICAL POWER

EP-101

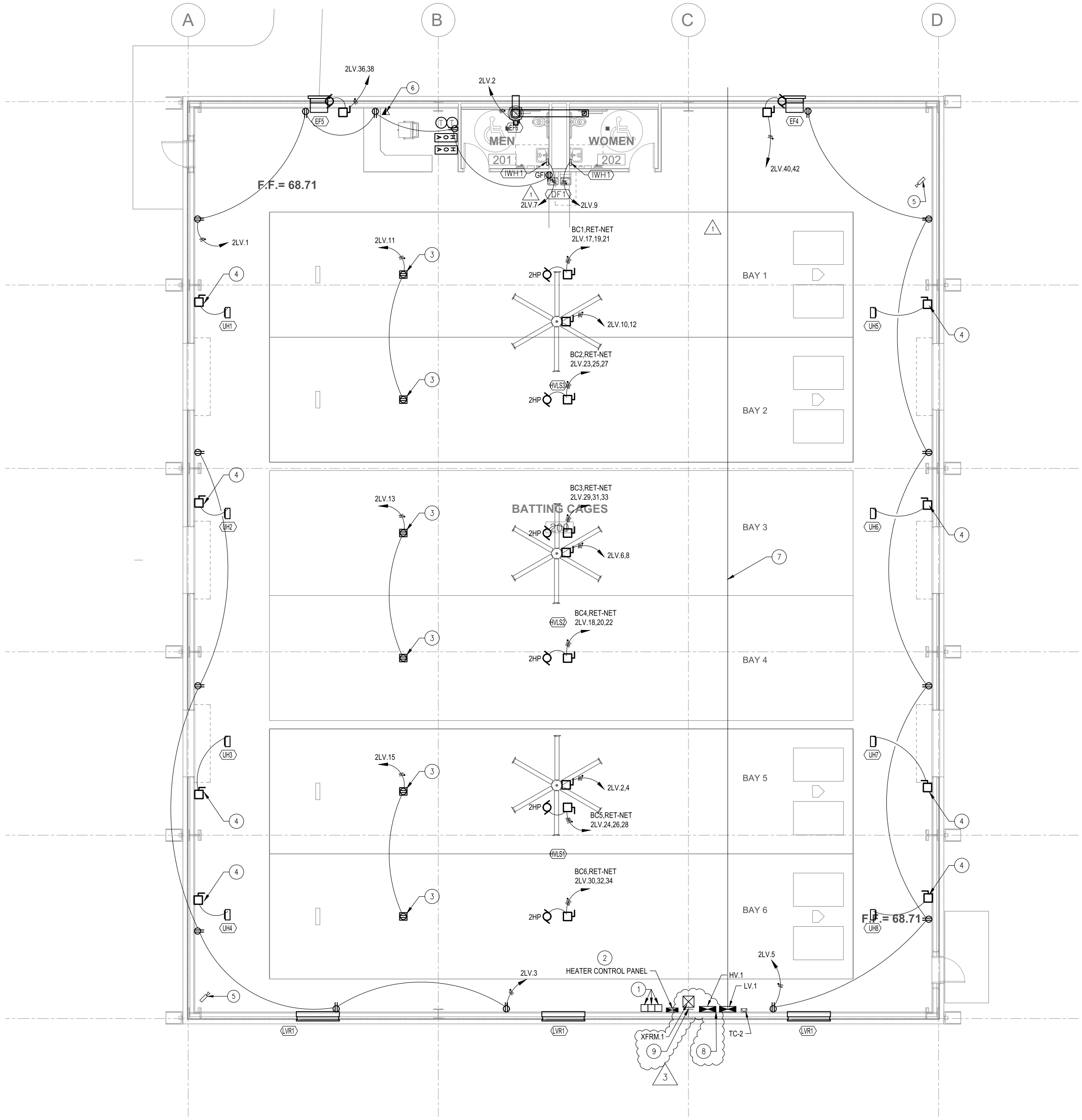
GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND ELECTRICAL GENERAL NOTES, SEE SHEET E001

(#) KEY NOTES:

1. HVLS CONTROLS.
2. HEATER CONTROL PANEL. PANEL TO BE FURNISHED BY MECHANICAL CONTRACTOR AND INSTALLED BY ELECTRICAL CONTRACTOR.
3. FLOOR MOUNTED RECEPTACLE.
4. ROUTE THROUGH HEATER CONTROL PANEL
5. SURVEILLANCE CAMERA LOCATION. ROUTE POWER SUPPLY TO CIRCUIT "2LV.39"
6. TELE-DATA RECEPTACLE.
7. 3/4" EMT FEEDER TO BUILDING E LIGHTING.
8. PROVIDE #4 UFER GROUND TERMINATION FROM UFER GROUND AT PANEL. UFER GROUND TO BE CONSTRUCTED ACCORDING TO NEC REQUIREMENTS.
9. PROVIDE # 2 GROUNDING TO BUILDING STEEL FOR TRANSFORMER. GROUND AND BOND GROUNDED CONDUCTOR PER NEC REQUIREMENTS FOR SEPARATELY DERIVED SYSTEMS.

△3



1 FLOOR PLAN
3/16"=1'-0"

IDG+ ARCHITECTS

440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

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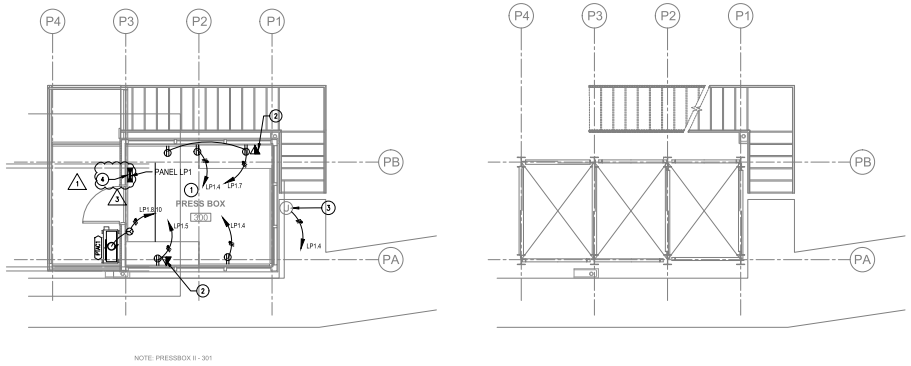
BID PACKAGE #2	09/07/2022

BATTING CAGE FLOOR PLAN
ELECTRICAL POWER

EP-200



NOTE: PRESSBOX II - 301

1 FLOOR PLAN – BUILDING "C"
1/4"=1'-0"

NOTE: PRESSBOX II - 301

2 FLOOR PLAN – BUILDING "B"
1/4"=1'-0"

SCALE: 1/4" = 1'-0"

KEY NOTES:

1. ALL INTERNAL WIRING, RECEPTACLES, PANELS, SHALL BE PROVIDED BY PRE-FAB BUILDING MANUFACTURER AND BUILDING WILL BE SUPPLIED WITH THESE ITEMS IN PLACE.
2. TELE-DATA RECEPTACLE FOR SCOREBOARD AND DELAY-OF-GAME COMMUNICATION. THESE ITEMS TO BE PROVIDED BY PRE-FAB BUILDING MANUFACTURER AND BUILDING WILL BE SUPPLIED WITH THESE ITEMS IN PLACE. (1)
3. PROVIDE JUNCTION BOX FOR SURVEILLANCE CAMERA. ROUTE POWER TO CIRCUIT TO PANEL LP1
4. PROVIDE #6 GROUND TO BUILDING STEEL. DO NOT BOND NEUTRAL PER NEC REQUIREMENTS FOR SUB-FED BUILDINGS. (3)

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND ELECTRICAL GENERAL NOTES, SEE SHEET E001. (1)

IDG+ ARCHITECTS
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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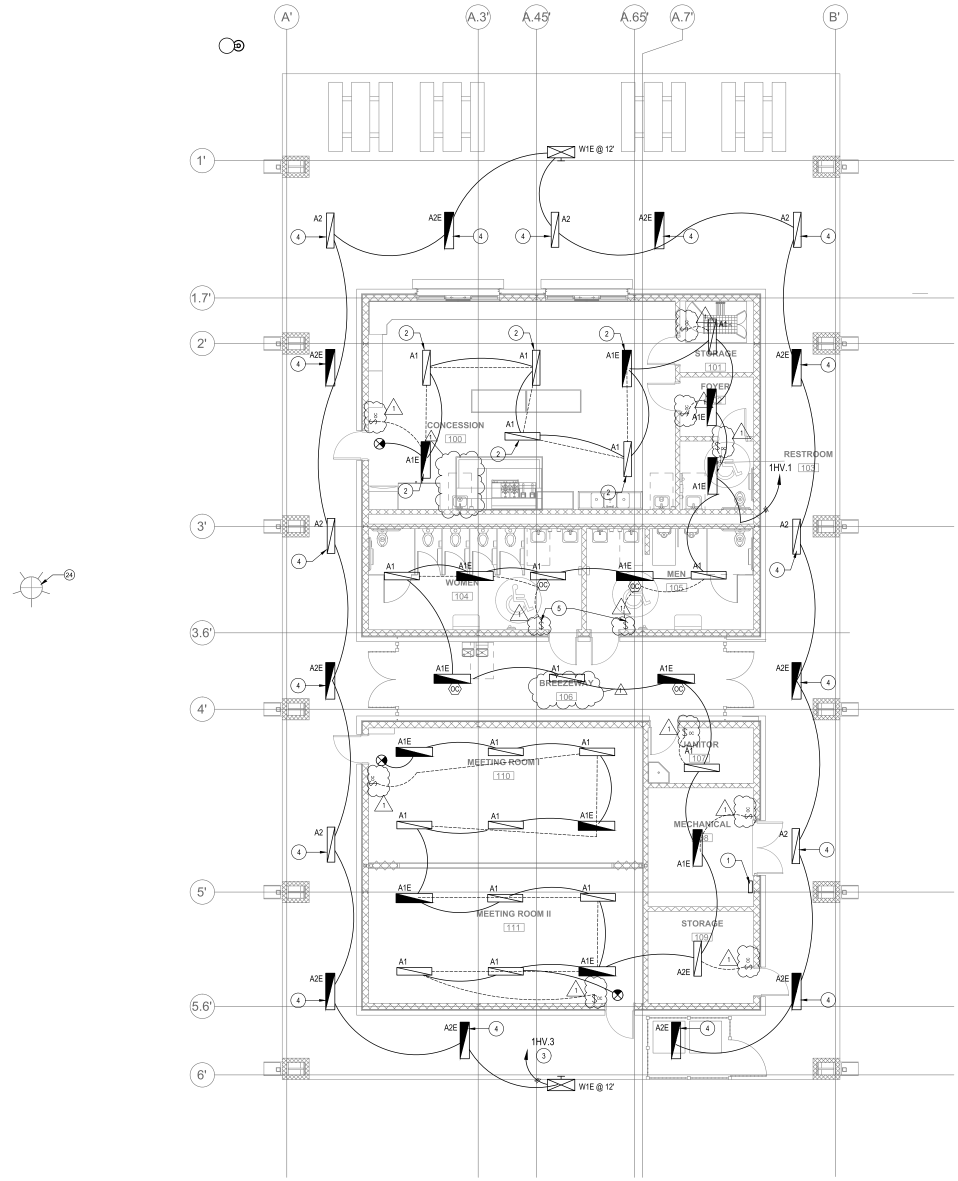
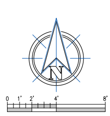
FLOOR PLAN
ELECTRICAL POWER

EP-300



1 FLOOR PLAN
3/16"=1'-0"



SCALE: 1/4" = 1'-0"

KEY NOTES:

1. TIME CLOCK, TC-1
2. PROVIDE A FOOD RATED COVER FOR LIGHT FIXTURE.
3. ROUTE CIRCUIT THROUGH TC-1.
4. MOUNT FIXTURE TO UNDERSIDE OF ROOF DECK.
5. PROVIDE TAMPER PROOF LIGHT SWITCH. INTERLOCK WITH CEILING MOUNTED OCCUPANCY SENSOR TO CONTROL LIGHTS. LIGHTS SHALL REMAIN ON FOR 15 MINUTES AFTER LAST SENSED OCCUPANCY.

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND ELECTRICAL GENERAL NOTES, SEE SHEET EE00.1
2. ROOMS CONTROLLED BY WALL MOUNTED SWITCHES WITH OCCUPANCY SENSORS WILL BE CONFIGURED TO TURN OF LIGHTING AFTER 15 MINUTES OF NON-ACTIVITY.
3. TIME CLOCK SHALL BE PROGRAMMED ACCORDING TO OWNER REQUIREMENTS. PHOTOCELL OVERRIDE SHALL PREVENT CANOPY LIGHTS FROM OPERATING WHEN ADEQUATE EXTERNAL LIGHTING IS PRESENT (5FC OR GREATER (ADJUSTABLE).

IDG+ ARCHITECTS

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REGISTERED PROFESSIONAL ENGINEER
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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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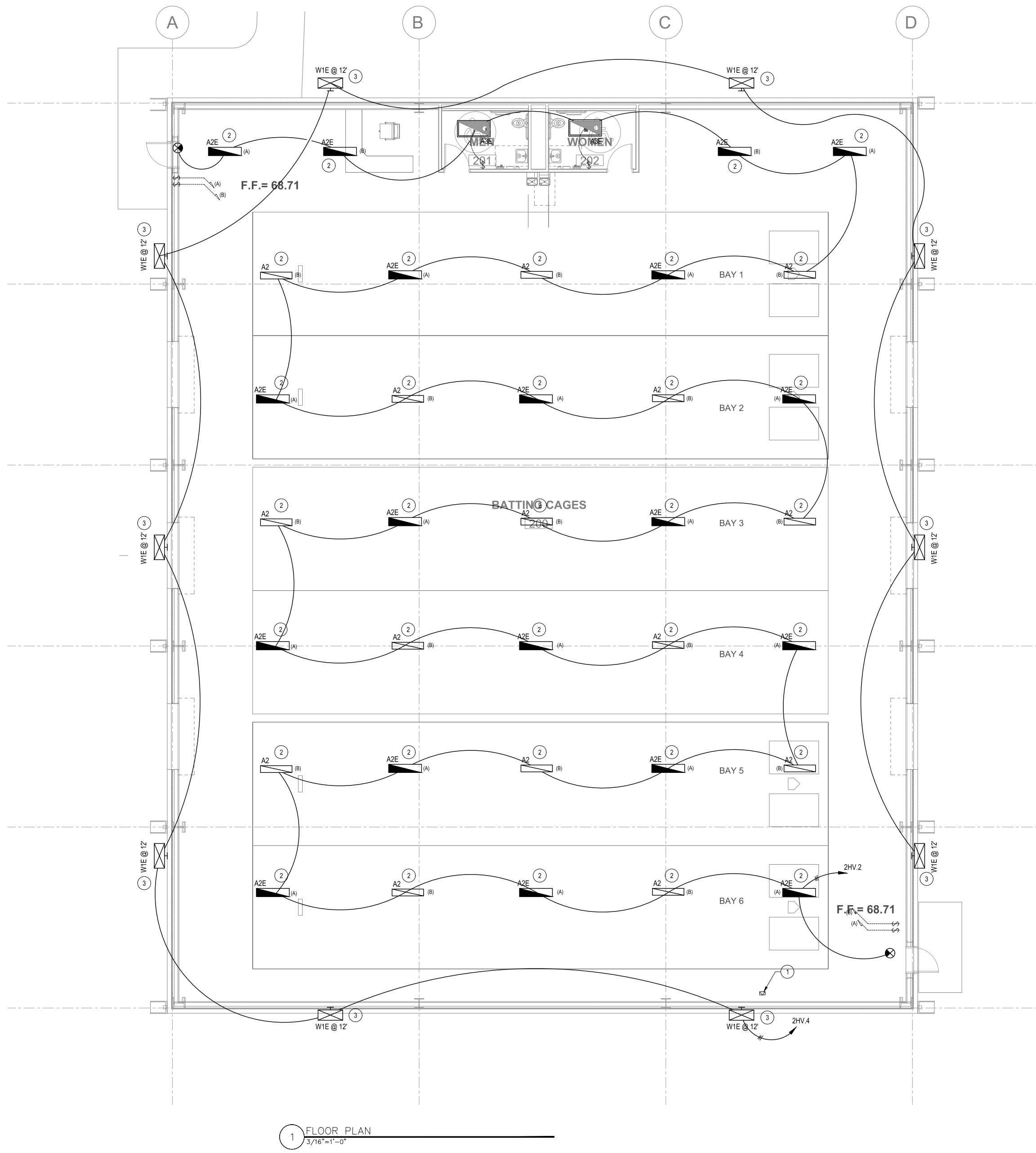
FLOOR PLAN
ELECTRICAL LIGHTING

EL-100



1 FLOOR PLAN
3/16"=1'-0"

SCALE: 3/16" = 1'-0"

KEY NOTES:

1. TIME CLOCK, TC-2
2. MOUNT FIXTURES IN PRACTICE AREA TO UNDERSIDE OF ROOF DECK.
3. ROUTE CIRCUIT THROUGH TC-2.

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND ELECTRICAL GENERAL NOTES, SEE SHEET E001

IDG+ ARCHITECTS

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FLOOR PLAN
ELECTRICAL LIGHTING

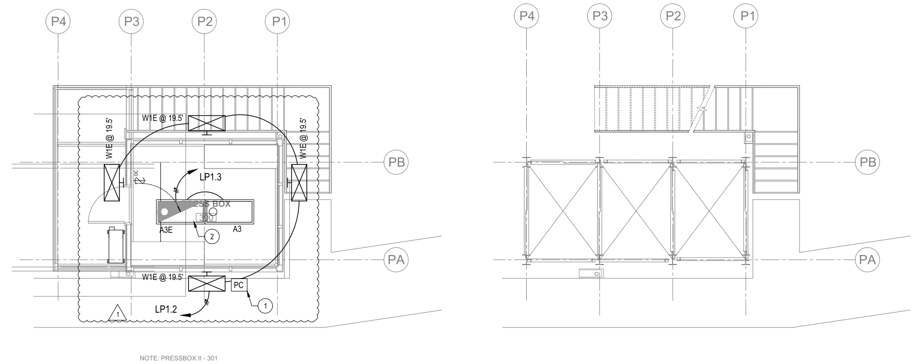
EL-200

KEY NOTES:

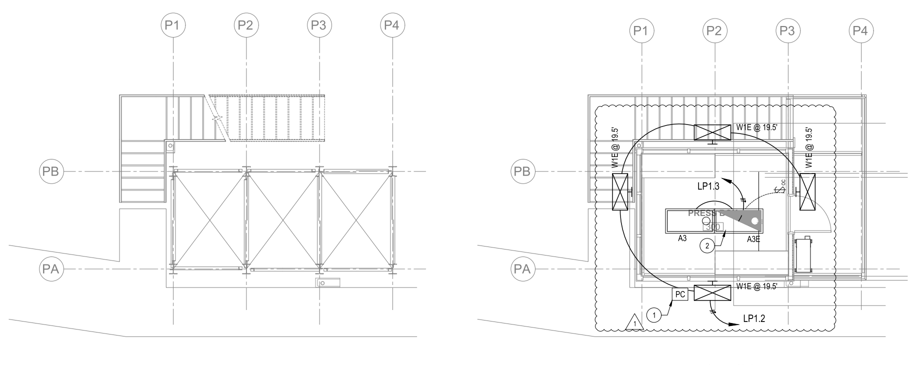
1. PROVIDE PHOTOCELL TO CONTROL ALL EXTERIOR LIGHTS. LIGHTS TO PROVIDED BY ELECTRICAL CONTRACTOR.
2. INTERIOR LIGHTING, WIRING, AND CONTROLS TO BE PROVIDED BY PRESS-BOX BUILDING PROVIDER. BUILDING TO BE SUPPLIED PRE-WIRED WITH THESE ITEMS IN PLACE.

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND ELECTRICAL GENERAL NOTES, SEE SHEET E001.



1 FLOOR PLAN – BUILDING "C"
1/4"=1'-0"



2 FLOOR PLAN – BUILDING "B"
1/4"=1'-0"

IDG+ ARCHITECTS
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Project No: 6001-02

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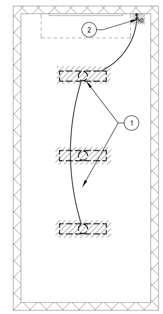
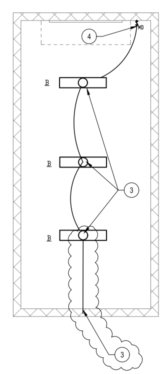
FLOOR PLAN
ELECTRICAL LIGHTING

EL-300



1 DEMOLITION FLOOR PLAN – BUILDING "E"
1/4"=1'-0"



2 FLOOR PLAN – BUILDING "E"
1/4"=1'-0"

KEY NOTES:

1. REMOVE FIXTURE. BRANCH CIRCUIT CONDUIT AND WIRING TO REMAIN.
2. REMOVE SWITCH. JUNCTION BOX TO REMAIN.
3. REPLACEMENT LIGHT FIXTURE.
4. NEW SWITCH WITH OCCUPANCY SENSOR.
5. ROUTE FEEDER TO BUILDING E.

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND ELECTRICAL GENERAL NOTES, SEE SHEET E001.

IDG+ ARCHITECTS

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FLOOR PLANS
LIGHTING

EL-400

FORT BEND COUNTY

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Bid Package 3: Baseball Fields Turf, Baseball Fields Equipment, Building "D" Turf

09/07/2022

TDLR #: TABS 2022005864
ILMS# 21076845

FORT BEND COUNTY COMMISSIONERS

KP GEORGE, County Judge

VINCENT MORALES, JR., Precinct 1

GRADY PRESTAGE, Precinct 2

ANDY MEYERS, Precinct 3

KEN DEMERCHANT, Precinct 4

PROJECT TEAM

ARCHITECT..... IDG+ ARCHITECTS, INC

STRUCTURAL ENGINEERS..... RDP ENGINEERS

MEP ENGINEERS..... MARSHALL ENGINEERING CORPORATION

CIVIL ENGINEERS..... NEDU ENGINEERING SERVICES, INC.

ARCHITECTS
440 Benmar Dr., Suite 3335
Houston, Texas
PH: 832-448-2462
Project No: 6001-02

ABBREVIATIONS

ACC	ACCESSIBLE
A/C	AIR CONDITIONING,AIR CONDITIONED
ACOUS	ACOUSTIC, ACOUSTICAL
AD	AREA DRAIN
ADH	ADHESIVE
ADJ	ADJACENT OR ADJUSTABLE
ADMIN	ADMINISTRATIVE, ADMINISTRATION
AFF	ABOVE FINISH FLOOR
ALUM	ALUMINUM
ALT	ALTERNATE
ANOD	ANODIZED
AP	ACCESS PANEL
APPROX	APPROXIMATE
ARCH	ARCHITECT, ARCHITECTURAL
ASPH	ASPHALT
AUTO	AUTOMATIC
AUX	AUXILIARY
AVG	AVERAGE
BD	BOARD
BLDG	BUILDING
BRK	BRICK
BLK(G)	BLOCK(ING)
BM	BEAM
BOL	BOLLARD
BOT	BOTTOM
BRKT	BRACKET
BSMT	BASEMENT
BUR	BUILT-UP ROOF
BVL	BEVELED, BEVEL
CAB	CABINET
CC	CENTER TO CENTER
CEM	CEMENT, CEMENTITIOUS
CER	CERAMIC
CG	CORNER GUARD
C.I.	CAST IRON
CIP	CAST IN PLACE
CJ	CONTROL JOINT
CJT	CONSTRUCTION JOINT
CL	CENTER LINE
CLG	CEILING
CLO	CLOSET
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS, CONTINUATION
CONTR	CONTRACTOR
COOL	COOLER
CORR	CORRIDOR
CPT	CARPET
CT	CERAMIC TILE
CTR	COUNTER
CWG	CLEAR WIRE GLASS
CUST	CUSTODIAL
DBL	DOUBLE
DEPT	DEPARTMENT
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIV	DIVISION
DN	DOWN
DS	DOWNSPOUT
DW	DISHWASHER
DWG	DRAWING
DWR	DRAWER
DF	DRINKING FOUNTAIN
EHD	ELECTRIC HAND/ HAIR DRYER
E	EAST
EA	EACH
EJC	EXPANSION JOINT COVER
EJ	EXPANSION JOINT
EL	ELEVATION
ELEV	ELEVATOR
ELEC	ELECTRIC, ELECTRICAL
EMER	EMERGENCY
ENCL	ENCLOSURE
ENGR	ENGINEER
ENTR	ENTRANCE
E.D.F	ELECTRIC DRINKING FOUNTAIN
EQ	EQUAL
EQUIP	EQUIPMENT
EST	ESTIMATE
EW	EACH WAY
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPOSED, EXPANSION, OR EXPANDED
EXT	EXTERIOR
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
F TO F	FACE TO FACE
FF	FINISH FLOOR
FHC	FIRE HOSE CABINET
FIN	FINISH OR FINISHED
FIXT	FIXTURE
FLR	FLOOR
FLRG	FLOORING
FLUOR	FLUORESCENT
FP	FIREPROOF
FT	FOOT, FEET
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GEN	GENERATOR
GL	GLASS OR GLAZING
GYP	GYPSUM
H	HIGH
HB	HOSE BIBB
HDW	HARDWARE
HEX	HEXAGON, HEXAGONAL
HGR	HANGER
HGT	HEIGHT
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HP	HIGH POINT
HR	HOUR
HW	HOT WATER
HVAC	HEATING, VENTILATION & AIR CONDITIONING
ID	INSIDE DIAMETER
IDF	INTERMEDIATE DATA FRAME
INCAN	INCANDESCENT
INCL	INCLUSIVE, INCLUDE
INFO	INFORMATION
INSUL	INSULATION
INT	INTERIOR
JUNC	JUNCTION
JST	JOIST
JT	JOINT
KS	KNEESPACE
LAB	LABORATORY
LAM	LAMINATE, LAMINATED
LAV	LAVATORY
LB(S)	POUND(S)
LDG	LANDING
L	LONG, LENGTH
LF	LINEAR FEET
LH	LEFT HAND
LOC	LOCATION
LP	LOW POINT
LT	LIGHT
LTG	LIGHTING
LVR	LOUVER
MACH	MACHINE
MAINT	MAINTENANCE
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MED	MEDIUM
MEMB	MEMBRANE
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MET	METAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MO	MASONRY OPENING, MOTOR OPERATED
MOD	MODIFY, MODIFIED
MTD	MOUNTED
MTG	MOUNTING
MW	MICROWAVE
MTL	METAL
N	NORTH
NA	NOT APPLICABLE
NAT	NATURAL
NFPA	NATIONAL FIRE PROTECTION ASSOC.
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NR	NOT RATED
NTS	NOT TO SCALE
OA	OVERALL
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OFF	OFFICE
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OTS	OPEN TO STRUCTURE
PART	PARTITION
PB	PARTICLE BOARD
PERF	PERFORATE, PERFORATED
PL	PLATE
PLAS	PLASTER
PLAM	PLASTIC LAMINATE
PLYWD	PLYWOOD
PLBG	PLUMBING
PNL	PANEL
PR	PAIR
PREP	PREPARATION
PT	PAINT
PTD	PAINTED
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
R	RADIUS
RA	RETURN AIR
RCP	REFLECTED CEILING PLAN
RCPT	RECEPTACLE
RCVG	RECEIVING
RD	ROOF DRAIN
RE	REFER, REFERENCE
REC	RECEPTION
REF OR REFRIG	REFRIGERATOR
REINF	REINFORCE, REINFORCING
REQD	REQUIRED
RET	RETURN
REV	REVISION
RH	RIGHT HAND
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
RR	RESTROOM
RB	RESILIENT BASE
S	SOUTH
SA	SUPPLY AIR
SC	SEALED CONCRETE
SCHED	SCHEDULE
SECT	SECTION
SECY	SECRETARY
SERV	SERVICE, SERVING
SF	SQUARE FEET
SHLVG	SHELVING
SHT	SHEET
SHWR	SHOWER
SIM	SIMILAR
SLDG	SLIDING
SND	SANITARY NAPKIN DISPENSER
SNDU	SANITARY NAPKIN DISPOSAL UNIT
SQ	SQUARE
SPEC	SPECIFICATIONS
SPKR	SPEAKER
ST	STREET
SS	STAINLESS STEEL
STA	STATION
STC	SOUND TRANSMISSION CLASS
STD	STANDARD
STL	STEEL
STOR OR STO	STORAGE
STRUC	STRUCTURAL
SUSP	SUSPENDED
SW	SWITCH
SYM	SYMMETRICAL
SYN	SYNTHETIC
SURF	SURFACE
TAS	TEXAS ACCESSIBILITY STANDARDS
TB	TACKBOARD
TC	TOP OF CURB
TEL	TELEPHONE
TEMP	TEMPERATURE
TERR	TERRAZZO
THK	THICK(NESS)
TLT	TOILET
TRANS	TRANSPORTATION
TRD	TREAD
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL, TOP OF SLAB
TPD	TOILET PAPER DISPENSER
TYP	TYPICAL
UL	UNDERWRITERS LABORATORY
UNFN	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UTIL	UTILITY
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST	VESTIBULE
V.I.F.	VERFY IN FIELD
VWC	VINYL WALL COVERING
VP	VISION PANEL
W	WIDTH, WEST
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WD	WOOD
WGL	WIRE GLASS
WP	WATERPROOF
WT	WEIGHT
WTW	WALL TO WALL
WWF	WELDED WIRE FABRIC

SHEET REFERENCES

MATERIALS & SYMBOLS

COMMON BRICK

STRUCTURAL CLAY TILE

CONCRETE MASONRY UNITS

CAST OR CUT STONE

MARBLE

CONCRETE

EARTH

GRAVEL

SAND

WOOD(ROUGH)

WOOD(BLOCKING)

PLYWOOD

TERRAZZO
EXPOSED AGGREGATE

CEMENT TOPPING

RIGID INSULATION

EXTRUDED SHAPES

BREAK METAL SHAPES

BATT OR BLANKET
INSULATION

CORK OR COMPOSITE

RUBBER OR NEOPRENE

STEEL IN SECTION

BRASS OR BRONZE

STAINLESS STEEL OR
ALUMINUM

SHEET METAL
(ALL METALS SMALL SCALE)

METAL ELEVATION

CAST IRON

CERAMIC TILE

QUARRY TILE

RESILIENT TILE

CARPET & PAD

PLASTER ON METAL LATH

GYPSUM BOARD

PLASTER OR DRYWALL
PARTITION

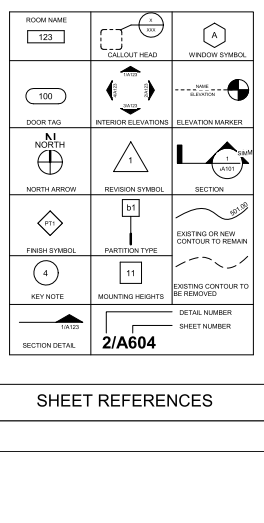
SOLID PLASTER PARTITION

INSULATED PARTITION
SOUND OR THERMAL

WOOD FRAME PARTITION

RIGID INSULATION

STEEL SHAPES



ARCHITECTURAL

G000	COVER SHEET
G001	DRAWING INDEX
G002	ACCESSIBILITY STANDARDS
G003	CODE ANALYSIS
G004	LIFE SAFETY PLAN

GENERAL

	SURVEY
	PLAT (SHEET 1 OF 2)
	PLAT (SHEET 2 OF 2)
C1	GENERAL NOTES
C3	SITE GRADING & UTILITY PLAN
C3-1	UTILITY PLAN
C4	DRAINAGE PLAN
C5	DETENTION AND DRAINAGE CALCULATIONS
C6	PAVING LAYOUT
C9	STORM DETAILS
C11	PAVING DETAILS

CIVIL

LANDSCAPE

STRUCTURAL

AD100	DEMOLITION SITE PLAN
A100	SITE PLAN
A103	BASEBALL FIELD I
A104	BASEBALL FIELD II
A105	BASEBALL FIELD III
A106	BASEBALL/SOFTBALL FIELD IV
A109	SITE DETAILS
A200B-4	BATTING CAGE FLOOR PATTERN PLAN

TECHNOLOGY

MECHANICAL

PLUMBING

ELECTRICAL

ALTERNATES

PACKAGE 3: THE SCOPE OF WORK IS AS FOLLOW BUT NOT LIMITED TO:

- NEW TURF ON BASEBALL FIELDS AND BATTING CAGE BUILDING "D".
- OTHER EQUIPMENT THAT GOES WITH ALL 4 BASEBALL FIELDS SUCH FIELD SIGNS, MARKING ETC AS SHOWN IN THE DRAWINGS.

SCOPE OF WORK

PROJECT LOCATION

NORTH

VICINITY MAP

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE: HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

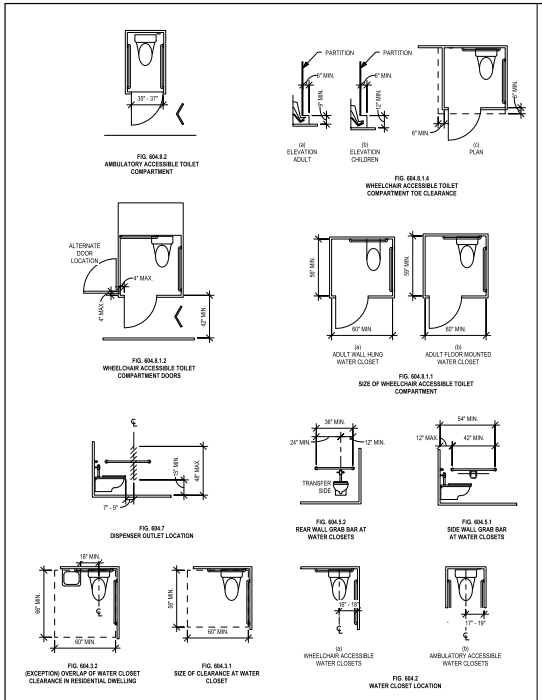
Drawing Date:	07/26/2021
Drawn:	IK
Checked:	BM, CD
Scale:	12" = 1'-0"
ACAD File:	

Revisions:

DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

DRAWING INDEX

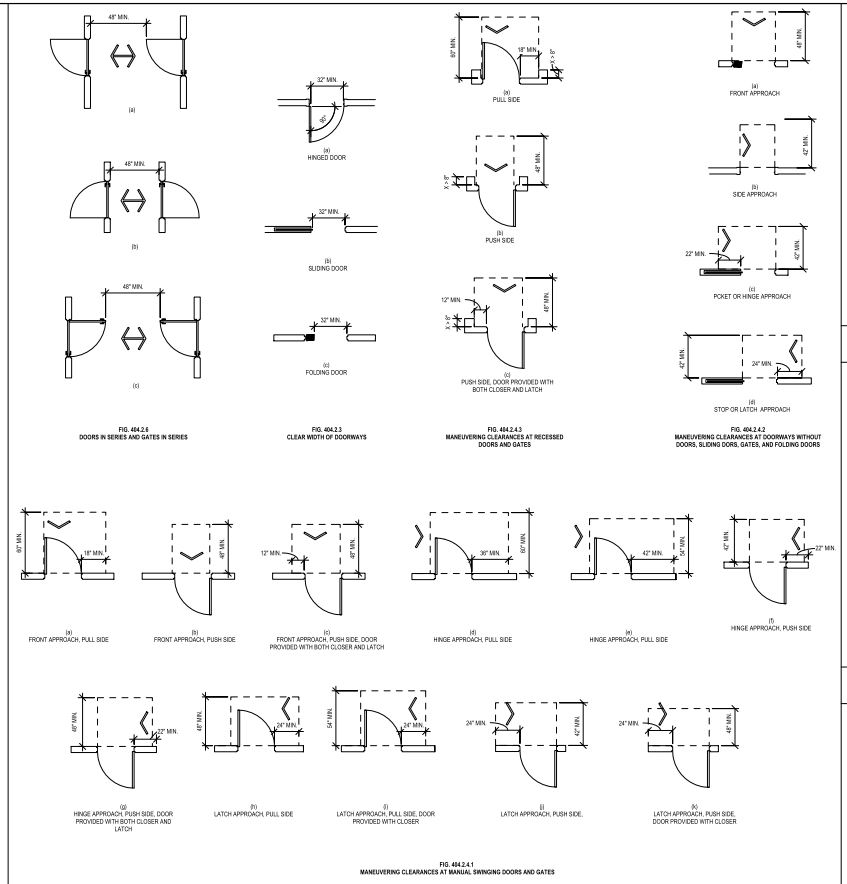
G001



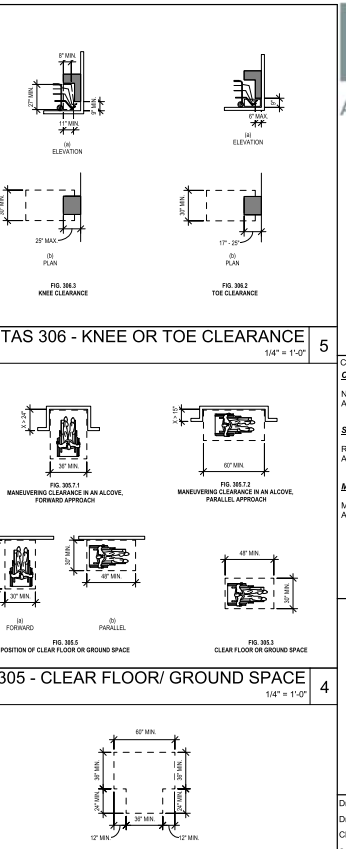
	AGES 3 & 4	AGES 5 THROUGH 8	AGES 9 THROUGH 12
WATER CLOSET CENTERLINE	12 IN. (305 MM.)	12 TO 15 IN. (305 TO 380 MM.)	15 TO 18 IN. (380 TO 455 MM.)
TOILET SEAT HEIGHT	11 TO 12 IN. (280 TO 305 MM)	12 TO 15 IN. (305 TO 380 MM.)	15 TO 17 IN. (380 TO 430 MM.)
GRAB BAR HEIGHT	18 TO 20 IN. (280 TO 305 MM.)	20 TO 25 IN. (510 TO 635 MM.)	25 TO 27 IN. (635 TO 685 MM.)
DISPENSER HEIGHT	14 IN. (355 MM.)	14 TO 17 IN. (355 TO 430 MM.)	17 TO 19 IN. (430 TO 485 MM.)

ADVISORY SPECIFICATIONS FOR WATER CLOSETS SERVING CHILDREN AGES 3 THROUGH 12

TAS 604 - WATER CLOSETS AND TOILET COMPARTMENTS 1/4" = 1'-0" 11



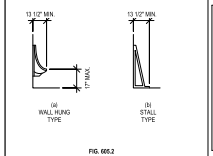
TAS 404 - DOORS DOORWAYS, AND GATES 1/4" = 1'-0" 7



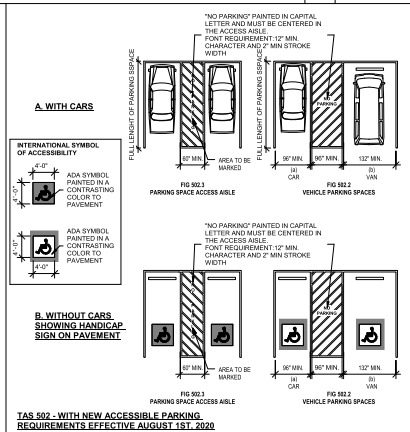
TAS 306 - KNEE OR TOE CLEARANCE 1/4" = 1'-0" 5

TAS 305 - CLEAR FLOOR/ GROUND SPACE 1/4" = 1'-0" 4

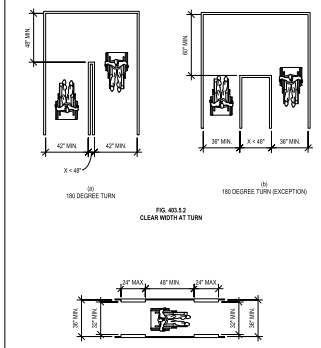
TAS 304 - TURNING SPACE 1/4" = 1'-0" 3



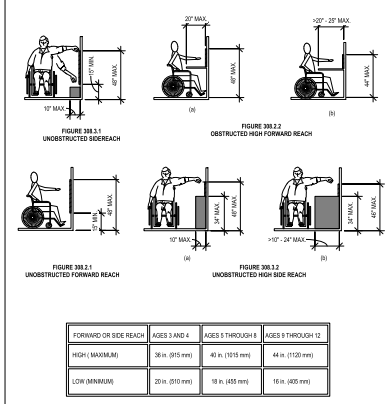
TAS 605 - URINALS 1/4" = 1'-0" 10



TAS 502 - PARKING SPACES 1/4" = 1'-0" 9



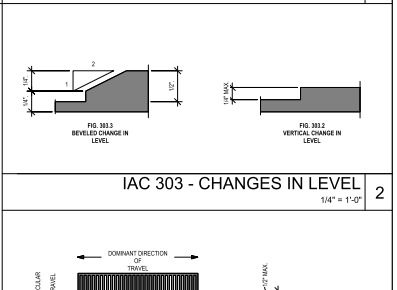
TAS 403 - WALKING SURFACES 1/4" = 1'-0" 8



FORWARD OR SIDE REACH	AGES 3 AND 4	AGES 5 THROUGH 8	AGES 9 THROUGH 12
HIGH (MAXIMUM)	36 in. (915 mm)	40 in. (1015 mm)	44 in. (1120 mm)
LOW (MINIMUM)	20 in. (510 mm)	18 in. (455 mm)	16 in. (405 mm)

CHILDREN'S REACH RANGES

TAS 308 - REACH RANGES 1/4" = 1'-0" 6



IAC 303 - CHANGES IN LEVEL 1/4" = 1'-0" 2

TAS 302 - FLOOR OR GROUND SURFACES 1/4" = 1'-0" 1

IDG+ ARCHITECTS
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Project No: 6001-02

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BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

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100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

ACCESSIBILITY STANDARDS

G002

CODE ANALYSIS

1. PROJECT DESCRIPTION:
Project Name: Baseball Fields Upgrade Phase II: South Post Oak Sportsplex
Location: 5535 Hobby Road
Houston, TX 77053
Project No: 6000-02
Analysis By: Peggy Nordmann
Date(s): 08/04/2021

2. GOVERNING AGENCY(s):

Fort Bend County
City of Houston

3. GOVERNING CODE(s):

2012 International Building Code w/ Local Amendments
2012 Uniform Mechanical Code w/ Local Amendments
2012 Uniform Plumbing Code w/ Local Amendments
2012 International Fire Code w/ Local Amendments
2015 International Energy Conservation Code w/ 2001 Supplement
2020 National Electric Code w/ State Mandates
2015 International Existing Building Code w/ Local Amendments
2015 International Fire Code w/ Local Amendments
2012 Texas Accessibility Standards
Fort Bend County Fire Marshall
2013 ANSI/ASHRAE/IES Standard 90.1

4. ZONING DISTRICT:

Not Applicable

5. FIRE DISTRICT:

City of Houston Fire Marshall

6. BUILDING DESIGN CATEGORY:

Category II-B, Table 1604.5

7. WIND LOAD:

150 mph (3 Second Wind Gust), Figure 1609.3(1)

8. SNOW LOAD:

0 , Figure 1608.2

9. SEISMIC USE GROUP:

Risk Category Group III, Section 1604.5

10. OCCUPANCY CLASSIFICATION: Primary: ASSEMBLY - (A-5) Section 305.1

11. SPECIAL OCCUPANCY PROVISIONS:

Not Applicable

12. CONSTRUCTION TYPE:
Table 601

Assembly (A-5): Type IIB (NON-SPRINKLED)

All wood blocking to be fire-retardant

13. PROPERTY RESTICTIONS AND REQUIREMENTS:

Plan North: 10'-0" Building Line - City of Houston
Plan East: No Restrictions
South: No Restrictions
West: No Restrictions

14. ALLOWABLE FLOOR AREA and HEIGHT:
See Table 503

UL - Unlimited

CONSTRUCTION TYPE -	HEIGHT ABOVE GRADE PLANE
TYPE II-B	-

15. ALLOWABLE FLOOR AREA MODIFICATIONS:

A-5 Occupancy:
Allowable floor area for non-sprinkled Type II - B = UL sf per floor
Actual floor area = 13,327 SF

A = Allowable Area per Story
S = Stories above grade
UL = Unlimited
NP = Not permitted
1 = Allowable building height and story increase due to automatic sprinkler system installation. Section 504.2
2 = Allowable building area increase due to street frontage. Section 506.2
3 = Allowable building area increase due to automatic sprinkler system installation. Section 506.3
4 = Unlimited area buildings. Section 507
W = Width of public way or open space (feet) in accord. w/ Section 506.2.1

Equation 5.1: Aa = [At + (At x If) + (At x Is)]
Equation 5.2: If = [F/P - .25]W/30

* Section 506.2, ** Section 506.1,

16. BUILDINGS AT BASEBALL FIELDS

Building "A" Concession Stand
4,422 SF, One Story
Construction Type II B (non-sprinklered)
Fire Separation Distance (Table 602):
North: 29#
East: 29'
South: 93'
West: 23'

Building "B" West Press Box
112 SF, Second Story only (No First Floor)
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance:
North: Exceeds 30'
East: 23'
South: Exceeds 30'
West: Exceeds 30'

Building "C" East Press Box
112 SF , Second Story only (No First Floor)
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance:
North: Exceeds 30'
East: Exceeds 30'
South: Exceeds 30'
West: Exceeds 20'

Building "D" Batting Cage Building
10,156 SF, One Story
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance
North: 10' - 7" (No exterior wall openings)
East: Exceeds 30'
South: Exceeds 30'
West: Exceeds 30'

Building "E" Existing Storage Building
297 SF, One Story
Construction Type II-B (Non-Sprinklered)
Fire Separation Distance
North: Exceeds 30'
East: Exceeds 30'
South: 10' - 7" (No exterior wall openings)
West: Exceeds 30'

17. FIRE RESISTANCE RATING REQ. FOR EXT. WALLS BASED ON FIRE SEPARATION DISTANCE:
See Table 602

Wall Protection	Fire Rating (Hour(s))
< 5'	1
≥ 5' to < 10' 1 (0 for IIB)	1
≥ 10' to < 30'1 (0 for IIB)	0
≥ 30'	0

18. MAXIMUM AREA OF EXTERIOR WALL OPENINGS:

Wall Opening	% of Unprotected Wall	% of Protected Wall
< 3'	Not Permitted	Not Permitted
3' to < 5'	Not Permitted	15
5' to < 10'	10	25
10' to < 15'	15	45
15' to < 20'	25	75
20' to < 25'	45	No Limit
25' to < 30'	70	No Limit
30' or more	No Limit	No Limit

Roof Covering Classification: Table 1505.1

Type C (for IIB)

19. OCCUPANCY SEPARATION REQUIREMENTS:

No Separation Required

Nota A - Occupancy separation not required between storage and business

20. BUILDING FIRE RESISTIVE REQUIREMENTS:
See Table 601

All 0 if using IIB - including roof assembly (Note e)

21. PROTECTION OF INTERIOR WALLS
See Table 803.11

Finish Requirements - Class C

22. SPECIAL FIRE RESISTANCE PROVISIONS:

Not Applicable

23. DESIGN LOADS (UNIFORM AND CONCENTRATED):
See Table 1607.1,

Category	Uniform Load(psf)	Concentrated Load(lbs)
Corridors	100	-
Fire Escapes	100	-
Lobby	100	-
Classrooms	40	1,000
Offices	50	2,000
Corridors above 1st floor	80	2,000
Sidewalks	250	8,000
Stairs	100	Note f
Walkways / Elevated Platforms	60	-

24. OCCUPANT LOAD:

See Table 1004.1.2 (Maximum Floor Area Allowances per Occupant)

Space Use
Assembly (A-5)

Occupant Load Factor (sf)

Building "A" Concession
Concession Stand
1. Concession - 7/62 SF/200 GSF = 4
2. Storage - 62 SF/300 GSF = 1
Meeting Rooms
3. Meeting Room I - 441 SF/15 NSF = 30
4. Meeting Room II - 441 SF/15 NSF = 30
5. Janitor/HVAC/Storage 333/300 GSF = 2
Occupant Load Total : 67 Persons

Building "B" Press Box
1. Press Box - 112 SF/100 GSF = 2
Building "B" Occupant Load Total: 2 persons

Building "C" Press Box
1. Press Box - 112 SF/100 GSF = 2
Building "C" Occupant Load Total: 2 persons

Building "D" Batting Cage
1. Batting Cages - 9,405 SF/50 GSF = 188
Building "D" Occupant Load Total: 188 Persons

Building "E" Existing Storage building
1. Storage - 62 SF/300 GSF = 1
Building "E" Occupant Load Total: 1 Person

SPORT COMPLEX BUILDINGS (A, B, C, D, E)

Total Occupant Load: 260 persons

25. EXIT WIDTH CALCULATION :

Building "A"
Concession Stand
Exit Width (1005.3.2)
(Occup.) 5 X 0.2"= 1" Required
36"x1 = 36" Provided
Meeting Rooms I & II (441 SF Each)
(Occup.) 30 X 0.2"= 6" Required
36"x1 = 36" Provided

Building "B" & "C" (Each) Press Box
(Occup.) 2 X 0.2"= .40" Required
36"x1 = 36" Provided

Building "D" Batting Cages
(Occup.) 188 X 0.2"= 37.6" Required
36"x2 = 72" Provided

Building "E" Existing Storage Building
(Occup.) 1 X 0.2"= .2" Required
72"x1 = 72" Provided

.....

Exit Travel Distance (1015)
A-3 Non-Sprinklered: 200' (Table 1016.2)
S-2 Non-sprinklered: 300'

Common Path of Egress Travel (Table 1021.2 (2))
Occ. A to not Exceed 75'
Occ S to not Exceed 75'

26. CORRIDOR EGRESS
Minimum Corridor Egress Ceiling Height:. Section 1003.2
All Occupancies 7'-6" (COH Amendment).
Calculated Egress Exit Required Width: Table 1005.3.2
Actual Egress Exit Width: See Plans
xy exits doors of 36" = yy" total egress
Minimum Egress Door Width and Height: Section 1005
Occ. A 32" Clear & 80" Height (48" max. width for swinging door leaf)
Minimum Building Occupant Load Required Exits: Section 1014
Condition 1: Two exits required when occupancy exceeds Table 1015.1
1015.1.1: Three or more exits provided from a floor or space with occup. load of 501-1,000
Section 1012.1 - Minimum Number of Exits (see below)
Occupant load 1-500 persons per story 2 min. number of exits per story
Maximum Space Occupant Load for (1) Egress: Table 1015.1
Occ. A 49 max. occupant load for space with one means of egress (COH Amendments)
Egress Exit Access: Section 1016.2
Non-Sprinklered: Where two exits or exit access doorways are required, from any portion of the exit access, the exit doors or exit access doorways shall be placed a distance apart equal to not less than one-third of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit door or exit access doorways.

Minimum Corridor Egress Width: Section 1018.1

Maximum Egress Length: Table 1017.2

Maximum Dead End Corridor: Section 1018.4

27.INTERIOR ENVIRONMENT
Minimum Habitable Room Width: Section 1208.1
7'-0" in any dimension
Minimum Habitable Spaces Ceiling Height: Section 1208.2
All Occupancies 7'-6"
Minimum Support Spaces Ceiling Height: Section 1208.2,
All Occupancies 7'-0"

28. PLUMBING **FIXTURE REQUIREMENTS:**
Fixture Count Requirements: See Table 2902.1, page 579

Occ. A-5
Water Closets
MALE 1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500
FEMALE 1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520
DRINKING FOUNTAIN 1 per 1000
MALE LAVATORIES 1 per 200
FEMALE LAVATORIES 1 per 150
2902.1.1: The occupant load shall be composed of 50% of each sex, unless statistical data approved by the building official indicate a different distribution of the sexes.

2014 Illinois Plumbing Code: Appendix A, Table B

ACTUAL OCCUPANCY = 400	MEN 200					WOMEN 200					UNISEX				TOTAL BUILDING	
	REQUIRED	EXISTING	DEMO	NEW	TOTAL	REQUIRED	EXISTING	DEMO	NEW	TOTAL	EXISTING	DEMO	NEW	TOTAL	REQUIRED	PROVIDED
WATER CLOSET	1	1	1	2	2	6	2	2	6	6	0	-	1	1	7	9
URINAL	-	2	2	2	2	-									-	9
TOTAL WC'S & URINALS	1	3	3	4	4	6	2	2	6	6	0	-	1	1	7	11
LAVATORY	1	2	2	3	3	1	2	2	3	3	0	-	1	1	2	7
DRINKING FOUNTAIN															1	2
MOP SINK															1	1

29. PARKING REQUIREMENTS:

See City of Houston Amendments
2012 Texas Accessibility Standard section 208 Table 208.2

Classification Parking Requirements:

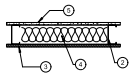
Class 6 (Recreational and Entertainement) L. Sport Complex
1 Space for every 40 SF of Seating
VAN Accessible Spaces 1 for every 8 accessible spaces must be "VAN" Accessible

Actual Building Parking Spaces:

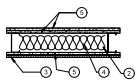
Classification Actual Spaces Space 1 for every 40 SF of seating
Total Parking Required: 18
Total Parking Provided with accessibe spaces: 123 + 5 accessible = 128 Parking Spaces

DESIGN NO. U404

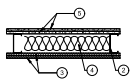
Bearing Wall Rating - 1 and 2 Hr (See items 2, 3 and 5)
Nonbearing Wall Rating - 1 and 2 Hr (See items 2, 3 and 5)



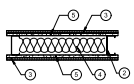
1 Hr. Configuration



2 Hr. Configuration



2 Hr. Configuration B



2 Hr. Configuration C

1. Steel Floor and Ceiling Runners- - (Not Shown) - Channel shaped, 3-1/58 in. wide by 1-1/4 in. deep, fabricated from min 20 MSG (0.0329 in., min bare metal thickness) galvanized steel spaced max 16 in. OC. For bearing walls, studs shall be designed in accordance with the current edition of the Specification for the Design of Cold-Formed Steel Structural Members by the American Iron and Steel Institute. All design details enhancing the structural integrity of the bearing wall assembly, including the axial design load of the studs, shall be as specified by the steel stud designer and/or producer and shall meet the requirements of all applicable local code agencies. Steel studs attached to floor and ceiling runners with 3/8 in. long Type S-12 steel screws on both sides of the studs or by welded or bolted connections' designed in accordance with the AISI specifications. For nonbearing walls, studs to be cut 3/8 to 3/4 in. less than assembly height and friction-fitted into floor and ceiling runners.

2. Steel Studs- - 3-5/8 in. wide, fabricated from min 20 MSG (0.0329 in., min bare metal thickness) galvanized steel spaced max 16 in. OC. For bearing walls, studs shall be designed in accordance with the current edition of the Specification for the Design of Cold-Formed Steel Structural Members by the American Iron and Steel Institute. All design details enhancing the structural integrity of the bearing wall assembly, including the axial design load of the studs, shall be as specified by the steel stud designer and/or producer and shall meet the requirements of all applicable local code agencies. Steel studs attached to floor and ceiling runners with 3/8 in. long Type S-12 steel screws on both sides of the studs or by welded or bolted connections' designed in accordance with the AISI specifications. For nonbearing walls, studs to be cut 3/8 to 3/4 in. less than assembly height and friction-fitted into floor and ceiling runners.

3. Cementitious Backer Units* - - 1/2 in. or 5/8 in. thick, applied vertically or horizontally with vertical joints centered over studs. Fastened to studs and runners with corrosion resistant, chamfered, ribbed wafer head screws with a minimum head diameter of .400 inch. For nonbearing systems, fastened to studs and bottom runners; with the uppermost screws placed 1/2 in. to 2 in. below the bottom edge of the leg of the top runner. Horizontal joints need not be backed by framing. 1 Hr System - Screws shall be min 1-1/4 in. Long and spaced a max of 8 in. OC. All vertical joints staggered one stud cavity from gypsum board vertical joints on the opposite side of studs. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. 2-Hr System - For the base layer in Configuration B, the screws shall be min 1-1/4 in. long and spaced a max of 12 in. OC. For the face layers, screws shall be 1-5/8 in. long and spaced a max of 8 in. OC. All face layer joints offset min 12 in. from underlying base layer joints. Joints in either layer need not be staggered from joints on the opposite side of the wall.
UNITED STATES GYPSUM CO - DUROCK Exterior Cement Board, or DUROCK Brand Cement Board.

4. Batts and Blankets* - Min 3 in. thick mineral wool insulation batts, friction-fitted between studs .
THERMAFIBER INC -Type SAFB.

5. **Gypsum Board*** - 5/8 in. thick, with square or tapered edges, applied vertically or horizontally with vertical joints centered over studs. Horizontal joints need not be backed by framing. Fastened with Type S-12 screws. *1-Hr System* - For vertical application, fastened to studs and runners with 1 in. long screws spaced max 8 in. OC at vertical edges and spaced max 12 in. OC in the field. For horizontal application, fastened to studs and runners with 1 in. long screws spaced max 8 in. OC. Vertical joints staggered one stud cavity from cement board vertical joints on opposite side of studs. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. *2-Hr System* - Base layer with an overlying gypsum board face layer fastened with 1 in. long screws spaced max 16 in. OC to studs and runners. Base layer with an overlying cement board face layer, fastened with 1 in. long screws spaced max 12 in. OC to studs and runners. Face layers fastened with 1 -5/8 in. long screws spaced max 16 in. OC to studs and runners with screws offset 8 in. from face layer screws. Face layer joints offset min 12 in. from base layer joints. Joints in either layer need not be staggered from joints on the opposite side of the wall.
CANADIAN GYPSUM COMPANY -Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC or WRX.
UNITED STATES GYPSUM CO -Type AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC or WRX.

U.L. RATINGS
1" = 1'-0" | 1

IDG Architects — Ft. Bend Co.-South Post Oak Sportsplex — Proj. No. 6001-02 — Baseball Fields Upgrades – Phase II

61496 OPT0232826 Version 2
HARDWARE GROUP NO. 001

PROVIDE EACH RU DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	SFIC MORTISE CYL.	80-132 X CAM/COLLAR AS REQ'D	626	SCH
1	EA.	NOTE	REMAINDER OF HARDWARE BY DOOR MFR.		

-Coordinate hardware with door MFR.

HARDWARE GROUP NO. 205

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA.	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	RAIN DRIP	142A DW x 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 209

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA.	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ (MOUNT ON INT.)	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	39A	A	ZER
1	EA.	THRESHOLD	655A	A	ZER

Issued for 95% CD — 08 71 00-10 — Door Hardware
27 November 2021

IDG Architects — Ft. Bend Co. – South Post Oak Sportsplex — Proj. No. 6001-02 — Baseball Fields Updates – Phase II

HARDWARE GROUP NO. 214

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA.	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
2	EA.	MANUAL FLUSH BOLT	FB458	626	IVE
1	EA.	DUST PROOF STRIKE	DP2	626	IVE
1	EA.	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	OH STOP	9033 SERIES X SIZE & MOUNTING AS REQ	630	GLY
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ (Active Leaf)	689	LCN
2	EA.	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA.	RAIN DRIP	142A DW x 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	MEETING STILE	8193AA (2 PCS - 1 SET) HEIGHT AS REQ	AA	ZER
2	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 301

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA.	PRIVACY W/COIN TURN	L9044 17A LS83-363	626	SCH
1	EA.	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA.	GASKETING	4885 PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

HARDWARE GROUP NO. 501C

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA.	CLASSROOM LOCK	L9070HD 17A	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	GASKETING	4885 PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

Issued for 95% CD — 08 71 00-11 — Door Hardware
27 November 2021

IDG Architects — Ft. Bend Co.-South Post Oak Sportsplex — Proj. No. 6001-02 — Baseball Fields Upgrades – Phase II

HARDWARE GROUP NO. 715

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA.	PANIC HARDWARE	99-NL LENGTH AS REQ	626	VON
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	SFIC RIM CYLINDER	80-159 7"	626	SCH
1	EA.	SURFACE CLOSER	4040XP SCUSH X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	RAIN DRIP	142A DW x 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. 805L

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA.	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA.	CLASSROOM DEADBOLT	B563HD	626	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1	EA.	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA.	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA.	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA.	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA.	FLOOR/WALL STOP	FS441/WS401 - AS REQ	630	IVE
1	EA.	RAIN DRIP	142A DW x 4"	AA	ZER
1	EA.	GASKETING	328AA H & J	AA	ZER
1	EA.	DOOR SWEEP	8198AA LENGTH AS REQ	AA	ZER
1	EA.	THRESHOLD	655A	A	ZER

HARDWARE GROUP NO. J902

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA.	PADLOCK LCYL-SFIC	KS41F1200	606	SCH
1	EA.	SFIC EVEREST CORE	80-037 CKC EVZ9 R	626	SCH
1			BALANCE OF HARDWARE BY GATE SUPPLIER		

- CANE BOLT BY GATE SUPPLIER.

END OF SECTION 08 71 00

Issued for 95% CD — 08 71 00-12 — Door Hardware
27 November 2021

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466
Project No: 6001-02

CONSULTANTS:

CIVIL ENGINEER

NEDU ENGINEERING SERVICES
ADDRESS: 6464 SAVOY DR #610, HOUSTON TEXAS 77036

STRUCTURAL ENGINEER

RDP ENGINEERS
ADDRESS: 104 INDUSTRIAL BLVD SUITE 111 SUGAR LAND,TEXAS 77478

MEP ENGINEER

MARSHALL ENGINEERING CORPORATION
ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

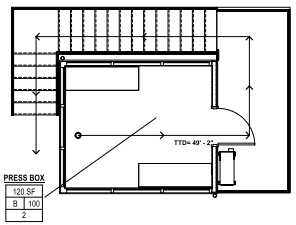
Drawing Date:	07/26/2021
Drawn:	PN, IK,
Checked:	BM, CD
Scale:	1" = 1'-0"
ACAD File:	

Revisions:

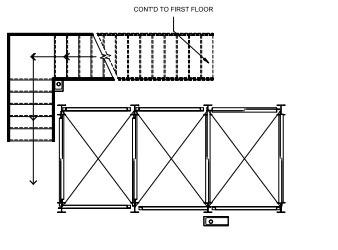
DESCRIPTION	
SCHEMATIC DESIGN	06/07/2021
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
⚠ CITY OF HOUSTON COMMENTS	01/18/2022
ISSUE FOR BID	09/07/2022

CODE ANALYSIS

G003



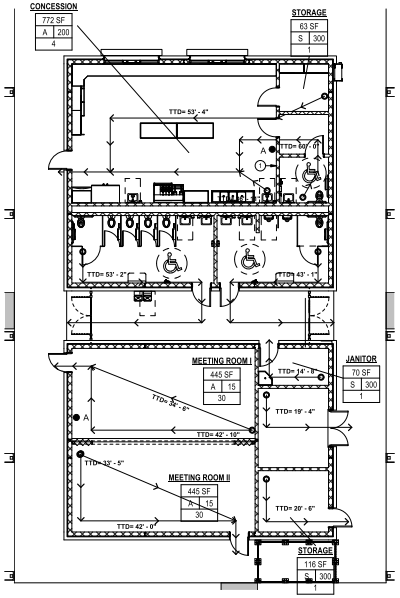
PRESS BOX - 2ND FLOOR LIFE SAFETY 3
1/4" = 1'-0"



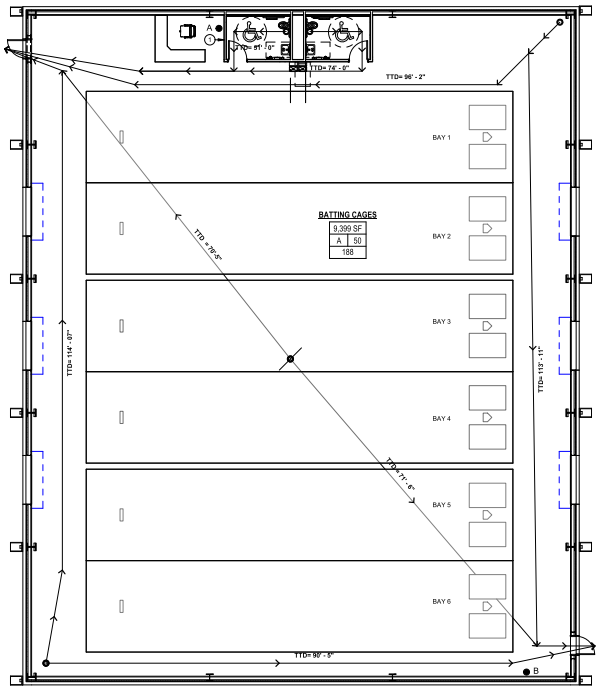
PRESS BOX - 1ST FLOOR LIFE SAFETY 2
1/4" = 1'-0"

1 PROVIDE AN AUTOMATED EXTERNAL DEFIBRILLATOR AS SHOWN WITH STORAGE CABINET & WALL RECESSED MOUNTED TYPE PROVIDE A SIGN ABOVE SHOWING THE LOCATION. RE: SPECIFICATIONS

KEY NOTES



CONCESSION BUILDING LIFE SAFETY PLAN 4
1/8" = 1'-0"



BATTING CAGE BUILDING LIFE SAFETY PLAN 1
1/8" = 1'-0"

Fire Extinguisher
A - GENERAL (Semi-Recess)
B - GENERAL (Surface Mounted)
C - KITCHEN (Surface Mounted)

WALL MOUNTED FIRE EXTINGUISHER (FE) TYPE ABC, 10LB UNITS TO MEET CURRENT ANSI/UL STANDARDS 711 REQUIREMENTS, REFERENCE SPECIFICATIONS FOR MANUFACTURE

ONE HOUR (1) RATED FIRE PARTITION UL DESIGN NO. U419.

INDICATES EMERGENCY EXIT ROUTE

TTD 115'

TRAVEL DISTANCE TO AN EXIT NOT TO EXCEED 150 FEET

INDICATES POINT OF STARTING LOCATION

EXIT

INDICATES DIRECTION OF EXIT TRAVEL

Room name
2000 SF — AREA OF ROOM
OCCUPANCY TYPE E 20 — AREA PER OCCUPANT
100 — OCCUPANT LOAD

CODE ANALYSIS LEGEND

1. THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
2. THE GENERAL CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES, LIGHTING, ETC. AS APPLICABLE BY CODES AND REGULATIONS TO PROTECT PEDESTRIANS AND WORKERS.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMIT FEES AND APPLICATIONS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CHECKING AND VERIFYING ANY AND ALL DIMENSIONS AND OR EXISTING FIELD CONDITIONS PRIOR TO START.
5. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES AND OMISSIONS TO THE ARCHITECT PRIOR TO INSTALLATION OF NEW WORK.
6. THE GENERAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES WITH ARCHITECT PRIOR TO BIDDING.
7. THE GENERAL CONTRACTOR SHALL PROTECT ANY CONSTRUCTION OR FINISHES THAT IS TO REMAIN.
8. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY CONSTRUCTION THAT IS EXISTING TO REMAIN.
9. SALVAGE ALL DOORS AND HARDWARE, MOVABLE FURNITURE, APPLIANCES, EQUIPMENT, AND COORDINATE DELIVERY TO OWNER
10. THE GENERAL CONTRACTOR SHALL COORDINATE THE RE-USE AND RELOCATION OF DIFFUSERS, STROBES, EXIT SIGNS AND MECHANICAL GRILLS WITH MEP. REPORTING DISCREPANCIES TO THE ARCHITECT.
12. PROVIDE KICKERS AT 48" O.C.
13. PROVIDE CLEAR PLASTIC CORNER GUARDS AT EXPOSED GYPSUM CORNERS EXCEPT WITHIN MAINTENANCE AREAS AND WINDOW JAMB.
14. CONTRACTOR SHALL OBTAIN AND VERIFY ALL DIMENSIONS AND CONDITIONS AT JOB SITE AND BE FULLY RESPONSIBLE FOR SAME.

GENERAL NOTES

IDG+ ARCHITECTS
440 BENMAR DR., SUITE 3335
HOUSTON, TEXAS 77060
PH: 832-448-2462
FAX: 832-448-2466

Project No: 6001-02

CONSULTANTS:

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ADDRESS: 715 N. HOUSTON AVE. HUMBLE, TEXAS 77338

BASEBALL FIELDS UPGRADE PHASE II: SOUTH POST OAK SPORTSPLEX

5675 HOBBY ROAD, HOUSTON, TEXAS 77053

Drawing Date:	07/26/2021
Drawn:	IK
Checked:	BM, CD
Scale:	As indicated
ACAD File:	

Revisions:

DESCRIPTION	
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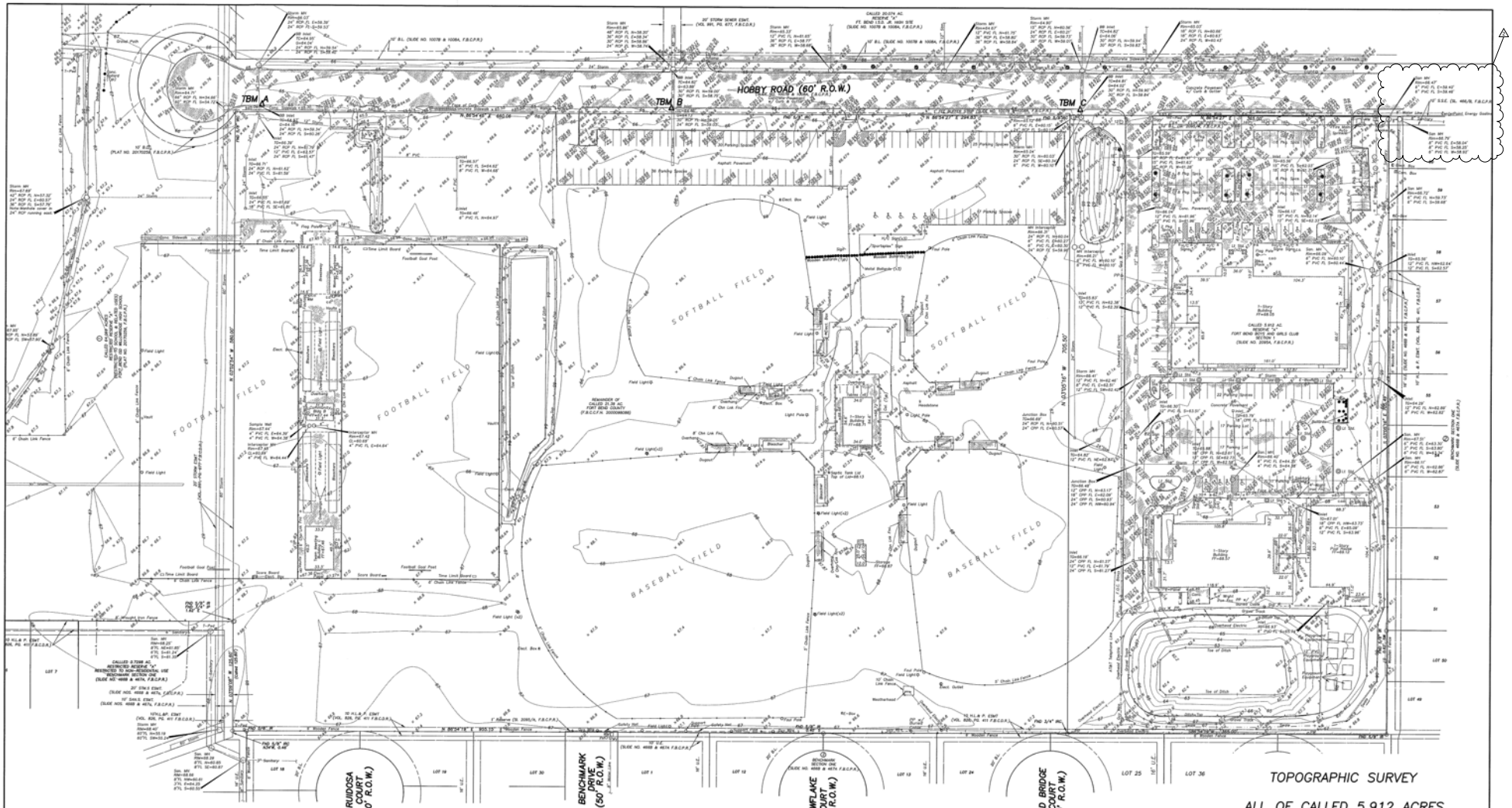
DESIGN DEVELOPMENT	08/23/2021
75% CD	09/09/2021
95% CD	09/27/2021
100% CD	11/22/2021
ISSUE FOR PERMIT	12/22/2021
ISSUE FOR BID	09/07/2022

LIFE SAFETY PLAN

G004



LEGEND

	PROPERTY CORNER		WOOD FENCE
⊙ FND	FOUND MONUMENTATION		BARBED WIRE FENCE
○ SET	SET MONUMENTATION W/CAP		CHAIN LINK FENCE
GM	GAS METER		WROUGHT IRON FENCE
PP	POWER POLE		OVERHEAD ELECTRIC
Guy	GUY WIRE		SANITARY SEWER LINE
MH	MANHOLE		STORM SEWER LINE
CO	CLEANOUT		WATERLINE
WV	WATER VALVE		GAS LINE
FH	FIRE HYDRANT		TELEPHONE LINE
WM	WATER METER		EASEMENT
Tel Box	PHONE EQUIPMENT		AERIAL EASEMENT
TV	CABLE EQUIPMENT		BUILDING LINE
LS	LIGHT STANDARD		PARKING SETBACK
LE	LIGHT		CENTER OF SWALE
	TRAFFIC SIGN		TOP OF BANK
	TREE		
	PIPE BOLLARD		
	PIPELINE MARKER	452.6	EXIST. NATURAL GROUND ELEVATION
	CURB LINE		
	EDGE ASPHALT	452.67	EXIST. ASPHALT OR CONCRETE ELEVATION
	CURB INLET		
	AREA INLET		
	EDGE OF BUILDING	452.67 / 452.17	TOP OF CURB ELEVATION / GUTTER ELEVATION

CEDER
OAK
ASHBERRY
HACKBERRY

50 25 0 50 100 150

NOTES:

1. THE BEARINGS SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD '83
2. THIS PROPERTY LIES IN UNSHADED ZONE "X" AS PER THE FLOOD INSURANCE RATE MAPS, COMMUNITY PANEL NO. 480296 1005 M, EFFECTIVE DATE MAY 2, 2019.
3. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT. THE SURVEYOR HAS NOT ATTEMPTED TO ABSTRACT THE PROPERTY. EASEMENTS, SETBACK LINES, AND AGREEMENTS MAY EXIST WHICH ARE NOT SHOWN HEREON.
4. BENCHMARK: HARRIS COUNTY FLOODPLAIN RM NO. 010225, BRASS DISK STAMPED RM 010225, LOCTAED 4.5 MILES WEST ON FM 2234 FROM THE INTERSECTION OF SH 288 & FM 2234 TO A BRIDGE BETWEEN HIRAM–CLARK AND PARK MANOR ST. MONUMENT IS ON THE EAST END OF A HEADWALL ON THE NORTH R.O.W. OF FM 2234. ELEV.=64.42' (NAVD'88, 2001 ADJ.)
5. TBM A: BOX CUT ON CURB OF A "BB" INLET LOCATED ON THE SOUTH RIGHT–OF–WAY OF HOBBY ROAD, APPROXIMATELY 58 FEET WEST OF THE HOBBY ROAD CUL–DE–SAC. ELEV.=64.97' (NAVD'88, 2001 ADJ.)
6. TBM B: BOX CUT ON CURB OF A "BB" INLET LOCATED ON THE SOUTH R.O.W. OF HOBBY ROAD APPROXIMATELY 550 FEET WEST OF THE HOBBY ROAD CUL–DE–SAC. ELEV.=64.86' (NAVD'88, 2001 ADJ.)
7. TBM C: BOX CUT ON TOP OF CURB AT CENTERLINE OF CURB INLET, APPROXIMATELY 500' WEST OF CENTERLINE OF SENTINEL ROAD. ELEV.=64.81' (NAVD'88, 2001 ADJ.)
8. TBM D: BOX CUT ON THE NORTHWEST CORNER OF A CURB INLET ON THE NORTH CURB LINE OF HOBBY STREET, APPROXIMATELY 250 FEET EAST OF CHIMNEY ROCK ROAD. ELEV.=66.63' (NAVD'88, 2001 ADJ.)
9. THE LOCATION OF UNDERGROUND SANITARY AND STORM LINES IS BASED ON VISIBLE AND APPARENT EVIDENCE. THE LOCATION AND SIZE OF UNDERGROUND WATER LINES IS BASED ON COMPILED DRAWINGS. UNDERGROUND GAS, COMMUNICATIONS, AND ELECTRICAL LINES CANNOT ALWAYS BE LOCATED AND MAY NOT ALL BE SHOWN ON THIS SURVEY. LOCATIONS SHOWN ARE BASED ON UTILITY MARKINGS AT THE TIME OF THIS SURVEY AND ANY COMPILED MAPS PROVIDED.

I hereby certify that this plat correctly represents the results of a topographic survey made on the ground under my supervision on the 27th day of April, 2021

Randy S. McClendon
Registered Professional Land Surveyor
Texas Registration No. 4079

NOTE: Without an original signature, this product is strictly preliminary, and shall not be recorded for any purpose and shall not be used or viewed or relied upon as a final survey document.

TOPOGRAPHIC SURVEY

ALL OF CALLED 5.912 ACRES
RESERVE "A"
FORT BEND BOYS AND GIRLS CLUB, SEC.1
(SLIDE NO. 2095A, F.B.C.P.R.) &
REMAINDER OF CALLED 21.38 AC.
(F.B.C.C.F.N. 2000098088)
J. POINTEVENT SURVEY NO. 3, A–305
FORT BEND COUNTY, TEXAS

TEJAS SURVEYING, INC.
FIRM NO. 10031300
1810 FIRST OAKS STREET, SUITE 220
RICHMOND, TEXAS 77406
Website: mrsurveyor.com

SCALE: 1"=50'	FIELD BOOK: 21–02	DATE: 05–19–2021
GF NO. XXXXXXXXX	ADDRESS: HOBBY ROAD, HOUSTON, TX 77053	REV: 10–20–2021
PHONE: (281) 240–9099	CAD FILE: TP\61\61–2105T	JOB NO. 61–2105–EAST

Form **W-9**
(Rev. December 2014)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type
See **Specific Instructions** on page 2.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification; check only **one** of the following seven boxes:

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____

Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner.

☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Social security number

			–		–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here	**Signature of U.S. person ▶**	**Date ▶**

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at *www.irs.gov/fw9*.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What is backup withholding?* on page 2.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,

2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code* on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* above.

What is FATCA reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account, list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note. ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C Corporation, or S Corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

Limited Liability Company (LLC). If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2—The United States or any of its agencies or instrumentalities

3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 5[2]
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note. You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.ssa.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: *A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.*

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code* earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account[1]
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor[2]
4. a. The usual revocable savings trust (grantor is also trustee) b. So-called trust account that is not a legal or valid trust under state law	The grantor-trustee[1] The actual owner[1]
5. Sole proprietorship or disregarded entity owned by an individual	The owner[3]
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	**Give name and EIN of:**
7. Disregarded entity not owned by an individual	The owner
8. A valid trust, estate, or pension trust	Legal entity[4]
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 2.

***Note.** Grantor also must provide a Form W-9 to trustee of trust.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov.* You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: *spam@uce.gov* or contact them at *www.ftc.gov/idtheft* or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

Job No.: _____

TAX FORM/DEBT/ RESIDENCE CERTIFICATION
(for Advertised Projects)

Taxpayer Identification Number (T.I.N.): _____

Company Name submitting Bid/Proposal: _____

Mailing Address: _____

Are you registered to do business in the State of Texas? Yes No

If you are an individual, list the names and addresses of any partnership of which you are a general partner or any assumed name(s) under which you operate your business

_____

_____

I. **Property:** List all taxable property in Fort Bend County owned by you or above partnerships as well as any d/b/a names. Include real and personal property as well as mineral interest accounts. (Use a second sheet of paper if necessary.)

Fort Bend County Tax Acct. No.*	Property address or location**
_____	_____
_____	_____
_____	_____
_____	_____

** This is the property account identification number assigned by the Fort Bend County Appraisal District.*

*** For real property, specify the property address or legal description. For business personal property, specify the address where the property is located. For example, office equipment will normally be at your office, but inventory may be stored at a warehouse or other location.*

II. **Fort Bend County Debt** - Do you owe any debts to Fort Bend County (taxes on properties listed in I above, tickets, fines, tolls, court judgments, etc.)?

Yes No If yes, attach a separate page explaining the debt.

III. **Residence Certification** - Pursuant to Texas Government Code §2252.001 *et seq.*, as amended, Fort Bend County requests Residence Certification. §2252.001 *et seq.* of the Government Code provides some restrictions on the awarding of governmental contracts; pertinent provisions of §2252.001 are stated below:

(3) "Nonresident bidder" refers to a person who is not a resident.

(4) "Resident bidder" refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state.

I certify that _____ is a Resident Bidder of Texas as defined in Government Code
[Company Name]
§2252.001.

I certify that _____ is a Nonresident Bidder as defined in Government Code
[Company Name]
§2252.001 and our principal place of business is _____.
[City and State]

Mandatory Form

Contractor Acknowledgement of Storm Water Management Program

I hereby acknowledge that I am aware of the stormwater management program and standard operating procedures developed by Fort Bend County in compliance with the TPDES General Permit No. TXR040000. I agree to comply with all applicable best management practices and standard operating procedures while conducting my services for Fort Bend County. I agree to conduct all services in a manner that does not introduce illicit discharges of pollutants to streets, stormwater inlets, drainage ditches or any portion of the drainage system. The following materials and/or pollutant sources must not be discharged to the drainage system as a result of any services provided:

1. Grass clippings, leaves, mulch, rocks, sand, dirt or other waste materials resulting from landscaping activities, (except those materials resulting from ditch mowing or maintenance activities)
2. Herbicides, pesticides and/or fertilizers, (except those intended for aquatic use)
3. Detergents, fuels, solvents, oils and/or lubricants, other equipment and/or vehicle fluids,
4. Other hazardous materials including paints, thinners, chemicals or related waste materials,
5. Uncontrolled dewatering discharges, equipment and/or vehicle wash waters,
6. Sanitary waste, trash, debris, or other waste products
7. Wastewater from wet saw machinery,
8. Other pollutants that degrade water quality or pose a threat to human health or the environment.

Furthermore, I agree to notify Fort Bend County immediately of any issue caused by or identified by:

_____

(Company/Contractor)

that is believed to be an immediate threat to human health or the environment.

_____ _____

Contractor Signature Date

_____

Printed Name

_____

Title