San Jacinto River Authority
Purchasing Department
1577 Dam Site Road
Conroe, Texas 77304

REQUEST FOR COMPETITIVE SEALED PROPOSALS
CSP 20-0020

WOODLANDS DIVISION
EMERGENCY REPAIR SERVICE CENTER

Date Issued: JANUARY 24, 2020

Response Due Date & Time: FEBRUARY 21, 2020 at 11:00 AM CST
Location for Delivery: as stated above

SJRA PROJECT NO. WDPR0110.1001.2N001

SAN JACINTO RIVER AUTHORITY TECHNICAL SERVICES DEPARTMENT

NIGP CLASS and ITEM

914	00

Disclosure Requirements

Chapter 176 of the Texas Local Government Code mandates the public disclosure of certain information concerning persons doing business or seeking to do business with the San Jacinto River Authority, including affiliations and business and financial relationships such persons may have with San Jacinto River Authority officers. An explanation of the requirements of Chapter 176, applicable forms and a complete text of the new law are available at: http://www.sjra.net. If you are unable to obtain such information online, please contact the San Jacinto River Authority Purchasing Department, 1577 Dam Site Road, Conroe, Texas 77304 or call (936) 588-3111.

BY DOING BUSINESS OR SEEKING TO DO BUSINESS WITH THE SAN JACINTO RIVER AUTHORITY, YOU ACKNOWLEDGE THAT YOU HAVE BEEN NOTIFIED OF THE REQUIREMENTS OF CHAPTER 176 OF THE TEXAS LOCAL GOVERNMENT CODE AND THAT YOU ARE SOLELY RESPONSIBLE FOR COMPLYING WITH THEM.

Doc. No. **Document Title** **Doc. Date**

SECTION 00 01 10

TABLE OF CONTENTS

INTRODUCTORY INFORMATION

REQUIREMENTS FOR OFFERORS

INSTRUCTIONS TO OFFERORS

INFORMATION AVAILABLE TO OFFERORS

PROPOSAL FORMS AND SUPPLEMENTS

CONTRACT FORMS AND CONDITIONS OF THE CONTRACT

AGREEMENT

BONDS AND CERTIFICATES

Doc. No. **Document Title** **Doc. Date**

APPENDICES

END OF SECTION

SECTION 00 11 13

INVITATION TO SUBMIT PROPOSALS

GENERAL NOTICE

The San Jacinto River Authority is requesting Competitive Sealed Proposals (CSP) for the Construction of the following project in Montgomery County, Texas:

CSP No. 20-0020 – Emergency Repair Service Center

PROJECT DESCRIPTION

Construction of a 100'x40' pre-engineered storage building as described in Specification 01 11 13 – Work Covered by Contract Documents. Also, installation of site improvements including bollards, and paving of surrounding site as described in Specification 01 11 13 – Work Covered by Contract Documents.

Competitive Sealed Proposals must be delivered to the San Jacinto River Authority, G&A Building, 3rd Floor Receptionist, 1577 Dam Site Road, Conroe, TX 77304 no later than 11:00 AM (CST) on February 21, 2020. Proposals will be publicly opened and read aloud at this time. Address proposals to:

Grady Garrow, CPPB, CTCM, CTCD
Senior Buyer
San Jacinto River Authority
Purchasing Department
1577 Dam Site Road
Conroe, TX 77304

A mandatory Pre-Submittal Conference will be held at the Woodlands Division, 2436 Sawdust Road, The Woodlands, Texas 77380, at 10:00 AM CST on February 5, 2020. Proposals will not be accepted from Offering Firms which fail to attend the Pre-Submittal Conference.

A complete set of (CSP) Documents may be accessed via a link from the SJRA Website (http://www.sjra.net/purchasing/bidopportunities/), Purchasing Tab, Bid Opportunities.

Attendance at the Pre-Submittal Conference may be the only opportunity for Offerors to see the existing conditions of the site prior to Proposal due date.

The SJRA reserves the right to reject any or all Proposals and to waive informalities and irregularities.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 21 13.02CN

INSTRUCTIONS TO OFFERORS

(COMPETITIVE SEALED PROPOSALS)

1. Overview of Competitive Sealed Proposal Process.

The objective of the Competitive Sealed Proposal (CSP) process is to competitively procure goods and services with the firm whose Proposal provides the best value for the Owner (SJRA). Proposals will be received, publically opened, and the names and monetary Proposals of Offerors read aloud. Subsequently, the Proposals will be ranked according to the criteria described in this CSP Document. Both cost and non-cost factors will be evaluated and scored. One or more Offerors may be invited back for discussions or to present their Proposal to the SJRA before the final rankings are made.

The SJRA may enter into contract negotiations with the highest ranked firm for the completion of the Work. If the negotiations with the highest ranked firm are unsuccessful, the SJRA will formally close negotiations with this firm and initiate contract negotiations with the next highest ranked firm. Upon Standard Form of Agreement between both parties, a Contractor-executed Contract may be recommended for approval by the SJRA Board of Directors or the SJRA General Manager, as applicable. Upon approval, the Contract will be executed by the General Manager of the SJRA.

2. Defined Terms.

2.1. Definitions for the following terms used in these Instructions do not replace definitions for similar terms that may be contained within other sections of the Contract Documents.

2.2. Certain additional terms used in these Instructions to Offerors have the meanings indicated below and are applicable to both the singular and plural thereof.

2.2.1. Addendum or Addenda- Additions, deletions, and/or changes to any part of the CSP issued in writing by the Owner prior to Proposal due date and time.

2.2.2. Apparent Best Value Offeror- the Offering Firm whose Proposal for completion of the Work provides the best value for the Owner as defined by the ranking detailed in Article 11 of Instructions to Offerors.

2.2.3. Board of Directors – The governing body of the SJRA comprised of seven (7) directors appointed to six (6) year terms by the Governor of the state of Texas.

2.2.4. Contract Negotiations- Discussions which take place between the Owner and the Apparent Best Value Offeror in an effort to reach Standard Form of Agreement on contract scope of work, price, time and other contractual requirements.

2.2.5. Contractor – The successful Offeror to this CSP who enters into a contractual relationship with the Owner for completion of the Work, following any contract approval by the SJRA Board of Directors or the SJRA General Manager, as applicable.

2.2.6. CSP Document- Abbreviation of the Competitive Sealed Proposals Document, the document used to request Competitive Sealed Proposals for the procurement of goods and services as authorized under Government Code Chapter 2269, Subchapter D.

2.2.7. Engineer's Opinion of Probable Construction Cost – Engineer's opinion of project construction cost to owner developed by the Principal Architect/Engineer. Actual contract amount may vary significantly.

2.2.8. Issuing Office - The location from which the CSP Documents are issued. For this project the issuing office is San Jacinto River Authority, 1577 Dam Site Road Conroe, Texas 77304.

2.2.9. Offeror, Offering Firm- Firm which responds to a CSP by submitting a Proposal directly to Owner. Offeror and Offering Firm shall have the same meaning in the Instructions to Offerors.

2.2.10. Owner - The San Jacinto River Authority (SJRA).

2.2.11. Proposal- Offeror's submittal which conforms to the requirements set forth in this CSP.

2.2.12. Proposal Form- As detailed in the requirements of this CSP, contains unit pricing for all parts of the Work and their aggregate as detailed and affirmed on the Proposal Form and may include additional forms supplied by Offeror and/or the Owner that relate to the Offeror's proposed cost for completing the Work.

2.2.13. SJRA- San Jacinto River Authority, a government agency whose mission is to develop, conserve, and protect the water resources of the San Jacinto River basin.

2.2.14. Statement of Qualifications, (SOQ) - Offeror submitted documents which describe the Offering Firm's qualifications for performing the Work and contain no pricing or cost data. Requirements for the Statement of Qualifications (SOQ) are set forth in Article 8 and Article 10 of the Instructions to Offerors (this CSP).

2.2.15. Subcontractor - Any contractor hired by the Contractor to furnish services, or goods and services, specified in this CSP.

2.2.16. Successful Offeror - The Firm who has completed negotiations with the Owner and, following any approval by the SJRA Board of Directors or the SJRA General Manager, as applicable, is selected to enter into a Contract with the Owner to complete the Work.

2.2.17. Supplier- Any supplier of materials and/or equipment to Contractor for the Project.

3. Schedule.

CSP Documents Posted on Website:	January 24, 2020
Legal Advertisements:	January 24, 2020 January 31, 2020
Pre-Proposal Conference (Mandatory):	February 5, 2020, 10:00 am (CST)
Deadline for Questions and Inquiries:	February 7, 2020, 12:00 pm (CST)
Proposal Submission Deadline:	February 21, 2020, 11:00 am (CST)
Anticipated Construction Start:	April 2020

4. Competitive Sealed Proposal Documents/Copies.

4.1. This Request for Competitive Sealed Proposals (CSP) consists of the following documents:

4.1.1. Invitation to Submit Proposals (00 11 13);
4.1.2. Instructions to Offerors (00 21 13.02);
4.1.3. Proposal Form (00 41 00.02), Contractor shall also complete and submit the provided Microsoft Excel spreadsheet of the Proposal Form;
4.1.4. Statement of Qualifications (00 21 13.03);
4.1.5. All Contract Documents referenced in this CSP;
4.1.6. Addenda to this CSP issued by the SJRA Purchasing Department;
4.1.7. Any attached forms; and
4.1.8. Proposal Security (Offeror's Bond)

4.2. A complete set of CSP Documents may be accessed may be viewed and accessed via a link from the SJRA Website (http://www.sjra.net/purchasing/bidopportunities/) Purchasing Tab (Bid Opportunities).

4.3. Complete sets of CSP Documents must be used in preparing Proposals; neither Owner nor Principal Architect/Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of CSP Documents.

4.4. Owner and Principal Architect/Engineer, in making copies of CSP Documents available on the above terms, do so only for the purpose of obtaining Proposals for the Work and do not confer a license or grant for any other use.

5. Competitive Sealed Proposal Process\Contract Documents.

5.1. All questions about the Competitive Sealed Proposal Process or the meaning or intent of the Contract Documents are to be directed to the SJRA Purchasing Department.

Contact:

Grady Garrow, CPPB, CTCM, CTCD
Senior Buyer
San Jacinto River Authority
Purchasing Department
1577 Dam Site Road
Conroe, TX 77304

5.2. All questions shall be submitted to the buyer referenced above via email.

5.3. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by Addenda and posted via link a link from the SJRA Website (http://www.sjra.net/purchasing/bidopportunities/) Purchasing Tab (Bid Opportunities).

6. Pre-Submittal Conference.

6.1. A single mandatory Pre-Submittal Conference will be conducted at the offices of the San Jacinto River Authority, the Woodlands Division, 2436 Sawdust Road, The Woodlands, Texas 77380, (281-367-9511) at 10:00 A.M, February 5, 2020. Representatives of Owner and Principal Architect/Engineer will be present to discuss the project. Proposals will not be accepted from offering firms who fail to attend the pre-submittal conference.

6.2. All questions about the meaning or intent of the Competitive Sealed Proposal and Contract Documents are to be directed to the SJRA Purchasing Department. The SJRA Purchasing Department will address all questions as Owner considers necessary in response to inquiries arising at the conference through written Addenda and posted via link a link from the SJRA Website (http://www.sjra.net/purchasing/bidopportunities/) Purchasing Tab (Bid Opportunities). Oral statements may not be relied upon and will not be binding or legally effective.

7. Estimated Budget.

7.1. An Engineer's Opinion of Probable Construction Cost (project cost estimate) has been generated by the Principal Architect/Engineer. If an award is made, the actual contract amount may vary.

7.2. The Engineer's Opinion of Probable Construction Cost for this project is $400,000.00.

8. Basis for Ranking of Proposals.

8.1 The Owner will consider the qualifications (Statement of Qualifications) of the Offerors and their respective proposed Contract Price (Proposal Form) when evaluating Proposals to determine which Offeror, in the sole opinion of the Owner,

will provide the best value to the Owner. All procurements shall conform to Chapter 2269 of the State of Texas Government Code. The Proposals will be evaluated using the following criteria and weighting:

8.1.1. Proposed Project Cost: The Offeror's Proposed Cost of Performing the Work shall be indicated as the "Total Proposal Price" (indicated as "E" on in the Proposal Form (Specification Section 00 41 00.02). The Owner has established an internal budget for this Project. The total Proposal Price is defined per the Proposal Form to include the cost(s) of the proposed Total Base Items ("A"). The Total Proposal Price may and at the Owner's sole discretion, be inclusive of the individual or collective costs associated with the Offeror's Total Extra unit Price Items ("B"), Total Cash Allowances ("C") and Total Alternate Items ("D") costs. For example: Total Proposal Price ("E") = A + B + C + D.

The Owner will evaluate the Total Proposal Price (including an requested costs for Extra Unit Price Items, Cash Allowances and Alternate Items, as identified) that the Owner can award with its available budget at the time Contract is negotiated. Attach the Proposal Form and all information/documents required to be submitted with the Proposal. Contractor shall also complete and submit the provided Microsoft Excel spreadsheet of the Proposal Form.

8.1.2. Experience/Past Performance of Offeror with Similar Projects: Provide general information about the Organization as required in Table 1 and Table 2 of Specification Section 00 21 13.03 Statement of Qualifications (SOQ). Provide any additional information as required by the Construction Experience section of Table 2. Describe the Organizational structure and the qualifications of the management team as it relates to this Project in Table 3. Provide a narrative format as described in Table 4, describe Offeror's experience as a general contractor and describe the Organization's operating philosophy and approach to constructing, completing, and commissioning projects. Describe the Organization's approach to managing Subcontractors and Suppliers (Table 11), quality management and construction contract administration. Limit the narrative portion responding to this criterion to no more than 10 pages in length. Provide a list of projects completed by the Organization in the last five (5) years using copies of Table 5.

Experience should include, as a minimum, the satisfactory completion of at least ten (10) storage buildings of minimum 1,500 square feet in size with a Category 3 hurricane wind rating. A higher point score will be given to Offerors whose proposed key personnel have obtained the given minimum experience within the last five (5) years. Contractor must also submit information showing qualifications for proposed manufacturer and erector meet requirements of 13 34 14 (Section 1.3.B).

Offeror must demonstrate experience in the construction of projects of similar construction cost and/or techniques and describe how they intend to provide the needed experience and expertise. Submit descriptions of projects on which proposed key personnel have experience by submitting completed copies of the attached Table 12, with at least one project for each of the key individuals. If Offeror does not have specific experience with projects of this type and magnitude, the Offeror may describe its proposed approach and how its experience with other projects enhances its capability to successfully complete this Project. Offeror may submit photographs, project descriptive narratives, letters of recommendation, project awards, and references to demonstrate experience in constructing a project which meets the Owner's expectations for a quality Project constructed on time and within budget (Tables 13 and 14). This narrative is not to exceed one (1) page in length.

Provide information to demonstrate the ability of the Organization to complete projects within budget and on time. Offerors are to provide a tabulation of all projects completed by the Organization within the last five (5) years on Tables 13 and 14 to demonstrate performance in these areas. Comments may be added to the tabulations to indicate any reasons for amending the contract amounts or completion dates. Provide narrative information to indicate the number of projects and dollar volume currently under contract by the Organization and the projected completion date of each active project. Describe how the resources dedicated to these assignments will impact Offeror's ability to effectively execute the construction of this Project. Provide an estimate of the amount of the Project that will be done using in-house resources and the amount to be performed by Subcontractors and Suppliers. This narrative is not to exceed five (5) pages in length.

8.1.3. Experience and Qualifications of Proposed Key Personnel with Similar Projects: Provide information on the managerial structure and the key personnel that will be actively working on this Project in Tables 6 through 10 and Table 12. Key personnel include the Project Manager, Project Superintendent, Safety Manager, and Quality Control Manager. If more than one of these key roles are to be filled by one individual, provide this with the list of proposed individuals. The Offeror is to provide a list of individuals from which the individual for any given position may be selected if the Offeror is not able to commit to one individual for the Project at the time the Proposal is submitted. Qualifications of these individuals will be considered in evaluating the qualifications of the Offeror. The Proposal must offer to commit the services of the proposed key personnel for the life of the Project as a condition of qualification. Failure to offer to commit the proposed key Personnel may result in the disqualification of the Offeror and may void the award of the Contract.

Provide the resumes (not to exceed one page for each) of proposed key personnel with the SOQ describing their education and experience in Table 6. Include more detailed information on projects on which they have had significant involvement in the last five (5) years, or that demonstrate their experience with similar projects. This list is to include the name and a current telephone number of references for each of these project assignments. Offerors are to include a list of the current project assignments for each of the individuals proposed, the anticipated completion date for this assignment and the percentage of the time they will have available to devote to this Project. The Project Superintendent must be dedicated to this Project full time for the duration of the Project.

8.1.4. Approach: The Offeror shall include a brief write-up, not to exceed three (3) pages that summarizes the Offeror's proposed schedule for site preparation, procurement of structure/components, and erection of the structure.

8.1.5. Financial Management (Stability): Provide the past two (2) years of available financial statements, preferably audited, with this Proposal. Provide financial statements showing the name and address of the firm preparing the financial statements and the date of preparation. Offerors may choose to report on the financial stability of their Organization to demonstrate that they have the ability to complete the Project in a manner that will not impose undue efforts on the part of the Owner to invoke rights under bonds to complete the Project or for Offeror to meet financial obligations. Describe the Offeror's systems and philosophy for financial management of the Project. Describe Offeror's systems and philosophy for contracting with Subcontractors and Suppliers and managing payments and retainage. Provide other information if desired to demonstrate solid financial management practices that will enhance completion of the Project. This narrative is not to exceed two (2) pages in length.

This is a Pass or Fail. Any Offeror receiving a score of "Fail", will be automatically disqualified.

8.1.6. Other Factors: The Owner will consider other factors in evaluating Proposals, including the following (narratives for this Section shall not exceed five (5) pages total in length):

8.1.6.1. Safety: Demonstrated success in the implementation of a project site safety program. This may be demonstrated by documentation of the Offeror's safety program, and statement regarding their commitment to safety. Indicators such as the EMR (Experience Modification Ratio) may be used to demonstrate the effectiveness of the safety program.

8.1.6.2. Claims Experience and Litigation History: List all claims or litigation

involving construction project owners that have been filed within the last five (5) years, whether or not still outstanding. Provide a brief description of the nature of each suit and, if not already resolved, when it is anticipated that the suit will be resolved.

8.2. Table of criteria and weighting for the ranking of Offeror's Proposals.

Rating Category	Description	Weighting Points
8.1.1	Proposed Project Cost (E= A+B+C)	50
8.1.2	Experience/Past Performance of Offeror with Similar Projects	10
8.1.3	Experience and Qualifications of Proposed Key Personnel with Similar Projects	15
8.1.4	Project Approach	20
8.1.5	Financial Management (Stability)	Pass/Fail
8.1.6	Other Factors	5
	Total	**100**

9. Proposal Form.

9.1. A Proposal Form (00 41 00.02) is included with the CSP Documents; additional copies may be obtained at (http://www.sjra.net/purchasing/bidopportunities/)(Purchasing Tab).

9.2. All blanks on the Proposal Form must be completed in ink, by hand, or electronically printed.

9.3. Contractor shall also complete and submit the provided Microsoft Excel spreadsheet of the Proposal Form. Template may be obtained via the SJRA website (http://www.sjra.net/purchasing/bidopportunities/) (Purchasing Tab).

9.4. The Proposal price shall include such amount as the Offeror deems proper for overhead and profit.

10. Offering Firm's Statement of Qualifications (SOQ).

10.1. SOQs shall not exceed fifteen (15) pages, including transmittal letters and narratives, and excluding completed SOQ tables and attachments, covers and plain section dividers. SOQs shall be printed on single side 8 ½" by 11" pages with not less than 1 inch margins, not less than 1.25 line spacing and not less than 11 point font.

10.2. The SOQ must be submitted with the Proposal and include, as a minimum, the information as described in Article 8, Basis for Ranking of Proposals. Failure to

submit the required information in the SOQ may result in the Owner considering the Proposal non-responsive and result in rejection of the Proposal by Owner. Offerors may be required to provide supplemental information if requested by the Owner to clarify, enhance or supplement the information provided in the SOQ.

10.3. Offerors must provide requested SOQ information using the tables provided in specification section 00 21 13.03 - Statement of Qualifications. A copy of these tables will be made available in Microsoft Word to assist with the preparation of the SOQ. Information in these tables must be provided completely and in detail. The information in these tables will be used to make direct comparisons with the information provided by other Offerors. Failure to include the information completely and clearly may result in lower scores in the evaluations. Information that cannot be totally incorporated in the table may be included in an appendix to the table. Appendices must be clearly referenced by appendix number in the table, and the appended material must include the appendix number on every sheet of the appendix. Each appendix must include only the information that responds to the question or item number to which the appended information applies. The required tables are listed below:

Table 1	General Information
Table 2	Organizational Experience
Table 3	Organizational Structure
Table 4	Project Experience and Resources
Table 5	Current Projects and Projects Completed within the last 5 Years
Table 6	Proposed Key Personnel
Table 7	Proposed Project Managers
Table 8	Proposed Project Superintendent
Table 9	Proposed Project Safety Manager
Table 10	Proposed Quality Control Manager
Table 11	Subcontractors and Suppliers
Table 12	Project information for Key Personnel
Table 13	Demonstration of Budget Performance
Table 14	Demonstration of On-time Performance

10.4. Offerors may provide supplemental information to the SOQs using AIA, AGC or other industry standard SOQ tables and / or Offerors may submit additional information such as organizational brochures or other marketing information to help demonstrate their ability to provide best value to the Owner. This

information may not be submitted as a substitute to the information specifically requested in this Section, or in the SOQ tables. If this information is to be included as an appendix to the information requested in Article 10.3. (above), the appendix must specify the paragraph or section to which the appendix applies and the paragraph or section must accurately reference the appendix.

11. Ranking of Offeror's Proposals.

11.1. The Owner will consider the qualifications (Statement of Qualifications) of the Offerors and Offeror's proposed Subcontractors, Suppliers and consultants, in addition to the proposed cost(s) (Proposal Form) when evaluating Proposals to determine which Proposal offers the best value to the Owner. Owner will rank each of the Offeror's Proposals based on the criteria and criteria weighting described in Article 8, Basis for Ranking of Proposals.

11.2. Evaluation and ranking of the Proposals will be completed no later than the 45th Calendar day after the date of Proposal opening. Offerors are requested not to withdraw their Proposals within ninety (90) Calendar days from the date on which Proposals are opened. Proposal Security of the highest ranking firms will be held by the Owner until contract negotiations are finalized.

11.3. In evaluating Proposals, Owner will consider the selection criteria set forth in Article 8 of these Instructions to Offerors and whether or not the Proposals comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested by Owner.

11.4. Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided in the General Conditions. Owner may also consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to recommendation of award to Owner's Board of Directors or its General Manager, as applicable.

11.5. Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Proposal and to establish the responsibility, qualifications and financial ability of Offerors, proposed Subcontractors, Suppliers and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

11.6. The Owner, at its discretion, may also choose to conduct interviews with the top ranking Offerors to provide Offerors a better opportunity to demonstrate they

can provide the best value to the Owner for this Project. Should the Owner choose to conduct interviews with the top ranking Offerors, they will be notified of:

11.6.1. The time and place for the interview.
11.6.2. Interview format and agenda.
11.6.3. Questions to prepare for the interview.
11.6.4. Individuals that are expected to participate in the interview.

Failure to participate in the interview may result in disqualification from consideration for the Project.

12. Award of Contract.

12.1. It is the intent of the San Jacinto River Authority to award this contract to the Offering Firm whose Proposal for completion of the Work provides the best value for the Owner after consideration of the relative importance of costs and other evaluation factors described in the Basis for Ranking Proposals set forth in Article 8 of these Instructions to Offerors.

12.2. The Owner reserves the right to adopt the most advantageous interpretation of the Proposals submitted in the case of ambiguity or lack of clearness in stating Proposal Prices, to reject any or all Proposals, and/or to waive informalities.

12.3. Owner reserves the right to reject any or all Proposals, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Proposals and to reject the Proposal of any Offeror if Owner determines that an award to that Offeror would not provide the best value for the Owner, whether because the Proposal is not responsive or the Offeror is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner.

12.4. Owner also reserves the right to waive all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Apparent Best Value Offeror. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

12.5. The qualifications of a firm shall not deprive the Owner of the right to accept a Proposal, which in its judgment offers the best value to the Owner. In addition, the Owner reserves the right to reject any Proposal where circumstances and developments have, in the opinion of the Owner, changed the qualifications or responsibility of the firm.

12.6. Material misstatements in the information submitted for evaluation may be ground for rejection of Offeror's Proposal. Any such misstatement, if discovered after award of the contract to such firm, may be grounds for immediate termination of the contract. Additionally, the Offeror will be liable to the Owner for any costs or damages to the Owner resulting from such misstatements, including costs and attorneys' fees for collecting such costs and damages.

12.7. If the Contract is to be awarded, it will be awarded to the Apparent Best Value Offeror following successful Contract Negotiations and following any required approval by the SJRA Board of Directors or the SJRA General Manager, as applicable.

12.8. If Contract Negotiations with the Apparent Best Value Offeror are unsuccessful, The Owner will formally close Contract Negotiations with this Firm and attempt to open Contract Negotiations with the next highest-ranked firm according to the selection criteria set forth in Article 8 of these Instructions to Offerors.

12.9. If the Contract is to be awarded, Owner will notify Successful Offeror of intent to submit contract for approval by SJRA's Board of Directors within ninety (90) Calendar days after the day of the Proposal opening. Following approval by the SJRA Board of Directors or the SJRA General Manager, as applicable, the General Manager of the SJRA may execute the contract.

12.10. The Offeror may submit exceptions or alternatives not in accordance with the terms and conditions of the Contract Documents, or for Work that is not in strict compliance with the Contract Documents. In such event, Offeror must describe the intent and substance of the changes in the Proposal in adequate detail so they are clearly identifiable and understandable. Alternates will not be considered in the ranking and evaluation of the Proposals. Upon selection of the Proposal that offers the best value to the Owner, the Owner and Principal Architect/Engineer may consider proposed alternates in negotiating a final Contract scope, time/schedule and price.

12.11. Addenda may be issued to clarify, correct, or change the Contract Documents, prior Addenda or the related supplemental data as deemed advisable by Owner or Principal Architect/Engineer.

13. Interpretation and Addenda.

13.1. All questions about the meaning or intent of the Competitive Sealed Proposal and Contract Documents are to be directed to the SJRA Purchasing Department in writing. Interpretations or clarifications considered necessary by Owner's Representative in response to such questions will be issued by written Addenda and

posted via a link from the SJRA website (http://www.sjra.net/purchasing/bidopportunities/) Purchasing Tab (Bid Opportunities).

Contact:

Grady Garrow, CPPB, CTCM, CTCD
Senior Buyer
San Jacinto River Authority
Purchasing Department
1577 Dam Site Road
Conroe, TX 77304
ggarrow@sjra.net

13.2. To properly qualify their Proposal, each Offeror shall, prior to submitting their Proposal, check the receipt of all Addenda and acknowledge such receipt on the Proposal Form and on the acknowledgement line of the Addendum Cover page. Proposals submitted without such acknowledgment of all issued Addenda and letters of clarification may cause Proposal to be considered non-responsive. Such Addenda and letters of clarification shall become a part of the executed contract and modify the contract documents accordingly.

13.3. Questions received after the deadline for Questions and Inquiries may not be answered.

13.4. Only questions answered by formal written Addenda issued by Owner will be binding. Oral and other interpretations or clarifications will be without legal effect.

13.5. Addenda may be issued to clarify, correct, or change the Contract Documents, Addenda or the related supplemental data as deemed advisable by Owner or Principal Architect/Engineer. Addenda may also be issued to modify the CSP Documents as deemed advisable by Owner or Principal Architect/Engineer.

13.6. Notification of Addenda will be by default via the SJRA Purchasing Department.

13.7. The Owner will not be responsible or liable for any failure. Offerors are encouraged to visit the SJRA webpage where the CSP Documents are issued until the legal limit for filing addenda (48 hours prior to Proposal due date and time) has passed to ensure receipt of all addenda.

14. Confidentiality of Proposal Information.

All materials submitted to the SJRA and upon receipt by the SJRA become public property and are subject to the Texas Public Information Act, Government Code Chapter 552. If an Offeror does not desire proprietary Information in the SOQ to be

disclosed, each page must be identified and marked proprietary at the time of submittal. The SJRA will, to the extent provided by law, endeavor to protect such information from disclosure. The final decision as to what information must be disclosed, however, lies with the Texas Attorney General. Failure to identify proprietary information will result in all unmarked sections being deemed non-proprietary and available to the public upon request. Proposers shall not be permitted to mark entire Proposal as proprietary.

15. Examination of Contract Documents and Site.

15.1. It is the responsibility of each Offeror before submitting a Proposal:

15.1.1. To examine thoroughly the Contract Documents and other related data identified in the CSP Documents (including "technical data" referred to below);

15.1.2. To visit the site to become familiar with and satisfy Offeror as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work;

15.1.3. To consider federal, state and local Laws and Regulations that may affect cost, progress, performance or furnishing of the Work;

15.1.4. To study and carefully correlate Offeror's knowledge and observations with the Contract Documents and such other related data; and

15.1.5. To promptly notify The SJRA Purchasing Department of all conflicts, errors, ambiguities or discrepancies which Offeror has discovered in or between the Contract Documents and such other related documents.

15.2. Reference is made to the General Conditions Article 4 and Contract Specification Section 00 31 19 – Existing Condition Information for identification of:

15.2.1. Reports of explorations and tests of subsurface conditions at or contiguous to the site which have been utilized by Principal Architect/Engineer in preparation of the Contract Documents. While such reports are intended to be an accurate record of the conditions at the specific boring locations on the date taken, it is not a guarantee of specific Site conditions which may vary between boring locations and over time, and Offerors may not rely upon the general accuracy of the "technical data" contained in such reports and upon other data, interpretations, opinions or information contained in such reports or otherwise relating to the subsurface conditions at the site, nor upon the completeness thereof for the purposes of preparing a Proposal for construction.

15.2.2. Copies of such reports will be made available by Owner to any Offeror on request. Such reports are not part of the Contract Documents. Offeror is responsible for any interpretation or conclusion drawn from any "technical data" or any such data, interpretations, opinions or

information. Offeror acknowledges that Owner and Principal Architect/Engineer disclaim any responsibility for the accuracy, correctness, completeness, suitability, and sufficiency of such reports and for Offeror's interpretation of such reports.

15.3. Information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site are based upon information and data furnished to Owner and Principal Architect/Engineer by owners of such Underground Facilities or others, and Owner and Principal Architect/Engineer do not assume and expressly disclaim responsibility for the accuracy or completeness thereof or for Offeror's interpretation of such information and data. The Contractor is advised to coordinate closely with Owner, Principal Architect/Engineer and Utility Operator(s) prior to the commencement of any underground construction activities.

15.4. Provisions concerning responsibilities for the adequacy of data furnished to prospective Offerors with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Contract Documents due to differing or unanticipated conditions appear in Article 6 of the Standard Form of Agreement and Article 4.2 of the General Conditions.

15.5. Before submitting a Proposal, each Offeror will be responsible for obtaining such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and underground facilities) at or contiguous to the site or otherwise, which may affect cost, progress, performance or furnishing of the Work, or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Offeror and safety precautions and programs incident thereto or which Offeror deems necessary to determine its Proposal for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

15.6. On request, the SJRA Purchasing Department may provide each Offeror access to the site to conduct such examinations, investigations, explorations, tests and studies, as each Offeror deems necessary for submission of a Proposal. Offeror must fill any resultant holes and clean up and restore the site to its former condition upon completion of such explorations, investigations, tests and studies.

15.7. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor. Easements for permanent structures of permanent changes in existing facilities

are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

15.8. Reference is made to Specification Section 01 11 13 - Work Covered By Contract Documents for the identification of the general nature of Work that is to be performed at the site by the Owner or others (such as utilities and other prime Contractors) that relates to the Work for which a Proposal is to be submitted. On request, Owner may provide to each Offeror for examination access to or copies of Contract Documents (other than portions thereof related to price) for such Work.

15.9. The submission of a Proposal will constitute an incontrovertible representation by Offeror that Offeror has complied with every requirement of this Article 15, that without exception the Proposal is premised upon performing and furnishing the Work required by the Contract Documents and applying the specific means, methods, techniques, sequences or procedures of construction (if any) that may be shown or indicated or expressly required by the Contract Documents, that Offeror has given Owner or Principal Architect/Engineer written notice of all conflicts, errors, ambiguities and discrepancies that Offeror has discovered in the Contract Documents and the written resolutions thereof by Principal Architect/Engineer are acceptable to Offeror, and that the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

15.10. The provisions of 15.1 through 15.9, inclusive, do not apply to Asbestos, Polychlorinated biphenyls (PCBs), Petroleum, Hazardous Waste or Radioactive Material covered by Article 4.4 Hazardous Conditions of the General Conditions.

16. Proposal Security.

16.1. Each Proposal must be accompanied by Proposal Security made payable to the Owner in the amount not less than five percent (5%) of the total Proposal Amount, including any Cash Allowances and Alternates, and shall be in the form of a cashier's check or Offeror’s Bond.

16.2. Offeror’s Bond must be on the form provided within the Contract Documents (CSP) and must bear the impressed seal of the Surety, and be signed by the Offeror and an authorized individual of the Surety. Bonds will only be accepted from Sureties authorized to issue bonds in accordance with state law.

16.3. The Proposal Security of Successful Offeror will be retained until such Offeror has executed the Standard Form of Agreement, furnished the required contract securities and met the other conditions contained in Specification Section 00 41 00.02 – Proposal Form, whereupon the Proposal Security will be returned. If the Offeror fails to execute and deliver the Standard Form of Agreement and furnish the required contract security within ten (10) Calendar days after the SJRA

Board of Directors has approved a contract award, Owner may annul its award and the Proposal Security of that Offeror will be forfeited. The Proposal Security of other Offerors whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the Effective Date of the Standard Form of Agreement or the ninety-first day after the Proposal opening, whereupon Proposal Security furnished by such Offerors will be returned. Proposal Security, if submitted in the form of cashier's check, submitted with Proposals which are not competitive will be returned within ten (10) Calendar days after the Proposal opening.

17. Contract Times.

The number of Calendar days within which, or the dates by which, the Work is to reach Substantial and Final Completion are set forth in Specification Section 00 52 00 – Standard Form of Standard Form of Agreement between Owner and Contractor.

18. Substitutes and "Or-Equal" Items.

The Contract, if awarded, will be on the basis of goods and services described in the Drawings or specified in the Specifications with consideration for possible substitute or "or equivalent" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal"/"or equivalent" item of material or equipment may be furnished or used by Contractor if acceptable to Principal Architect/Engineer and Owner, application for such acceptance may be made prior to Contract award in accordance with Texas Government Code 2269.155. See section 6.02.5 in the General Conditions of the Contract for more information.

19. Subcontractors, Suppliers and Others.

19.1. If the Owner requests the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of material and equipment) to be submitted to Owner, Apparent Best Value Offeror, and any other Offerors so requested, shall within five (5) Calendar days from request submit to Owner a list of all such Subcontractors, Suppliers or other persons or organizations proposed for those portions of the Work for which such identification is requested. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person or organization if requested by Owner. If the Owner or Principal Architect/Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, Owner may, before giving notice of its intent to recommend award to Owner's Board of Directors, request that Apparent Best Value Offeror submit an acceptable substitute without an increase in price.

If Apparent Best Value Offeror declines to make any such substitution, Owner may formally close contract negotiations with Offeror and enter into contract negotiations with the next most highly-ranked Offeror that proposes to use acceptable Subcontractors, Suppliers and other persons and organizations. The declining to make requested substitutions will not constitute grounds for sacrificing the Proposal Security of any Offeror. Any Subcontractor, Supplier, other person or organization listed and to whom Owner or Principal Architect/Engineer does not make written objection prior to giving notice of its intent to recommend Award to Owner's Board of Directors will be deemed acceptable to Owner and Principal Architect/Engineer, subject to revocation of such acceptance after the Effective Date of the Standard Form of Agreement as provided in Article 6.04 of the General Conditions.

19.2. No Contractor shall be required to employ any Subcontractor, Supplier, other person or organization against whom Contractor has reasonable objection.

20. Preparation of Proposals.

20.1. Prepare one (1) unbound original of the complete Proposal Package, including the completed Proposal Form 00 41 00.02. Clearly mark this package with the word "Original". Prepare one (1) bound copy with original signatures, and one (1) electronic copy on a flash drive (in .pdf format) with a completed Proposal with original signatures, Statement of Qualifications 00 21 13.03, and a full set of Financials.

20.2. An Original Proposal is the Proposal containing the Original Signature of a person authorized to sign on behalf of the Offering Firm.

20.3. Proposals shall be enclosed in an opaque sealed Envelope (or Package), marked with CSP No. 20-0020 – Emergency Repair Service Center and name and address of Offering Firm.

20.4. Each Original Proposal submitted by an Offeror shall contain the following:

20.4.1. Offerors Statement of Qualifications (SOQ; 00 21 13.03);
20.4.2. Completed Proposal Form (00 41 00.02);
20.4.3. Completed Certification of Proposal (00 41 00.02), Contractor shall also complete and submit the provided Microsoft Excel spreadsheet of the Proposal Form;
20.4.4. Form of Business (00 45 20);
20.4.5. Proposal Security (Offeror's Bond 00 43 13);
20.4.6. Resolution of Contractor (00 45 43);
20.4.7. Conflict of interest Forms (Form CIQ; 00 45 10) shall be submitted under a separate cover and not included in the sealed Proposal;
20.4.8. One (1) flash drive with a Completed Proposal with Original signatures, Statement of Qualifications (SOQ) and a full set of Financials; and

20.4.9. Any other Documentation required by the terms of this Competitive Sealed Proposal.

20.5. Conflict of Interest Questionnaire, Specification Section 00 45 10 of Contract shall be submitted under separate cover. If Offering Firm affirms that there are no Conflicts of Interest, Offeror shall indicate so by writing name of firm and “No Conflicts” on CIQ form and signing form.

20.6. Proposals submitted by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

20.7. Submitted Proposals by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

20.8. All names must be typed or printed in ink below the signature.

20.9. The Proposal shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Proposal Form).

20.10. The address and telephone number for communications regarding the Proposal must be shown.

20.11. Evidence of authority to conduct business as an out-of-state corporation in the state where the Work is to be performed shall be provided in accordance with Specification Section 00 41 00.02 – Proposal Form. State Contractor license number, if any, must also be shown.

21. Submission of Proposals.

21.1. Proposals shall be submitted at the time and place indicated in the Invitation to Submit Proposals (00 11 13) and accompanied by the Proposal Security and other required documents.

21.2. If the Proposal is sent through the mail or other delivery system the sealed envelope shall be enclosed in a separate envelope with the notation "SEALED PROPOSAL ENCLOSED" on the face of it. Proposals not received by the time or at the location specified will be returned unopened to the Offeror.

21.3. The clock used by the Owner at the place used for receiving Proposals shall conclusively determine the time that Proposals are received.

21.4. Proposals sent by facsimile or electronic mail or delivered to any other location other than the address provided in the Invitation to Offerors will NOT be accepted.

22. Modification and Withdrawal of Proposals.

22.1. Proposals may be modified or withdrawn by a document duly executed (in the same manner that a Proposal must be executed) and delivered to the place where Proposals are to be submitted prior to the date and time for the opening of Proposals.

22.2. If, within twenty-four (24) hours after Proposals are opened, any Offeror files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material or substantial mistake in the preparation of its Proposal, that Offeror may withdraw its Proposal. The Proposal Security may be retained by the Owner if Offeror cannot clearly demonstrate to the Owner evidence of a material or substantial mistake in its Proposal. Thereafter, that Offeror may be disqualified from responding to a reissued CSP for the Work to be furnished under these Contract Documents.

23. Opening of Proposals.

Proposals will be opened and (unless obviously non-responsive) the names and Monetary Proposals of Offering Firms read aloud at a public opening. An abstract of the Proposals will be made available no later than the seventh day after the Contract is awarded.

24. Proposals to Remain Subject to Acceptance.

All Proposals will remain subject to acceptance for ninety (90) Calendar days after the date of the opening, but Owner may, in its sole discretion, release any Proposal and return the Proposal Security prior to that date.

25. Prevailing Wage Rates.

Contractors for this Project must pay no less than the prevailing wage rates for the area established by the San Jacinto River Authority and included in Specification Section – 00 73 43 – Wage Scale for Construction.

26. Liquidated Damages or Economic Disincentives.

Provisions for liquidated damages or economic disincentives are set forth in Specification Section 00 52 00 -Standard Form of Standard Form of Agreement between Owner and Contractor and Specification Section 00 72 00 – General Conditions of the Contract.

27. Contract Security and Insurance.

Article 5 of the General Conditions sets forth Owner's requirements as to insurance and Performance and Payment Bonds. When the Successful Offeror delivers the original, hard copy executed Standard Form of Agreement to Owner, it must be accompanied by evidence of insurance and unsigned Performance and Payment Bonds as required by Article 5 of the General Conditions, unless prior written approval of Contractor's evidence of insurance and unsigned performance and payment Bond forms has been received from the SJRA Purchasing Department. Such evidence of insurance shall include, without limitation, all required certificates and endorsements, evidencing all required coverages, limits of liability, additional insured status, waivers of subrogation and other insurance requirements.

28. Conflict of Interest and Disclosure of Interested Parties.

28.1 Chapter 176 of the Texas Local Government Code mandates the public disclosure of certain information concerning persons doing business or seeking to do business with the San Jacinto River Authority, including affiliations and business and financial relationships such persons may have with San Jacinto River Authority officers. An explanation of the requirements of Chapter 176, applicable forms and a complete text of the law are available at: http://www.ethics.state.tx.us/forms/CIQ.pdf.

BY DOING BUSINESS OR SEEKING TO DO BUSINESS WITH THE SAN JACINTO RIVER AUTHORITY, YOU ACKNOWLEDGE THAT YOU HAVE BEEN NOTIFIED OF THE REQUIREMENTS OF CHAPTER 176 OF THE TEXAS LOCAL GOVERNMENT CODE AND THAT YOU ARE RESPONSIBLE FOR COMPLYING WITH THEM.

28.2 Texas Government Code Section 2252.908 requires persons who enter into a contract with a government entity to submit a disclosure of interested parties (Form 1295) to the government entity or state agency at the time business entity submits the signed contract to the government entity or state agency. Use the following link to access filing instructions: https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm.

29. Taxes.

Owner is exempt from payment of sales and use taxes of the State of Texas and of cities and counties thereof, on all goods and services to be incorporated into the Work. Said taxes shall not be included in the Proposal.

29.1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of goods to be incorporated into the Work.

29.2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to goods not incorporated into the Work, except to the extent the exemption referred to in paragraph 18.4 applies to the Project to exempt taxes on any such items.

29.3. If the Project is construction of a water or wastewater system certified by the Texas Commission on Environmental Quality as a regional system, equipment, services and supplies used solely to construct the Project are exempted from taxes imposed by Chapter 151, Limited Sales, Excise and Use Tax, Texas Tax Code. Said taxes shall not be included in the Proposal. Owner will furnish any required certificates of tax exemption to Contractor.

30. Verification Company Does Not Boycott Israel

Pursuant to Section 2270.002 of the Texas Government Code, the Contractor shall be required to execute contemporaneous with its execution of the Standard Form of Agreement a verification that Contractor does not Boycott Israel and Contractor will not Boycott Israel during the term of this Standard Form of Agreement. "Boycott Israel" as used herein means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes.

31. Signing of Standard Form of Agreement.

SJRA's Purchasing Department will transmit to the Successful Offeror the required number of unsigned counterparts of the Standard Form of Agreement with all other written Contract Documents attached. Contractor shall deliver original, hard copies of the required number of counterparts of the Standard Form of Agreement and written Contract Documents signed by Contractor, unsigned Bond forms, evidence of insurance as set out in Section 27 above, signed disclosure of interested parties (Form 1295), signed Conflict of interest Questionnaire, and signed and notarized Verification Company Does Not Boycott Israel, to SJRA Purchasing Department ten (10) Calendar days prior to the SJRA Board of Directors Meeting for which a contract award is anticipated. Notwithstanding the foregoing, the Standard Form of Agreement may be executed using electronic signatures at the option and in the discretion of Owner, and, in such event, the provisions of the Uniform Electronic Transaction Act, Chapter 332, Texas Business and Commerce Code, as amended, and any applicable policies and procedures of Owner regarding electronic signatures shall apply. However, the requirements of this Section 31 apply regardless of whether or not the Standard Form of Agreement is also executed using electronic signatures or transmitted electronically. Following and subject to award, the Owner shall deliver one (1) fully signed counterpart of the Standard Form of Agreement to Contractor. Within three (3) Calendar days of Contractor's receipt of the fully executed Standard Form of

Agreement, the Contractor shall deliver the original, hard copy fully executed Bonds to SJRA Purchasing Department.

END OF SECTION

TABLE 1 – GENERAL INFORMATION								
Organization Doing Business As:								
Business Address of Principle Office:								
Main Telephone Number:								
Fax Number:								
Web Site Address:								
Form of Business (check one):		Corporation		Partnership		Individual		Joint Venture
IF A CORPORATION								
Date of Incorporation:								
State of Incorporation:								
Chief Executive Manager's Name:								
President's Name:								
Vice President's Name(s):								
Secretary's Name:								
Treasurer's Name:								
IF A PARTNERSHIP								
Date of Organization:								
General or Limited Partnership?:								
IF AN INDIVIDUAL								
Name:								
Business Address:								
IF A JOINT VENTURE								
Name of Lead Joint Venture Manager:								
Name of Firm:								
Joint Venture Partner Manager(s):								
Name of Firm(s):								
Individuals Not Listed Above Having Significant Business Control:								

Indicators of Organization Size:			
Current Number Full Time Employees:		Estimate of Current Year's Revenue:	
Average Number of Projects per Year:		Average Project Construction Cost:	

TABLE 2 – ORGANIZATIONAL EXPERIENCE

Organization Doing Business As:	
Business Address of Principle Office:	
Main Telephone Number:	
Fax Number:	
Web Site Address:	
Organization Doing Business As:	

ORGANIZATIONAL HISTORY

List of names that this organization has operated under over the history of the organization, including the names of related companies presently doing business:

Names of Organization:	From Date	To Date

List of companies, firms or organizations that own any part of the organization.

Name of Companies, Firms or Organization:	Percent Ownership

CONSTRUCTION EXPERIENCE

1.	Years' experience in projects similar to the proposed project: As a General Contractor: _____ As a Joint Venture Partner: _____	
2.	Has this or a predecessor organization ever defaulted on a project or failed to complete any work awarded to it? If yes provide full details in a separate attachment. (Attachment #_____)	
3.	Has this or a predecessor organization been released from a bid or proposal in the past ten years? If yes provide full details in a separate attachment. (Attachment #_____)	
4.	Has this or a predecessor organization ever been disqualification as a bidder or Offeror by any local, state, or federal agency within the last five (5) years? If yes provide full details in a separate attachment. (Attachment #_____)	
5.	Is this organization or your proposed surety currently in any litigation or contemplating litigation? If yes provide full details in a separate attachment. (Attachment #_____)	
6.	Has this or a predecessor organization ever refused to construct or refused to provide materials defined in the contract documents? If yes provide full details in a separate attachment. (Attachment #_____)	
7.	Has your company, firm, corporation, or business implemented an Employee Health and Safety Program compliant with 29 CFR 1910 "General Industry Standards" https://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=STANDARDS&p_toc_level=1&p_keyvalue=1910 and/or 29 CFR 1926 "General Construction Standards" https://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=STANDARDS&p_toc_level=1&p_keyvalue=1926 as they apply to your Company's customary activities?	

8.	Has your company, firm, corporation, partnership, or institution represented by the company, firm, corporation, partnership, or anyone acting in representation, received citations for violations of OSHA within the past three (3) years? If YES, please provide the following additional information: Date of offense, location of establishment inspected, category of offense, final disposition of offense, if any, and penalty assessed.	
9.	Has your company, firm, corporation, partnership, or institution represented by the company, firm, corporation, partnership, or anyone acting in representation received citations for violations of environmental laws or regulations, of any kind or type, within the past five (5) years? Citations include notice of violation, notice of enforcement, suspension/revocations of state of federal licenses, or registrations, fines assessed, pending criminal complaints, indictments, or convictions, administrative orders, draft orders, final orders, and judicial final judgements. If YES, please provide the following additional information: Date of offense, location of where offense occurred, type of offense, final disposition of offense, if any, and penalty assessed.	
10.	Has your company, firm, corporation, partnership, or institution represented by the company, firm, corporation, partnership, or anyone acting in representation ever been convicted, within the past ten (10) years, of a criminal offense which resulted in a serious bodily injury or death? If YES, please provide the following additional information: Date of offense, location of where offense occurred, type of offense, final disposition of offense, if any, and penalty assessed.	
11..	Has your company filed or been named in any litigation involving your company and the Owner on a contract within the last five (5) years under your current company name or any other company name? If so, provide details of the issues and resolution if available. Include lawsuits where Owner was involved. (Notice: Failure to disclose this information during proposal submission, and later discovered, may result in contract termination at SJRA's option.)	
12.	Please provide a history of all OSHA actions, advisories, etc., Contractor has received on all jobs worked in any capacity, prime, or subcontractor. The history shall be for the two-year period preceding the Bid Date of the Project.	
13.	Please provide a list of all on-the-job injuries, accidents, and fatalities suffered by any present or former employees of Contractor during the same two-year period.	
14.	If less than the two-year period, give the date Contractor started doing business.	

THIS FORM MUST BE RETURNED WITH THE PROPOSAL RESPONSE

TABLE 3 – ORGANIZATIONAL STRUCTURE	
Organization Doing Business As:	

PROPOSED PROJECT ORGANIZATION

1. Provide a brief description of the managerial structure of the organization and illustrate with an organizational cart. Include the title and names of key personnel. Include this chart at an attachment to this description. (Attachment No. _____)

2. Provide a brief description of the experience and qualifications of the organization's management team, including officers that will be directly involved in the project. Describe the individuals that are authorized to execute Contract Documents, Change Orders or receive payment for the organization. Include a copy of a board resolution or other documentation as appropriate for the structure of the company authorizing these individuals to conduct business on behalf of the organization. (Attachment No. _____)

SURETY REFERENCES

TABLE 4 – PROJECT EXPERIENCE AND RESOURCES

Organization Doing Business As:	

PROJECTS

1. Provide a list of major projects that are currently underway, or have been completed within the last five (5) years on Table 5, using additional copies as required. Identify those projects which specifically illustrate the organizations capability to provide best value to the Owner for this project.

Provide a narrative description (not to exceed 10 pages) of your organizations approach to completing this project to provide best value for the Owner. Including a description of your approach in the following areas:

1. Contract administration
2. Management of subcontractor and suppliers
3. Time management
4. Cost control
5. Quality management
6. Project site safety
7. Managing changes to the project
8. Managing equipment

EQUIPMENT

2. Provide a list of major equipment proposed for use on this project. Attach additional information if necessary.

Equipment item	Primary use on project	Own	Will buy	Lease

DIVISION OF WORK BETWEEN ORGANIZATION AND SUBCONTRACTOR

3. What work will the organization complete using its own resources?

4. What work does the organization propose to subcontract on this project?

TABLE 5 – CURRENT PROJECTS AND PROJECTS COMPLETED WITHIN THE LAST 5 YEARS					
1	Project Owner:		Project Name:		
General Description of Project:					
Project Cost:			Date Project		
Key Project Personnel:	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name:					
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organizati	Telephone	E-mail
Owner:					
Designer:					
Construction Manager:					
2	Project Owner:		Project Name:		
General Description of Project:					
Project Cost:			Date Project		
Key Project Personnel:	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name:					
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organizati	Telephone	E-mail
Owner:					
Designer:					
Construction Manager:					
3	Project Owner:		Project Name:		
General Description of Project:					
Project Cost:			Date Project		
Key Project Personnel:	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name:					
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organizati	Telephone	E-mail
Owner:					
Designer:					
Construction Manager:					

TABLE 6 – PROPOSED KEY PERSONNEL

Organization Doing Business As:	

PROPOSED PROJECT ORGANIZATION

1. Provide a brief description of the managerial structure of the organization and illustrate with an organizational cart. Include the title and names of key personnel. Include this chart as an attachment to this description. See attachment No.

2. Provide a brief description of the managerial structure proposed for this project and illustrate with an organizational chart. Include the title and names of proposed key personnel and alternates. Include this chart at an attachment to this description. See attachment No.

EXPERIENCE OF KEY PERSONNEL

3. Provide information on the key personnel proposed for this project that will provide the following key functions. Provide information for candidates for each of these positions on the pages for each of these key personnel. Also provide biographical information for each primary and alternate candidate as an attachment. The biographical information must include the following as a minimum: technical experience, managerial experience, education and formal training, work history which describes project experience, including the roles and responsibilities for each assignment, and primary language. Additional information highlighting experience which makes them the best candidate for the assignment should also be included.

Role	Primary candidate	Alternate candidate
Project Manager		
Project Superintendent		
Project Safety Manager		
Quality Control Manager		

4. If key personnel are to fulfill more than one of the roles listed above, provide a written narrative describing how much time will be devoted to each function, their qualifications to fulfill each role and the percentage of their time that will be devoted to each role. If the individual is not to be devoted solely to this project, indicate how time it to be divided between this project and their other assignments.

TABLE 7 – PROPOSED PROJECT MANAGERS

Organization Doing Business As:	

PRIMARY CANDIDATE

1.	Name of Individual:	
	Years of Experience as Project Manager:	
	Years of Experience With This Organization:	
	Number of Similar Projects as Project Manager:	
	Number of Similar Projects in Other Positions:	

Current Project Assignments:

Name of Assignment:	Percent of Time Used for This Project:	Estimated Project Completion Date:

2. Reference contact information (listing names indicates approval to contacting the names individuals as a reference)

Name:		Name:	
Title/ Position:		Title/ Position:	
Organization:		Organization:	
Telephone:		Telephone:	
E-mail:		E-mail:	
Project:		Project:	
Candidate's Role on Project:		Candidate's Role on Project:	

ALTERNATE CANDIDATE

3.	Name of Individual:	
	Years of Experience as Project Manager:	
	Years of Experience With This Organization:	
	Number of Similar Projects as Project Manager:	
	Number of Similar Projects in Other Positions:	

Current Project Assignments:

Name of Assignment:	Percent of Time Used for This Project:	Estimated Project Completion Date:

4. Reference contact information (listing names indicates approval to contacting the names individuals as a reference)

Name:		Name:	
Title/ Position:		Title/ Position:	
Organization:		Organization:	
Telephone:		Telephone:	
E-mail:		E-mail:	
Project:		Project:	
Candidate's Role on Project:		Candidate's Role on Project:	

TABLE 8 – PROPOSED PROJECT SUPERINTENDENT			
Organization Doing Business As:			
PRIMARY CANDIDATE			
1.	Name of Individual:		
	Years of Experience as Project Superintendent:		
	Years of Experience With This Organization:		
	Number of Similar Projects as Project Superintendent:		
	Number of Similar Projects in Other Positions:		
	Current Project Assignments:		
	Name of Assignment:	Percent of Time Used for This Project:	Estimated Project Completion Date:

2. Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Name:		Name:	
Title/ Position:		Title/ Position:	
Organization:		Organization:	
Telephone:		Telephone:	
E-mail:		E-mail:	
Project:		Project:	
Candidate's Role on Project:		Candidate's Role on Project:	

ALTERNATE CANDIDATE			
3.	Name of Individual:		
	Years of Experience as Project Superintendent:		
	Years of Experience With This Organization:		
	Number of Similar Projects as Project Superintendent:		
	Number of Similar Projects in Other Positions:		
	Current Project Assignments:		
	Name of Assignment:	Percent of Time Used for This Project:	Estimated Project Completion Date:

4. Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Name:		Name:	
Title/ Position:		Title/ Position:	
Organization:		Organization:	
Telephone:		Telephone:	
E-mail:		E-mail:	
Project:		Project:	
Candidate's Role on Project:		Candidate Role on Project:	

TABLE 9 – PROPOSED PROJECT SAFETY MANAGER

Organization Doing Business As:	

PRIMARY CANDIDATE

1.	Name of Individual:	
	Years of Experience as Project Safety Manager:	
	Years of Experience With This Organization:	
	Number of Similar Projects as Project Safety Manager:	
	Number of Similar Projects in Other Positions:	

Current Project Assignments:

Name of Assignment:	Percent of Time Used for This Project:	Estimated Project Completion Date:

2. Reference contact information (listing names indicates approval to contacting the names individuals as a reference)

Name:		Name:	
Title/ Position:		Title/ Position:	
Organization:		Organization:	
Telephone:		Telephone:	
E-mail:		E-mail:	
Project:		Project:	
Candidate's Role on Project:		Candidate's Role on Project:	

ALTERNATE CANDIDATE

3.	Name of Individual:	
	Years of Experience as Project Safety Manager:	
	Years of Experience With This Organization:	
	Number of Similar Projects as Project Safety Manager:	
	Number of Similar Projects in Other Positions:	

Current Project Assignments:

Name of Assignment:	Percent of Time Used for This Project:	Estimated Project Completion Date:

4. Reference contact information (listing names indicates approval to contacting the names individuals as a reference)

Name:		Name:	
Title/ Position:		Title/ Position:	
Organization:		Organization:	
Telephone:		Telephone:	
E-mail:		E-mail:	
Project:		Project:	
Candidate's Role on Project:		Candidate's Role on Project:	

TABLE 10 – PROPOSED QUALITY CONTROL MANAGER			
Organization Doing Business As:			
PRIMARY CANDIDATE			
1.	Name of Individual:		
	Years of Experience as Quality Control Manager:		
	Years of Experience With This Organization:		
	Number of Similar Projects as Quality Control Manager:		
	Number of Similar Projects in Other Positions:		
	Current Project Assignments:		
	Name of Assignment:	Percent of Time Used for This Project:	Estimated Project Completion Date:

2. Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Name:		Name:	
Title/ Position:		Title/ Position:	
Organization:		Organization:	
Telephone:		Telephone:	
E-mail:		E-mail:	
Project:		Project:	
Candidate's Role on Project:		Candidate's Role on Project:	

ALTERNATE CANDIDATE			
3.	Name of Individual:		
	Years of Experience as Quality Control Manager:		
	Years of Experience With This Organization:		
	Number of Similar Projects as Quality Control Manager:		
	Number of Similar Projects in Other Positions:		
	Current Project Assignments:		
	Name of Assignment:	Percent of Time Used for This Project:	Estimated Project Completion Date:

4. Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Name:		Name:	
Title/ Position:		Title/ Position:	
Organization:		Organization:	
Telephone:		Telephone:	
E-mail:		E-mail:	
Project:		Project:	
Candidate's Role on Project:		Candidate's Role on Project:	

TABLE 11 – SUBCONTRACTORS AND SUPPLIERS

Organization Doing Business As:	

PROJECT SUBCONTRACTORS

1. Provide a list of subcontractors that will provide more than 10 percent of the work (based on contract amounts)

Name	Work to be provided	Est. percent of contract

2. Provide information on the proposed key personnel, project experience and a description of past relationship and work experience for each subcontractor listed above using the Project Information forms.

SUPPLIERS

3. Provide a list of major equipment or materials proposed for use on this project. Attach additional information if necessary.

Supplier name	Equipment / material provided	Furnish only	Furnish and install

TABLE 12 – PROJECT INFORMATION FOR KEY PERSONNEL

Project Owner:		Project Name:	

General Description of Project:

PROJECT BUDGET AND SCHEDULE PERFORMANCE

Budget history

	Amount	% of Bid Amount
Bid :		
Change Orders		
Owner Enhancements:		
Unforeseen Conditions:		
Design Issues:		
Total:		
Final Cost:		

Schedule performance

	Date	Days
Notice to Proceed:		
Contract Substantial Completion Date at Notice to Proceed:		
Contract Final Completion Date at Notice to Proceed:		
Change Order Authorized Substantial Completion Date:		
Change Order authorized Final Completion Date:		
Actual / Estimated Substantial Completion Date:		
Actual / Estimated Final completion Date:		

KEY PROJECT PERSONNEL

	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name:				
Percentage of Time Devoted to The project:				
Proposed for This Project:				
Did Individual Start and Complete The Project?:				
If Not, Who Started or Completed the Project in Their Place:				
Reason for Change:				

Reference Contract information (Listing names indicates approval to contact the named individuals as a reference)

	Name	Title/ Position	Organization	Telephone	E-mail
Owner:					
Designer:					
Construction Manager:					
Surety:					

ISSUES / DISPUTES RESOLVED OR PENDING RESOLUTION BY ARBITRATION, LITIGATION OR DISPUTE REVIEW BOARDS:

Number of Issues Resolved:		Total Amount Involved in Resolved Issues:		Number of Issues Pending:		Total Amount Involved in Resolved Issues:	

TABLE 13 – DEMONSTRATION OF BUDGET PERFORMANCE

Organization Doing Business As:

PROVIDE INFORMATION ON ALL PROJECTS COMPLETED BY THE ORGANIZATION WITHIN THE LAST FIVE (5) YEARS:

Owner Name	Project Description	Original Contract Price	Owner Enhancements	Unforeseen Conditions	Design Issues	Contractor Issues	Total Changes	Percent Changes

TABLE 14 – DEMONSTRATION OF ON-TIME PERFORMANCE							
Organization Doing Business As:							
PROVIDE INFORMATION ON ALL PROJECTS COMPLETED BY THE ORGANIZATION WITHIN THE LAST FIVE (5) YEARS:							
Owner Name	Project Description	Original Contract Date for Substantial Completion	Original Contract Date for Final Completion	Amended Contract Date for Substantial Completion	Amended Contract Date for Final Completion	Actual Contract Date for Substantial Completion	Actual Contract Date for Final Completion

Affidavits

One of the following four affidavits shall be executed and provided with this information. The individual signing the affidavit shall attach evidence of their authority to bind the Organization to an agreement.

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

AFFIDAVIT FOR CORPORATION

State _____ §

County of _____ §

_____ , being duly sworn deposes and says
(Name)

That he is _____ of the Corporation submitting the
(Title)
foregoing qualification form and related information; that he has read such documents; and that such documents are true and correct and contain no material misrepresentations; and that he is authorized to make this affidavit on behalf of the Corporation.

_____
Signature

Signed and sworn to me before this _____ day of _____, 20 __

_____
Notary Public

My commission expires: _____

AFFIDAVIT FOR PARTNERSHIP

State _____ §

County of _____ §

_____ , being duly sworn deposes and says
(Name)

That he is _____ of the Company submitting the
(Title)
foregoing qualification form and related information; that he has read such documents; and that such documents are true and correct and contain no material misrepresentations; and that he is authorized to make this affidavit on behalf of the Partnership.

_____
Signature

Signed and sworn to me before this _____ day of _____, 20__

_____
Notary Public

My commission expires: _____

AFFIDAVIT FOR INDIVIDUAL

State _____ §

County of _____ §

_____ , being duly sworn deposes and says
(Name)

That he is _____ of the company submitting the
(Title)
foregoing qualification form and related information; that he has read such documents; and that such documents are true and correct and contain no material misrepresentations.

_____
Signature

Signed and sworn to me before this _____ day of _____, 20__

_____
Notary Public

My commission expires: _____

AFFIDAVIT FOR JOINT VENTURE STATEMENT

We the undersigned do hereby give notice to our agreement to bid as a joint venture on the Project.

_____
Name of Joint Venture

_____
Name of firm

_____
Signature

Signed and sworn to me before this _____ day of _____, 20__

_____
Notary Public

My commission expires: _____

_____
Name of firm

_____
Signature

Signed and sworn to me before this _____ day of _____, 20__

_____
Notary Public

My commission expires: _____

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 31 19

EXISTING CONDITION INFORMATION

1.1 SUMMARY

A. Section Includes:

1. Subsurface Investigation Report
2. Underground Facilities Reports
3. Existing Structures
4. Offeror Responsibilities

B. Related Specification Sections include but are not necessarily limited to:

1. Document 00 31 32 – Geotechnical Information

1.2 MEASUREMENT AND PAYMENT (NOT USED)

1.3 SUBMITTALS (NOT USED)

1.4 SUBSURFACE INVESTIGATION REPORT (NOT USED)

1.5 UNDERGROUND FACILITIES REPORTS (NOT USED)

1.6 EXISTING STRUCTURES

A. Contract Documents indicate physical conditions in or relating to existing surface and subsurface structures which are at or contiguous to the site that were known to, and have been used by, the SJRA and Principal Architect/Engineer in preparation of Contract documents.

1.7 OFFEROR RESPONSIBILITIES

A. Offeror shall have full responsibility for reviewing and verifying information and data, for locating underground facilities and existing structures shown or indicated in the Contract Documents, and for coordination of the Work with the owners of such underground facilities and existing structures during construction.

END OF SECTION

SECTION 00 31 32

GEOTECHNICAL INFORMATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Site Investigation Reports
2. Geotechnical Reports
3. Offeror Responsibilities

1.2 MEASUREMENT AND PAYMENT (NOT USED)

1.3 SUBMITTALS (NOT USED)

1.4 SITE INVESTIGATION REPORTS (NOT USED)

1.5 GEOTECHNICAL REPORTS

A. The Report No. G151-19 on Emergency Repair Service Center at WWTF No. 1, prepared by Aviles Engineering Corp.

1.6 OFFEROR RESPONSIBILITIES

A. Offeror shall take full responsibility for interpretation and use of information contained in above listed reports for its bidding and construction purposes.

B. Offeror may perform additional soils investigations as Offeror deems appropriate.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 00 41 00.02

PROPOSAL FORM

To: **The San Jacinto River Authority**
1577 Dam Site Road
G & A Building, 3rd Floor Receptionist
Conroe, Texas 77304

Project: Emergency Repair Service Center
CSP No.: 20-0020
Project No.: SJRA Project No. WDPR0110.1001.2N001
Offeror: _____
(Print or type full name of proprietorship, partnership, corporation, or joint venture)

1.0 OFFER

A. Total Proposal Price: The undersigned Offeror proposes and agrees, if this Proposal is accepted, to enter into an Agreement with Owner in the form included in the Contract Documents to perform all Work as specified or indicated in Contract Documents for the Contract Amount indicated in this Proposal or as modified by a Change Order or Change Directive.

B. Proposal Security: Included with the Proposal is a Proposal Security in the amount of 5 percent of the Total Proposal Price subject to terms described in Specification Section 00 21 13.02 – Instructions to Offerors.

C. Period for Proposal Acceptance: Offeror accepts all of the terms and conditions of the Request for Proposals and Instructions to Offerors, including without limitation those dealing with the disposition of required Bonds. This offer shall remain open to acceptance and is irrevocable for 90 days after Proposal Date (opening). That period may be extended by mutual written agreement of the SJRA and Offeror.

D. Liquidated Damages: Offeror accepts the provisions of the Agreement as to liquidated damages in the event of its failure to complete Work in accordance with the schedule set forth in the Agreement.

E. Addenda: Offeror hereby acknowledges it has received, examined and carefully studied all Addenda and all Addenda have been considered and all related costs are included in the Total Proposal Price. Offeror hereby acknowledges receipt of the following Addenda:

Addendum No.	Addendum Date	Signature Acknowledging Receipt

F. Proposal Supplements: The following documents shall be provided with the proposal:

- Offeror's Statement of Qualifications (SOQ).
- Completed Certification of Proposal
- Completed Felony Conviction Notice Form
- Form of Business 00 45 20
- Proposal Security (Offeror's Bond 00 43 13)
- Resolution of Contractor 00 45 43
- One (1) flash drive with a Completed Proposal with Original signatures, Statement of Qualifications (SOQ) and a full set of Financials.
- Others as listed: _____

G. Conflict of Interest Forms:

Conflict of Interest Forms (Form CIQ) shall be submitted under separate cover and not be included in the sealed proposal.

2.0 CONTRACT TIME

A. If Proposal is accepted, Contractor shall achieve Substantial Completion of the Work within 120 calendar days after the date when the Contract Time Requirements commence to run as provided in Article 2.3 of the General Conditions, and Contractor shall achieve Final Completion within 15 calendar days after the date required for Substantial Completion of the Work, subject to adjustments of Contract Time Requirements as provided in the Contract.

3.0 OFFEROR REPRESENTATIONS

A. Offeror is familiar with and is satisfied as to all federal, state and local laws and regulations that may affect cost, progress, performance and furnishing of the Work.

B. Offeror has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, performance and furnishing of the Work.

C. Offeror has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site and (2) Hazardous Conditions identified in reports and drawings provided to Offeror or available for Offeror review. Offeror

understands that neither Owner nor Principal Architect/Engineer is responsible for the accuracy of these documents and they are not part of the Contract Documents.

D. Offeror has obtained and carefully studied all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions including surface, subsurface and Underground Improvements at or contiguous to the Site which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Offeror, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents to be employed by Offeror, and safety precautions and programs incident thereto.

E. Offeror does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Proposal for performance of the Work at the Contract Amount proposed, within the Contract Time Requirements proposed and in accordance with the terms and conditions of the Contract Documents. Offeror shall make no claims against the Owner and shall bear all risk of losses, if any, resulting on account of the amount and character of the Work, or because the conditions under which the Work must be done vary or differ from conditions or information contained in the Contract Documents, or are different from what were estimated or anticipated by it.

F. Offeror is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

G. Offeror has correlated the information known to Offeror, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

H. Offeror has given Owner or Principal Architect/Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Offeror has discovered in the Contract Documents, and the written resolution thereof by Principal Architect/Engineer are acceptable to Offeror.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Proposal is submitted.

J. Laws to be Observed: In the performance of the Contract, the Contractor must comply with all applicable federal, state, and local laws, ordinances and

regulations, including but not limited to laws concerned with labor, safety, minimum wages, and the environment. The Contractor will make himself familiar with and shall at all times observe and comply with all federal, state, and local laws, ordinances and regulations which in any manner affect the conduct of the work, and shall Indemnify and save harmless the Owner, and its representatives against any claim arising from violation of any such law, ordinance or regulation by himself or by his subcontractor or by his employees.

K. Review by Owner:

(a) The Owner and authorized representatives, agents and employees of the Owner shall at all times have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, books and accounting records, subcontracts, purchase orders, and all other relevant data, documents and records pertaining to this Contract.

L. Offeror will submit written evidence of its authority to do business in the state where the Project is located with its Proposal, form 00 45 20 – Form of Business.

M. Offeror further represents that this Proposal is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Offeror has not directly or indirectly induced or solicited any other Offeror to submit a false or sham Proposal; Offeror has not solicited or induced any individual or entity to refrain from submitting a Proposal; and Offeror has not sought by collusion to obtain for itself any advantage over any other Offeror or over Owner.

4.0 DEFINED TERMS:

A. Terms defined in this Proposal, if any, shall be for the purposes of this Proposal. Terms with initial capital letters not defined herein shall have the meaning assigned to them in the other Bid Documents or Contract Documents.

5.0 TOTAL PROPOSAL PRICE HAS BEEN CALCULATED BY OFFEROR, USING THE FOLLOWING COMPONENT PRICES AND PROCESS (PRINT OR TYPE NUMERICAL AMOUNTS):

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

SAN JACINTO RIVER AUTHORITY
Emergency Repair Service Center
PROPOSAL FORM

A. BASE ITEMS

Item No.	Spec. Reference	Description	Qty.	Unit	Unit Price (this column controls)	Proposal Price
1	01 11 13 Division 2-32 and Drawings	Provide and install Pre-Engineered (include Design Sealed/Signed by Licensed Texas Professional Engineer) as shown on Drawings and noted in Specifications. Include all site preparation, systems, electrical work (designed and signed/sealed by Licensed Texas Professional Engineer) and connections to proposed foundation (Item 2), complete in place.	1	LS	$_____	$_____
2	01 11 13 Division 03 and Drawings	Provide and install proposed concrete foundation for building (design and signed/sealed by Licensed Texas Professional Engineer), including all site preparation, base material, and reinforced concrete, complete in place.	1	LS	$_____	$_____
3	01 11 13 Division 03 and Drawings	Provide and install proposed concrete drainage swale, inlet and storm sewer pipe as shown on Drawings, complete in place.	1	LS	$_____	$_____
4	01 11 13 Division 03, 27, 31, and Electrical, and Drawings	Provide and install all site electrical and communication (SCADA) pullboxes, conduit, wire and fiber optic cable as noted in the Drawings, complete in place.	1	LS	$_____	$_____

5	01 11 13 Division 32 and Drawings	Provide and install 6-inch base course parking area, including all site subgrade preparation and installation of base, as noted on Drawings and per specifications, complete in place.	850	SY	$_____	$_____
6	01 11 13 Drawings	Removable Pipe Bollards, complete in place	10	EA	$_____	$_____
7	01 11 13 Drawings	Pole mounted Light Fixture (includes conduit/wiring), complete in place	1	EA	$_____	$_____
8	01 11 13 Drawings	Relocate existing Awning in WWTF No. 1 to site next to proposed Building, as shown on Drawings, complete in place.				
A. Total Base Items:					**$_____**	

B. EXTRA UNIT PRICE ITEMS						
Item No.	Spec. Reference	Description	Qty.	Unit	Unit Price (this column controls)	Proposal Price
1	31 11 00.01	Extra 6" Base Course. Complete in Place	20	SY	$_____ $ 50.00[1]	$_____
2	31 21 33.01	Extra Hand Excavation	10	CY	$_____ $ 50.00[1]	$_____
3	31 21 33.01	Extra Machine Excavation	20	CY	$_____ $ 100.00[1]	$_____
4	31 21 33.01	Extra Placement of Backfill	30	CY	$_____ $ 50.00[1]	$_____
B. Total Extra Unit Price Items:						**$**_____

Table B Footnotes:
(1) Minimum Unit Price determined prior to Proposal. Can be increased by the Offeror by crossing out the Minimum and noting revised Unit Price on the line above.

C. CASH ALLOWANCES			
Item No.	Spec. Reference	Description	Cash Allowance [1]
1	N/A	N/A	$_____
C. Total Cash Allowances:			**$___N/A**_____

Table C Footnotes:
(1) Fixed price determined prior to Proposal. Cannot be adjusted by Offeror.

D. ALTERNATE ITEMS						
Item No.	Spec. Reference	Description	Qty.	Unit	Unit Price (this column controls)	Proposal Price
1	01 11 13 08 33 23	Motorize 14' x 14' Roll-Up Overhead Doors, including additional conduit, wiring and terminations, and any additional work for complete operation. Complete in Place – Adder to Base Item No. 1	2	EA	$_____	$_____
2	01 11 13 32 12 16 Drawings	2-inch Type D Asphalt Surface Course per Cross-Section on Drawing. Includes additional 2-inch Over Excavation for 6-inch Base Course. Complete in Place. Adder to Base Item No. 3.	850	SY	$_____	$_____
3	01 11 13 03 09 00 32 13 13 Drawings	Reinforced Concrete Pavement (6-inch minimum with 6-inch base, Contractor to Propose Design). Include any necessary over-excavation. Complete in Place. Adder to Base Item No. 3.	850	SY	$_____	$_____
4	01 11 13 32 11 00.01 Drawings	Recycled Crushed Concrete Base (6-inch thick) Driveway from Parking Area to Plant Driveway as shown on Drawings, complete in place.	280	SY	$_____	$_____
5	01 11 13 32 11 00.01 32 12 16 Drawings	2-inch Type D Asphalt over 6-inch thick Recycled Crushed Concrete Base Driveway from Parking Area to Plant Driveway as shown on Drawings, complete in place.	280	SY	$_____	$_____

6	01 11 13 32 11 00.01 Drawings	Recycled Crushed Concrete Base (6-inch thick) Driveway from Parking Area to Driveway near Admin Building, as shown on Drawings, complete in place.	30	SY	$_____	$_____
7	01 11 13 32 11 00.01 32 12 16 Drawings	2-inch Type D Asphalt over 6-inch thick Reycled Crushed Concrete Base Driveway from Parking Area to Driveway near Admin Building, as shown on Drawings, complete in place.	30	SY	$_____	$_____
8	08 33 23	Motorize 12' x 10 Overhead Door, including additional conduit, wiring and terminations, and any additional work for complete operation. Complete in Place – Adder to Base Item No. 1	1	EA	$_____	$_____
D. Total Alternate Items:					**$_____**	

Note: Alternate Items shall not be included in Total Proposal Price.

E. TOTAL PROPOSAL PRICE:
(Add Totals for Items A, B, and C **$_____**

6.0 SIGNATURES: By signing this Document, I agree that I have received and reviewed all Bid Documents, Contract Documents and Addenda and considered all costs associated with the Bid Documents, Contract Documents and Addenda in calculating the Total Proposal Price.

Offeror:_____
(Print or type full name of your proprietorship, partnership, corporation, or joint venture.*)

** By:_____
Signature Date

Name:_____
(Print or type name) Title

Doing Business as: _____

Business Address:_____
(Mailing)

_____
(Street, if different)

Telephone and Fax Number:_____
(Print or type numbers)

* If Proposal is a joint venture, add additional Proposal Form signature sheets for each member of the joint venture.

** Offeror certifies that the only person or parties interested in this offer as principals are those named above. Offeror has not directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive Proposing.

Note: This document constitutes a Governmental record, as defined by § 37.01 of the Texas Penal Code. Submission of a false Governmental record is a criminal offense as provided in § 37.10 of the Texas Penal Code.

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

7.0 CERTIFICATION OF PROPOSAL

The undersigned affirms that they are duly authorized to execute this Proposal, that this Proposal has not been prepared in collusion with any other Offeror, and that the contents of this Proposal have not been communicated to any other Offeror prior to the official opening of this Proposal. Additionally, the undersigned affirms that the Offeror is willing to sign the attached SJRA Agreement (if applicable).

Signed By: _____ Title: _____

Typed Name: _____ Company Name: _____

Phone No.: _____ Fax No.: _____

Email: _____

Proposal Address: _____
P.O. Box or Street City State Zip

Order Address: _____
P.O. Box or Street City State Zip

Remit to Address: _____
P.O. Box or Street City State Zip

Federal Tax ID No.: _____

Date: _____

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

END OF SECTION

SECTION 00 43 13

OFFEROR'S BOND

THAT WE, _____, as Principal,
(Offeror)
("Offeror"), and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound to the San Jacinto River Authority, a political sub-division of the State of Texas, in the sum of _____ Dollars ($_____) (an amount equal to five (5) percent of the Total Bid Price, including Cash Allowances and Alternates, if any, for the payment of which sum, well and truly to be made to the San Jacinto River Authority and its successors, the Offeror and Surety do bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Offeror has submitted on or about this day a proposal offering to perform the following:

_____

_____
(Project Name, Location and Number)
in accordance with the Drawings, Specifications, and terms and conditions related thereto to which reference is hereby made.

NOW, THEREFORE, if the Offeror's offer as stated in the Section 00 41 00.02 – Proposal Form is accepted by the San Jacinto River Authority, and the Offeror executes and returns to the San Jacinto River Authority Section 00 52 00 – Tandard Form of Agreement between Owner and Contractor, required by the San Jacinto River Authority, on the forms prepared by the San Jacinto River Authority, for the Work and also executes and returns the same number of the Performance, Payment and Maintenance Bonds (such bonds to be executed by a Corporate Surety authorized by the State Board of Insurance to conduct insurance business in the State of Texas, and having an underwriting limitation in at least the amount of the bond) and other submittals as required, in connection with the Work, within the Contract Time, then this obligation shall become null and void; otherwise it is to remain in full force and effect.

If Offeror is unable to or fails to perform the obligations undertaken herein, the undersigned Offeror and Surety shall be liable to the San Jacinto River Authority for the full amount of this obligation which is hereby acknowledged as the amount of damages which will be suffered by the San Jacinto River Authority on account of the failure of such Offeror to perform such obligations, the actual amount of such damages being difficult to ascertain.

Notices required or permitted hereunder shall be in writing and shall be deemed delivered when actually received or, if earlier, on the third day following deposit in a United States Postal Service post office or receptacle, with proper postage affixed (certified mail, return receipt requested), addressed to the respective other Party at the address prescribed in the Contract documents, or at such other address as the receiving Party may hereafter prescribe by written notice to the sending Party.

IN WITNESS THEREOF, the Offeror and Surety have signed and sealed this instrument on the respective dates written below their signatures and have attached current Power of Attorney.

ATTEST, SEAL: (if a corporation)
WITNESS: (if not a corporation)

_____
(Name of Offeror)

By:_____
Name:
Title:

By:_____
Name:
Title:
Date:

ATTEST/SURETY WITNESS: (SEAL)

(Full Name of Surety)

(Address of Surety for Notice)

(Telephone Number of Surety)

By:_____
Name:
Title:
Date:

By:_____
Name:
Title:
Date:

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 45 10

CONFLICT OF INTEREST QUESTIONNAIRE

Local Government Code Chapter 176 requires Offerors with the San Jacinto River Authority ("SJRA") to file a Conflict of Interest Questionnaire with the SJRA.

The Conflict of Interest Questionnaire is available for downloading on the Texas Ethics Commission's website at: http://www.ethics.state.tx.us/forms/CIQ.pdf. The completed Conflict of Interest Questionnaire will be posted on the SJRA website. Also you will find a list of the SJRA Local Government Officers on the SJRA website.

For your convenience the CIQ form is attached as part of this document. Although the SJRA has provided this document for the Offeror's convenience, it is the Offeror's responsibility to submit the latest version of the CIQ form as promulgated by the Texas Ethics Commission.

The Failure of any Offeror to comply with this law is a Class C misdemeanor.

END OF SECTION

CONFLICT OF INTEREST QUESTIONNAIRE - FORM CIQ

For vendor or other person doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local government entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.**

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information in this section is being disclosed.**

_____
Name of Officer

This section, (item 3 including subparts A, B, C & D), must be completed for each officer with whom the vendor has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership of one percent or more?

☐ Yes ☐ No

D. Describe each employment or business and family relationship with the local government officer named in this section.

4 ☐ **I have no Conflict of Interest to disclose.**

5

_____ _____
Signature of vendor doing business with the governmental entity Date

SECTION 00 45 20
FORM OF BUSINESS

Please mark the box describing your firm's form of business, fill in the requested information, and include the relevant attachments.

[ ] Corporation
Corporate Name: _____
State of Incorporation: _____
Mailing Address: _____
Type of Corporation: _____

Certificate of Assumed Name, if operating under a name different than that on the corporate charter (the Certificate must have been issued within the past 10 years to be valid)

*Certificate of Good Standing

*Certificate of Existence (if non-Texas corporation, Certificate of Authority)

[ ] Partnership/Joint Venture
Partnership/Joint Venture Name: _____
Mailing Address: _____
Type of Partnership/Joint Venture: _____

Copy of the Partnership or Joint Venture Agreement, **or**
Affidavit with the name of the partnership or joint venture, the names of the individual partners or participants in the joint venture, and a statement that the partnership or joint venture is in existence

Certificate of Assumed Name, (the Certificate must have been issued within the past 10 years to be valid)

If firm is a limited partnership, the Certificate of Limited Partnership

If any partner or joint venturer is a corporation, the above information relating to corporation must be included as to each sum partner or joint venturer.

[ ] Sole Proprietorship

Name: _____
Mailing Address: _____

Certificate of Assumed Name, if operating under a name different than that of the sole proprietor (the Certificate must have been issued within the past 10 years to be valid)

** Must be furnished upon request of the SJRA and must be less than 90 days old.*

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 45 43

RESOLUTION OF CONTRACTOR

_____ ("Contractor"),

(Name of Contractor, e.g., "Biz. Inc.", "Biz LLP")

is a _____,

(Type of Organization, e.g.: Corporation, Limited Partnership, Limited Liability Partnership, Limited Liability Company, etc.)

which is bound by acts of _____,

(Name and Form of Governing Entity, e.g., "Biz Inc. Board of Directors", "Bill Smith, GP", etc.)

("Governing Entity").

On the day of _____, 20___, the Governing Entity resolved, in accordance with all documents, rules, and laws applicable to the Contractor, that

_____, is authorized to act as the

(Contractor's Representative)

Contractor's Representative in all business transactions (initial one) ____ conducted in the State of Texas OR ____ related to this Contract; and

The Governing Entity warrants that the above resolution (a) was entered into without dissent or reservation by the Governing Entity, (b) has not been rescinded or amended, and (c) is now in full force and effect; and

PART 1 - IN AUTHENTICATION OF THE ADOPTION OF THIS RESOLUTION, I SUBSCRIBE MY NAME ON THIS ____ DAY OF _____, 20___.

_____ _____

(Authorized Signature for Governing Entity) (Print or Type Name and Title of Authorized Signatory)

SWORN AND SUBSCRIBED before me on _____

Date

_____

Notary Public in and for the State of Texas

My Commission Expires:_____ _____

Expiration Date Print or Type Name of Notary Public

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 52 00

STANDARD FORM OF AGREEMENT

BETWEEN OWNER AND CONTRACTOR

THIS AGREEMENT is dated as of _____ by and between **the San Jacinto River Authority** (hereinafter called "**OWNER"**) and _____ (hereinafter called "**CONTRACTOR"**).

OWNER and CONTRACTOR, in consideration of the covenants hereinafter set forth, agree as follows:

Article 1. WORK.

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Construction of **Emergency Repair Service Center**

Article 2. PRINCIPAL ARCHITECT/ENGINEER AND OWNER'S REPRESENTATIVE.

The project has been designed by San Jacinto River Authority Technical Service Department, 1577 Dam Site Road, Conroe, Texas 77304, who is hereinafter called "PRINCIPAL ARCHITECT/ENGINEER" and who assumes all duties and responsibilities and has the rights and authority assigned to PRINCIPAL ARCHITECT/ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents. OWNER'S Representative shall be San Jacinto River Authority Technical Service Department.

Article 3. CONTRACT TIMES.

The Work will be Substantially Completed within 120 **calendar days** after the date when the Contract Time Requirements commence to run as provided in Article 2.3 of the General Conditions, and CONTRACTOR shall achieve Final Completion within 15 **calendar days** of the date required for Substantial Completion.

OWNER and CONTRACTOR recognize that **time is of the essence** of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in the above paragraph, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) and, as a reasonable estimate of such damages, CONTRACTOR shall pay OWNER Fifty Dollars ($50.00) for each and every day of delay in CONTRACTOR achieving Substantial Completion of the Work and readiness for final payment beyond the times specified in the above paragraph. OWNER shall have the option of deducting the amount of any liquidated damages from any monies that may be owed to CONTRACTOR or to recover such amount from the CONTRACTOR or its sureties, at CONTRACTOR'S expense.

Article 4. CONTRACT AMOUNT.

OWNER shall pay CONTRACTOR for completion of the Work, in accordance with the Contract Documents, an amount in current funds equal to the sum of the amounts determined to be due and owing pursuant to the Proposal and any subsequent Change Orders and Change Directives thereto.

Article 5. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by OWNER'S Representative or PRINCIPAL ARCHITECT/ENGINEER as determined by the OWNER and as provided in the General Conditions and Supplemental Conditions, if any.

OWNER shall make progress payments on account of the Contract Amount on the basis of CONTRACTOR'S Applications for Payment as recommended by OWNER'S Representative or PRINCIPAL ARCHITECT/ENGINEER and in conformance with the procedures described in the General Conditions. All such payments will be measured by the schedule of values established in Article 2.4.2.07 of the General Conditions (and on the number of units of each Unit Price item completed, if unit price contract). Upon final completion and acceptance of the Work in accordance with Article 14.11 of the General Conditions, OWNER shall pay the remainder of the Contract Amount as recommended by OWNER'S Representative as provided in said Article 14.11.

The 10 percent retainage withheld pursuant to Article 14.01.5 of the General Conditions shall be deposited in an interest-bearing account, and the interest earned on such retainage shall be paid to CONTRACTOR on completion of the contract.

Article 6. CONTRACTOR'S REPRESENTATIONS.

In order to induce OWNER to enter into this Agreement CONTRACTOR makes the following representations:

CONTRACTOR has examined and carefully studied the Contract Documents (including the Addenda listed in Article 7) and the other related data identified in the Proposal Documents.

CONTRACTOR has visited the site and become familiar with and is satisfied as to the general, local, and site conditions that may affect cost, progress, performance, or furnishing of the Work.

CONTRACTOR is familiar with and is satisfied as to all federal, state, and local Legal Requirements that may affect cost, progress, performance, and furnishing of the Work.

CONTRACTOR has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site. CONTRACTOR acknowledges that such reports and drawings are not Contract Documents, are not warranted or represented in any manner by Owner to accurately show the conditions at the Site, and may not be complete for CONTRACTOR'S purposes. CONTRACTOR acknowledges that OWNER and PRINCIPAL ARCHITECT/ENGINEER do not assume and expressly disclaim any responsibility for the accuracy or completeness of the

information and data shown or indicated in the Contract Documents with respect to subsurface conditions or Underground Facilities at or contiguous to the Site or CONTRACTOR'S interpretation of such information and data. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary research, examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise which may affect cost, progress, performance, or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto. CONTRACTOR does not consider that any additional examinations, investigations, explorations, tests, studies, or data are necessary for the performance and furnishing of the Work at the Contract Amount, within the Contract Time Requirements and in accordance with the other terms and conditions of the Contract Documents.

CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Contract Documents.

CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the Site, reports, and Drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

CONTRACTOR has given PRINCIPAL ARCHITECT/ENGINEER through the OWNER or OWNER'S Representative written notice of all conflicts, errors, ambiguities, or discrepancies that CONTRACTOR has discovered in the Contract Documents and the written resolution thereof by PRINCIPAL ARCHITECT/ENGINEER is acceptable to CONTRACTOR, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

Pursuant to Section 2270.002 of the Texas Government Code, contemporaneous with CONTRACTOR's execution of this Agreement, CONTRACTOR shall execute the Verification Company Does Not Boycott Israel, attached hereto and incorporated herein.

Article 7. CONTRACT DOCUMENTS.

The Contract Documents are comprised of the following:

1. This Agreement.
2. Exhibits to this Agreement: Verification Company Does Not Boycott Israel

Document	Title	Date	Page(s)
N/A			
N/A			
N/A			
N/A			

3. Performance, Payment, Maintenance, and Surface Correction Bonds.
4. General Conditions of the Contract.
5. Supplemental Conditions, if any.

6. Specifications 00 00 01 through 32 13 13, prepared by Aaron K. Schindewolf, P.E., and sealed on January 15, 2020.
7. Drawings.
8. Addenda:

Addendum No.	Addendum Date	Signature Acknowledging Receipt

9. CONTRACTOR'S Proposal Form pursuant to Competitive Sealed Proposal No. 20-0020.
10. Prevailing Wage Rates.
11. The following which may be delivered or issued after the Effective Date of the Agreement and are not attached thereto: All written Change Orders or Change Directives pursuant to Article 3.3 of the General Conditions.

There are no Contract Documents other than those listed in this Article. The Contract Documents may only be amended, modified, or supplemented as provided in Article 3.3 of the General Conditions.

Article 8. INDEMNITY PROVISIONS.

THE GENERAL, SPECIAL, AND SUPPLEMENTAL CONDITIONS, IF ANY, INCORPORATED INTO THIS AGREEMENT CONTAIN PROVISIONS THAT MAY RELIEVE ONE PARTY FOR RESPONSIBILITY IT WOULD OTHERWISE HAVE UNDER THE LAW FOR DAMAGES OR OTHER LIABILITY ARISING OUT OF THE WORK.

EACH OF THE PARTIES HERETO SPECIFICALLY AGREES THAT IT HAS A DUTY TO READ THIS AGREEMENT, THE GENERAL, SPECIAL, AND SUPPLEMENTAL CONDITIONS, IF ANY, AND ALL OTHER CONTRACT DOCUMENTS AND AGREES THAT IT IS CHARGED WITH NOTICE AND KNOWLEDGE OF THE TERMS OF THIS AGREEMENT AND ALL CONTRACT DOCUMENTS; THAT IT HAS IN FACT READ THIS AGREEMENT AND ALL CONTRACT DOCUMENTS AND IS FULLY INFORMED AND HAS FULL NOTICE AND KNOWLEDGE OF THE TERMS, CONDITIONS AND EFFECTS OF THIS AGREEMENT; THAT IT HAS HAD THE OPPORTUNITY TO BE REPRESENTED BY INDEPENDENT LEGAL COUNSEL OF ITS CHOICE PRECEDING ITS EXECUTION OF THIS AGREEMENT AND HAS RECEIVED OR VOLUNTARILY CHOSEN NOT TO RECEIVE THE ADVICE OF ITS ATTORNEY IN ENTERING INTO THIS AGREEMENT; AND THAT IT RECOGNIZES THAT CERTAIN TERMS OF THIS AGREEMENT AND THE CONTRACT DOCUMENTS RESULT IN ONE PARTY ASSUMING THE LIABILITY INHERENT IN SOME ASPECTS OF THE TRANSACTION AND RELIEVING THE OTHER PARTY OF ITS RESPONSIBILITY FOR SUCH LIABILITY. EACH PARTY HERETO AGREES AND COVENANTS THAT IT WILL NOT CONTEST THE VALIDITY OR ENFORCEMENT OF ANY EXCULPATORY PROVISION OF THIS AGREEMENT ON THE BASIS THAT THE PARTY HAD NO NOTICE OR

KNOWLEDGE OF SUCH PROVISION OR THAT THE PROVISION IS NOT "CONSPICUOUS".

Article 9. MISCELLANEOUS.

Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.

CONTRACTOR certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Article 9:

1. “corrupt practice” means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the proposal process or in the Contract execution;

2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the proposal process or the execution of the Contract to the detriment of OWNER, (b) to establish Proposal or Contract prices at artificial noncompetitive levels, or (c) to deprive OWNER of the benefits of free and open competition;

3. “collusive practice” means a scheme or arrangement between two or more Proposers, with or without the knowledge of OWNER, a purpose of which is to establish Proposal prices at artificial, non-competitive levels; and

4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the proposal process or affect the execution of the Contract.

No assignment by a party hereto of any rights or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

OWNER and CONTRACTOR each binds itself, its officers, directors, shareholders, partners, members, successors, assigns, and legal representatives to the other party hereto, its officers, directors, shareholders, partners, members, successors, assigns and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

Any provision or part thereof of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions or parts thereof shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision or part thereof.

This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall be deemed to be one and the same agreement. A signed copy of this Agreement delivered by facsimile, email, or other means of electronic transmission shall be deemed to have the same legal effect as delivery of an original signed copy of this Agreement. Duplicate copies of duly executed and delivered counterparts of this Agreement shall be deemed to have the same full force and effect as originals and may be relied upon as such. Notwithstanding the foregoing, OWNER and CONTRACTOR agree that this Agreement may be executed using electronic signatures at the option and in the discretion of OWNER, and, in such event, the provisions of the Uniform Electronic Transaction Act, Chapter 332, Texas Business and Commerce Code, as amended, and any applicable policies and procedures of OWNER regarding electronic signatures shall apply.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement.

This Agreement will be effective on _____, (which is the effective date of the Agreement).

OWNER: San Jacinto River Authority

By: _____

Attest: _____

Address for giving notices:

CONTRACTOR:

By: _____

(CORPORATE SEAL)

Attest: _____

Address for giving notices:

License No. _____

Agent for service of process: _____

END OF SECTION

VERIFICATION COMPANY DOES NOT BOYCOTT ISRAEL

BEFORE ME, the undersigned authority, on this day personally appeared _____ [name], _____ [title] of _____ [Contractor], and, upon oath, after first being duly sworn, deposed and stated:

"My name is _____ and I am the _____[title] of _____ [Contractor], hereinafter referred to in this verification as 'Contractor'. The facts set forth herein are within my personal knowledge and are true and correct, and I am competent and authorized to make this verification on behalf of Contractor.

Contractor does not Boycott Israel; and

Contractor will not Boycott Israel during the term of this Agreement; and

'Boycott Israel' as used herein means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes."

Contractor: _____

By: _____
[Signature of Affiant]
Printed Name: _____
Title: _____

SUBSCRIBED AND SWORN TO before me on this ____ day of _____, 201_, by _____, _____ [title] of _____ [Contractor], known to me or proved through photo identification.

_____
Notary Public in and for the State of Texas
My commission expires: _____

TGC 2252.152 CERTIFICATION FORM

CONTRACTS WITH COMPANIES ENGAGED IN BUSINESS WITH IRAN, SUDAN, OR FOREIGN TERRORIST ORGANIZATIONS PROHIBITED - CERTIFICATION

I, _____, the undersigned representative of _____ (Company or business name) being an adult over the age of eighteen (18) years of age, pursuant to Texas Government Code, Chapter 2252, Section 2252.152 and Section 2252.153, certify that the company named above 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. I further certify that should the above-named company enter into a contract that is on said listing of companies on the website of the Comptroller of the State of Texas which do business with Iran, Sudan or any Foreign Terrorist Organization, I will immediately notify the San Jacinto River Authority's Purchasing Division.

_____
Name of Company Representative (Print)

_____
Signature of Company Representative

_____
Date

VENDOR INFORMATION FORM

San Jacinto River Authority
General & Administrative
1577 Dam Site Road
Conroe, TX 77304

VENDOR INFORMATION FORM

Company Name: _____

PO MAILING / PHYSICAL ADDRESS	**ACCOUNTS RECEIVABLE ADDRESS**
_____	_____
_____	_____
_____	_____
_____	_____

Contact Name:	_____	A/R Contact Name:	_____
Title:	_____	A/R Telephone:	_____
Telephone:	_____	A/R Fax:	_____
Emergency/ After Hrs #:	_____		
Fax:	_____	Accepts Procurement Card: Yes ☐ No ☐	
E-Mail:	_____	Web Site:	_____

NATURE OF BUSINESS

Wholesale Dealer	Sales	☐ Manufacturer	Service (repairs, etc.)
Construction	Factory Rep.	Retail Dealer	Professional Services
Govt. Agency			

Please notify the San Jacinto River Authority Purchasing Department immediately of any changes, such as company name, address, telephone number, fax number, email address or change in insurance.
I have reviewed and understand the Insurance Requirements (if applicable) as listed on the following page.

_____
Signature

Please attach a completed W-9 Form and return it with this Vendor Information Form.

SJRA Purchasing 07/2014 1 of 2

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.

Cat. No. 10231X Form **W-9** (Rev. 12-2014)

SECTION 00 60 20

MONTHLY SUBCONTRACTOR PAYMENT REPORTING FORM

Legal Project Name: _____

SJRA Project No.: _____

Contractor's Company Name: _____

Address: _____

CERTIFICATION

BEFORE ME, the undersigned authority, on this day personally appeared _____, _____ [title] of _____ [Contractor], and, upon oath, after first being duly sworn, deposed and stated:

"My name is _____ and I am the _____ [title] of _____ [Contractor], hereinafter referred to in this affidavit as "Contractor". The facts set forth herein are within my personal knowledge and are true and correct, and I am competent and authorized to make this affidavit on behalf of Contractor.

Contractor has paid each and all of its Subcontractors, laborers, suppliers, vendors and materialmen, if any, in full, for all work, labor, materials, equipment and/or services provided to Contractor for incorporation in or use or work on the Project, through the period ending _____ *[end date of last paid pay period]* (the "Pay Period"), except to the extent of any contractual retainage withheld by Contractor, or other amounts withheld by Contractor for defective work or otherwise in accordance with its contract with any Subcontractor, laborer, supplier, vendor or materialman and identified in the Payment Notifications described below.

Contractor acknowledges that SJRA is relying on Contractor's statements and representations herein in making payment for Work performed on the Project. Contractor agrees to indemnify SJRA from any and all loss, cost or expense, including but not limited to attorneys' fees incurred, resulting from any false or incorrect information contained in this affidavit."

EXCEPTION: Contractor sent Payment Notifications to the following Subcontractors, laborers, suppliers, vendors or materialmen explaining why Contractor withheld payment, copies of which are attached:

Name:	Name:
Street Address:	Street Address:
City, State, and Zip Code:	City, State, and Zip Code:
Amount of Payment Withheld:	Amount of Payment Withheld:

MONTHLY SUBCONTRACTOR PAYMENT REPORTING FORM

Date Payment First Withheld:	Date Payment First Withheld:
Description of Good Faith Reason:	Description of Good Faith Reason:

(Signature of Contractor's Representative) (Print or Type Name of Contractor's Representative)

SWORN TO AND SUBSCRIBED before me on: _____
Date

_____
Notary Public in and for the State of Texas

My Commission Expires: _____
Expiration Date

_____
Print or Type name of Notary Public

THIS PAGE INTENTIONALLY LEFT BLANK

4839-5211-5282, v. 1

SECTION 00 61 13.13

PERFORMANCE BOND

STATE OF TEXAS

COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS: That _____(Contractor) of the City of _____, County of _____, and State of Texas, as Principal, and _____ authorized under the Laws of the State of Texas to act as surety on bonds for principals, as Surety, are held and firmly bound unto San Jacinto River Authority (Owner), in the penal sum of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written contract with the Owner, dated the _____ day of _____, 20__, for construction of: _____ _____(the "Contract"), which Contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform said Contract and shall in all respects duly and faithfully observe and perform all and singular the covenants, conditions and agreements in and by said Contract agreed and covenanted by the Principal to be observed and performed, within the time provided therein and any extensions thereof that may be granted by the Owner, and during the life of any guarantees or warranties contained in or required under said Contract, and shall also well and truly perform all the undertakings, covenants, terms, conditions and agreements of any and all modifications of said Contract that may hereafter be made, then this obligation shall be void; otherwise to remain in full force and effect;

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code as amended and all liabilities on this bond shall be determined in accordance with the provisions of said statute to the same extent as if it were copied at length herein.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to work performed thereunder, or the plans, specifications, or drawings, accompanying the same, shall in anyway affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument on the _____ day of _____, 20__.

Principal	Surety
BY:_____	BY:_____
TITLE:_____	TITLE:_____
ADDRESS:	PHYSICAL ADDRESS:
_____	_____
_____	_____
_____	_____
	MAILING ADDRESS FOR NOTICE OF CLAIMS:
	_____
	_____
	_____
	TELEPHONE:_____
	LOCAL RECORDING AGENT PERSONAL IDENTIFICATION NUMBER:
	_____

The name and address of the Resident Agent of Surety is:

_____

END OF SECTION

4840-5159-9954, v. 1

SECTION 00 61 13.16
STATUTORY PAYMENT BOND

STATE OF TEXAS

COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS: That _____(Contractor) of the City of _____, County of _____, and State of Texas, as Principal, and_____ authorized under the Laws of the State of Texas to act as surety on bonds for principals, as Surety, are held and firmly bound unto San Jacinto River Authority (Owner), in the penal sum of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written contract with the Owner, dated the _____ day of _____, 20__, for construction of: _____ _____(the "Contract"),

which Contract is hereby referred to and make a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants supplying labor and material to him or a Sub-Contractor in the prosecution of the work provided for in said Contract, then, this obligation shall be void; otherwise to remain in full force and effect;

PROVIDED, HOWEVER, That this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code as amended and all liabilities on this bond shall be determined in accordance with the provisions of said statute to the same extent as if it were copied at length herein.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to work performed thereunder, or the plans, specifications, or drawings, accompanying the same, shall in anyway affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument on the _____ day of _____, 20__.

Principal	Surety
BY:_____	BY:_____
TITLE:_____	TITLE:_____
ADDRESS:	PHYSICAL ADDRESS:
_____	_____
_____	_____
_____	_____
	MAILING ADDRESS FOR NOTICE OF CLAIM:
	_____
	_____
	_____
	TELEPHONE:_____
	LOCAL RECORDING AGENT PERSONAL IDENTIFICATION NUMBER:
	_____

The name and address of the Resident Agent of Surety is:

_____

END OF SECTION

4825-7140-3858, v. 1

SECTION 00 61 19

ONE-YEAR MAINTENANCE BOND

THAT WE, _____ _____, as Principal, hereinafter called Contractor, and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound to the San Jacinto River Authority ("SJRA") in the sum of $_____ _____ , for the payment of which sum to be made to the SJRA and its successors, Contractor and Surety do bind themselves, their successors, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has on or about this day executed a Contract in writing with the SJRA for_____, all of such work to be done as set out in full in said Contract Documents therein referred to and adopted by the SJRA, all of which are made a part of this instrument as fully and completely as if set out in full herein.

NOW THEREFORE, if the said Contractor shall comply with the provisions of Paragraph 13.7.1 of the General Conditions, and correct work not in accordance with the Contract documents discovered within the established one-year period, then this obligation shall become null and void, and shall be of no further force and effect; otherwise, the same is to remain in full force and effect.

Notices required or permitted hereunder shall be in writing and shall be deemed delivered when given in accordance with the definition of Written Notice in the General Conditions of the Contract.

IN WITNESS THEREOF, the said Contractor and Surety have signed and sealed this instrument on the respective dates written below their signatures and Surety has attached its current Power of Attorney.

ATTEST, SEAL: (if a corporation)
WITNESS: (if not a corporation)

_____
Name of Contractor

By: _____
Name:
Title:

By: _____
Name:
Title:
Date:

ATTEST/SURETY WITNESS:

_____
Full Name of Surety

(SEAL)

Address of Surety for Notice

Telephone Number of Surety

By: _____
Name:
Title:
Date:

By: _____
Name:
Title: Attorney-in-Fact
Date:

END OF SECTION

4843-6617-2242, V. 1

SECTION 00 61 20

ONE-YEAR SURFACE CORRECTION BOND

THAT WE, _____ _____, as Principal, hereinafter called Contractor, and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound to the San Jacinto River Authority ("SJRA") in the sum of $_____such sum being equal to four percent of the Original Contract Price, for the payment of which sum to be made to the SJRA and its successors, Contractor and Surety do bind themselves, their successors, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has entered into a Contract in writing with the SJRA dated of even date herewith, for _____, all of such work to be done in accordance with the Contract documents therein referred to, and adopted by the SJRA.

NOW THEREFORE, if the Contractor shall comply with the provisions of Paragraph 13.7.1 of the General Conditions, and repair, replace, restore, and correct surface work associated with backfill operations of subsurface work not in accordance with the Contract documents discovered within one year from the date that the One-year Maintenance Bond has expired, then this obligation shall become null and void, and shall be of no further force and effect; otherwise, the same is to remain in full force and effect.

Notices required or permitted hereunder shall be in writing and shall be deemed delivered when actually received or, if earlier, on the third day following deposit in a United States Postal Service post office or receptacle, with proper postage affixed (certified mail, return receipt requested), addressed to the respective other party at the address prescribed in the Contract documents, or at such other address as the receiving party may hereafter prescribe by written notice to the sending party.

IN WITNESS THEREOF, the said Principal and Surety have signed and sealed this instrument on the respective dates written below their signatures.

ATTEST, SEAL: (if a corporation)
WITNESS: (if not a corporation)

By: _____
Name:
Title:

_____
Name of Contractor

By: _____
Name:
Title:
Date:

ATTEST/SURETY WITNESS:

(SEAL)

_____
Full Name of Surety

_____
Address of Surety for Notice

_____

_____
Telephone Number of Surety

By: _____
Name:
Title:
Date:

By: _____
Name:
Title: Attorney-in-Fact
Date:

END OF SECTION

SECTION 00 62 04

HISTORY OF OSHA ACTIONS AND LIST OF ON-THE-JOB INJURIES

Prior to award of the Contract, Successful Offeror will be required to file the following with the San Jacinto River Authority:

1. A history of all OSHA actions, advisories, etc., Contractor has received on all jobs worked in any capacity, prime or subcontractor. The history shall be for the two-year period preceding the Bid Date of the Project.

2. A list of all on-the-job injuries, accidents, and fatalities suffered by any present or former employees of Contractor during the same two-year period.

3. If less than the two-year period, give the date Contractor started doing business.

4. Provide the company Experience Modification Rate (EMR) for the three-year period preceding the Proposal Submission Date of the Project.

An officer of the company must certify in a notarized statement that the information submitted is true and correct.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 62 07

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS

Contractor certifies to the best of its knowledge and belief that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal, State, or local department or agency;

2. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction: violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

3. Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph 2 of this certification; and

4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award.

Company:

_____
Typed Name & Title of Authorized Representative

_____ _____
Signature of Authorized Representative Date

☐ I am unable to certify the above statements. My explanation is attached.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 62 10

NAME AND QUALIFICATIONS OF PROPOSED SUPERINTENDENT (FOR FILING)

Prior to award of the Contract, Offeror selected will be required to file the following with the San Jacinto River Authority:

1. The name and qualifications of the Superintendent being proposed to supervise the Project.

This information must be submitted to the SJRA within the time period stated in within 10 days of written notification of contract award. An officer of the company must certify in a statement that the information submitted is true and correct.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 62 16

AFFIDAVIT OF INSURANCE

BEFORE ME, the undersigned authority, on this day personally appeared

_____,
Affiant

who being by me duly sworn on his oath stated that he/she is _____
Title

of _____,
Contractor's Company Name

the Contractor named and referred to within the Contract Documents; that he/she is fully competent and authorized to give this affidavit on behalf of Contractor, and that the attached original insurance certificate truly and accurately reflects the insurance coverage that is now in effect and will be in effect during the periods required by the Contract.

_____
Affiant's Signature

SWORN AND SUBSCRIBED before me on _____.
Date

_____
Notary Public in and for the State of TEXAS

_____
Print or type Notary Public name

My Commission Expires: _____
Expiration Date

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

4827-0155-8354, V. 1

SECTION 00 65 16
CERTIFICATE OF SUBSTANTIAL COMPLETION

		Date of Substantial Completion:	
Project Name:		**Project Number:**	
Project Location:		**Contract Number:**	
Contractor:		**Notice To Proceed Date:**	
Engineer / Architect:		**Contracted Amount:**	
Construction Manager:		**Amount at Completion:**	
Inspector:		**Time to Complete:**	**Days**
Punch List Correction Period:	**Days**	**Date of Inspection:**	

Description of Substantially Complete Work:

Issuance and execution of this Certificate of Substantial Completion by the San Jacinto River Authority (SJRA), shall denote that the described Work for the referenced Project has been inspected for compliance to the Project's Contract Documents and the described Work was found to be Substantially Complete. Therefore, the Date of Substantial Completion is established as indicated above.

Items having no impact on the intended and proper implementation, operation, or utilization of the described Work which have been determined as requiring correction or incomplete, are documented on the attached Substantial Completion Punch List. All such items shall be completed within the above stated Punch List Correction Period.

Punch List omissions of Contract Work does not relieve the Contractor of its responsibility to complete the Project Work in accordance with the Contract Documents.

Contract required warranties and guarantee periods shall commence on the Date of Substantial Completion.

Final insurance(s) shall remain in effect until the Project's Date of Final Completion of the Work is established.

Construction Manager:	Print	Signature	**Date:**
Company:			
Principal Arch./Engineer:	Print	Signature	**Date:**
Company:			
Contractor:	Print	Signature	**Date:**
Company:			
SJRA Division Manager:	Print	Signature	**Date:**
SJRA Deputy General Manager:	Print	Signature	**Date:**

SUBSTANTIAL COMPLETION INSPECTION PUNCH LIST

		PREPARATION DATE:	
PROJECT NAME:		**PROJECT NUMBER:**	
PROJECT LOCATION:		**PREPARED BY:**	
CONTRACTOR:		**INSPECTION DATE:**	
WORK PORTION:			

INSPECTION ATTENDEES:

NAME	COMPANY	E-MAIL	TELEPHONE

SJRA FIELD REPRESENTATIVE:			**DATE:**	
	PRINTED	SIGNATURE		
CONTRACTOR *(ACKNOWLEDGE RECEIPT):*			**DATE:**	
	PRINTED	SIGNATURE		

SUBSTANTIAL COMPLETION INSPECTION PUNCH LIST

DESCRIPTION:	DATE COMPLETE:	SIGNED BY:
	PREPARATION DATE:	

CERTIFICATION OF SUBSTANTIAL COMPLETION

PROJECT NAME:		**PROJECT NUMBER:**	
PROJECT LOCATION:		**PREPARED BY:**	
CONTRACTOR:		**INSPECTION DATE:**	
WORK PORTION:			

SUBSTANTIAL COMPLETION INSPECTION PUNCH LIST (CONTINUED)

DESCRIPTION:	DATE COMPLETE:	SIGNED BY:

- End of Punch List -

SECTION 00 65 19

CONTRACTOR'S CERTIFICATION OF FINAL COMPLETION

CERTIFICATE OF FINAL COMPLETION OF: Emergency Repair Service Center

Project No.: WDPR0110.1001.2N001

Contract Dated: [*Contract Date*]

BEFORE ME, the undersigned authority, a Notary Public in and for the State of Texas, on this day personally appeared _____ who, being by me duly sworn, on his oath says that he or she represents _____, the Contractor who has performed a contract with the San Jacinto River Authority ("SJRA") for the construction of the Work described above, and is duly authorized to make this affidavit; that he or she has personally examined the Work described above as required by the Contract documents; that said Work and all items thereof have been completed and all known defects made good; that all surplus material, refuse, dirt and rubbish have been cleaned up and removed or disposed of as directed by the SJRA; that all parts of Work are in a neat, tidy, finished condition and ready in all respects for acceptance by the SJRA; that all gravel or shell roadway surfaces removed during the course of the Work have been replaced in accordance with the Specifications, that rates of pay for all labor employed on said Work have not been below the minimum set out in "Labor Classification and Minimum Wage Scale" in the Contract documents and that within the knowledge of affiant all just bills for labor and material and for the rental or use of any equipment or apparatus, used in, on, or in connection with the Work have been paid in full by the Contractor.

_____
Affiant's Signature

SWORN AND SUBSCRIBED before me on _____
PART 1 - **DATE**

_____
Notary Public in and for the State of TEXAS

_____
Print or type name

My Commission Expires: _____
Expiration Date

THIS IS TO CERTIFY that I have thoroughly inspected the Work performed by the above named Contractor on the above described Contract and find all things in accordance with the Contract documents governing this Work.

_____
Inspector

_____
[*Project Manager or Construction Manager*]

Approved:

_____
[*Title of Approval Authority*], [*Contracting Department*]

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 65 19.13

AFFIDAVIT OF BILLS PAID

STATE OF TEXAS

COUNTY OF _____

BEFORE ME, the undersigned authority, on this day personally appeared _____, party to that certain Contract entered into on the____ day of _____, 20__, between **San Jacinto River Authority** (Owner) and_____ for the erection, construction, and completion of certain improvements and/or additions upon the following described premises, to wit:

EMERGENCY REPAIR SERVICE CENTER, CSP NO. 20-0020

Said party being by me duly sworn states upon oath that the said improvements have been erected and completed in full compliance with the above referred to Contract and the agreed plans and specifications therefore.

Deponent further states that he has paid all bills and claims for materials furnished and labor performed on said Contract and that there are no outstanding unpaid bills or legal claims for labor performed or materials furnished upon said job.

This affidavit is being made by the undersigned realizing that it is in reliance upon the truthfulness of the statements contained therein that final and full settlement of the balance due on said Contract is being made, and in consideration of the disbursement of funds San Jacinto River Authority, deponent expressly waives and releases all liens, claims and rights to assert a lien on said premises and agrees to indemnify and hold Owner safe and harmless from and against all losses, damages, costs and expenses of any character whatsoever specifically including court costs, bonding fees and attorney fees, arising out of or in any way relating to claims for unpaid labor or material used or associated with construction of improvements on the above-described premises.

_____

_____

By: _____

Subscribed and sworn to before me, the undersigned authority, on this the _____day of _____, 20__.

_____Notary Public in and for _____ County, Texas.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 65 19.23

CERTIFICATE OF FINAL COMPLETION

		Date of Final Completion:	
Project Name:		**Project Number:**	
Project Location:		**Contract Number:**	
Contractor:		**Notice To Proceed Date:**	
Engineer / Architect:		**Contracted Amount:**	
Construction Manager:		**Amount at Completion:**	
Inspector:		**Time to Complete:**	**Days**
Punch List Correction Period:	**Days**	**Date of Inspection:**	

Description of Finally Complete Work:

Issuance and execution of this Certificate of Final Completion by the San Jacinto River Authority (SJRA), shall denote that the described Work of the referenced Project have been inspected for compliance to the Project's contract documents and are Finally Complete. The date of Final Completion is therefore established as indicated above.

SJRA Deputy General Manager signature indicates final acceptance of the Work and responsibility for the security, maintenance, damage to the Works, and insurance except for those items as provided by the Contract Documents (i.e., extended warranties).

Punch List omissions of Contract Work does not relieve the Contractor of its responsibility to complete the Project Work in accordance with the Contract Documents.

Construction Manager:	Print	Signature	**Date:**
Company:			
Principal Arch./Engineer:	Print	Signature	**Date:**
Company:			
Contractor:	Print	Signature	**Date:**
Company:			
SJRA Division Manager:	Print	Signature	**Date:**
SJRA Deputy General Manager:	Print	Signature	**Date:**

FINAL COMPLETION INSPECTION PUNCH LIST

		PREPARATION DATE:	
PROJECT NAME:		**PROJECT NUMBER:**	
PROJECT LOCATION:		**PREPARED BY:**	
CONTRACTOR:		**INSPECTION DATE:**	
WORK PORTION:			

INSPECTION ATTENDEES:

NAME	COMPANY	E-MAIL	TELEPHONE

SJRA FIELD REPRESENTATIVE:			**DATE:**	
	PRINTED	SIGNATURE		
CONTRACTOR *(ACKNOWLEDGE RECEIPT)*:			**DATE:**	
	PRINTED	SIGNATURE		

FINAL COMPLETION INSPECTION PUNCH LIST

DESCRIPTION:	DATE COMPLETE:	SIGNED BY:

		PREPARATION DATE:	
PROJECT NAME:		**PROJECT NUMBER:**	
PROJECT LOCATION:		**PREPARED BY:**	
CONTRACTOR:		**INSPECTION DATE:**	
WORK PORTION:			

FINAL COMPLETION INSPECTION PUNCH LIST (CONTINUED)

DESCRIPTION:	**DATE COMPLETE:**	**SIGNED BY:**

- End of Punch List -

SECTION 00 65 21

CONDITIONAL WAIVER AND RELEASE UPON PROGRESS PAYMENT

Legal Project Name: _____

SJRA Project No.: _____

Contractor's Company Name ("Contractor"): _____

Address: _____

On receipt by Contractor of a check from the San Jacinto River Authority ("SJRA") in the sum of $_____ payable to Contractor, and when the check has been properly endorsed and has been paid by the bank on which it is drawn, this document becomes effective to waive and release any and all rights, claims and causes of action which Contractor may have against SJRA, including but not limited to any and all claims for costs, expenses and damages incurred by Contractor, arising out of or related to all labor, materials, equipment and/or services furnished for incorporation in or use or work on the Project, through the period ending _____ *[end date of current pay period]* (the "Pay Period"), except to the extent of any contractual retainage withheld from Contractor, and except for the following pending claims, if any:

Description of Claim	Amount ($)

Contractor warrants that Contractor has already paid or will use the funds received from this progress payment to promptly pay in full all amounts due the Contractor's laborers, Subcontractors, materialmen, vendors and suppliers for all work, materials, equipment, and/or services provided for or to the above referenced Project through the Pay Period.

Date _____

_____ (Contractor name)

By: _____ (Signature)

_____ (Title)

This instrument was executed and acknowledged before me on this ___ day of _____, 20__, by _____, known to me as the person whose name is subscribed above, as _____ [title] of _____ [company], on behalf of and as the authorized act of said entity.

_____
Notary Public in and for the State of Texas

My Commission Expires: _____

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 65 27

CONDITIONAL WAIVER AND RELEASE UPON FINAL PAYMENT

Legal Project Name: _____

SJRA Project No.: _____

Contractor's Company Name ("Contractor"): _____

Address: _____

On receipt by Contractor of a check from the San Jacinto River Authority ("SJRA") in the sum of $_____ payable to Contractor, and when the check has been properly endorsed and has been paid by the bank on which it is drawn, this document becomes effective to waive and release any and all rights, claims and causes of action which Contractor may have against SJRA, including but not limited to any and all claims for costs, expenses and damages incurred by Contractor, arising out of or related to all labor, materials, equipment and/or services furnished for incorporation in or use or work on the Project, except for the following pending claims, if any:

Description of Claim	Amount ($)

Contractor warrants that Contractor has already paid or will use the funds received from this payment to promptly pay in full all amounts due the Contractor's laborers, Subcontractors, materialmen, vendors and suppliers for all work, materials, equipment, and/or services provided for or to the above referenced Project.

Date _____

_____ (Contractor name)

By: _____ (Signature)

_____ (Title)

This instrument was executed and acknowledged before me on this ___ day of _____, 20__, by _____, known to me as the person whose name is subscribed above, as _____ [title] of _____ [company], on behalf of and as the authorized act of said entity.

_____
Notary Public in and for the State of Texas

My Commission Expires: _____

THIS PAGE INTENTIONALLY LEFT BLANK

Section 00 72 00
GENERAL CONDITIONS OF THE CONTRACT

Table of Contents

ARTICLE 1 – DEFINITIONS

UNLESS OTHERWISE STATED IN THE CONTRACT DOCUMENTS, WORDS WHICH HAVE WELL-KNOWN TECHNICAL OR CONSTRUCTION INDUSTRY MEANINGS ARE USED IN THE CONTRACT DOCUMENTS IN ACCORDANCE WITH SUCH RECOGNIZED MEANINGS.

Whenever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

1.001 **Addendum:** Written instruments issued by the Contract Awarding Authority which clarify, correct or change the bidding requirements or the Contract Documents prior to the Due Date. "Addenda" is the plural form of Addendum.

1.002 **Agreement:** Document signed by the Parties and binding the Parties, containing the name of Contractor, title and location of the Project, original Contract Time Requirements, Original Contract Amount, enumeration of documents included in the Contract and other provisions.

1.003 **Allowance:** A not-to-exceed amount which is established between the Owner and the Contractor as part of the Contractor's Bid/Proposal when the precise scope of a particular line item has not been defined to a level which is adequate for the Contractor to provide definitive line item pricing for that particular scope of Work. The use of any Allowances by the Contractor in any Bid/Proposal will be subject to the Owner's sole approval. Additional Allowances or adjustments can be added to any Bid/Proposal upon the agreement of the Owner and Contractor.

1.004 **Alternative Dispute Resolution:** The process by which a disputed Claim may be settled if the Owner and the Contractor cannot reach an agreement between themselves, as an alternative to litigation.

1.005 **Application for Payment:** Is the Contractor's monthly pay application, the form of which must be acceptable to the Owner.

1.006 **Bid/Proposal:** A complete, properly signed response to an Invitation for Bid/Proposal that, if accepted, would bind the Bidder/Offeror to perform the resultant Contract.

1.007 **Bidder/Offeror:** A person, firm, or entity that submits a Bid/Proposal in response to an Invitation for Bids/Proposals. Any Bidder/Offeror may be represented by an agent after submitting evidence reasonably satisfactory to Owner demonstrating the agent's authority to bind the Bidder/Offeror. The agent cannot certify as to his own agency status.

1.008 **Bid/Proposal Documents:** The Advertisement or Invitation for Bids/Proposals, Instructions to Bidders/Offerors, the Bid/Proposal Form, the Contract Documents and Addenda.

1.009 **Bonds:** Performance Bond, Payment Bond, Maintenance Bond, and other Surety instruments executed by Surety. When in singular form the term refers to an individual instrument.

1.010 **Calendar Day:** Any day of the week; no days being excepted. Work on Saturdays, Sundays, and/or Legal Holidays shall be as approved by and coordinated with Owner.

1.011 **Change Directive:** A written directive to Contractor, signed by Owner, ordering a change in the Work that is within the general scope of the Contract and consisting of additions, deletions, or other revisions and stating a proposed basis for adjustment, if any, in the Contract Amount or Contract Time Requirements, or both. A Change Directive may be used in the absence of total agreement on the terms of a Change Order. A Change Directive can change the Contract Amount or Contract Time Requirements, and the parties may reasonably expect that the

change directed or documented by a Change Directive will be incorporated in a subsequently issued Change Order.

1.012 Change Orders: Written agreements entered into between Contractor and Owner authorizing an addition, deletion, or revision to the Contract, issued on or after the Execution Date of the Contract.

1.013 CMT Consultant: Owner's consultant responsible for the testing of construction materials engineering, and the verification testing services necessary for acceptance of the Work by the Owner as required by Section 2267.058(a) of the Texas Government Code.

1.014 Claim: A written demand or written assertion by the Owner or the Contractor seeking, as a matter of right, an adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The Party making the Claim has the responsibility to substantiate the Claim.

1.015 Commissioning: This is the process of verification, preliminary testing, starting up and functional operations testing of all equipment and systems which are part of the Project. The term "commissioning" shall specifically include the drafting, review and verification of all test plans and test reports for all equipment and systems which are part of the Project.

1.016 Construction Documents: Means the Plans or Drawings and the Specifications and such other documents incorporated into the Contract Documents that set out the Contractor's scope of work to be performed under the Contract and/or the technical requirements for the design and construction of the Work.

1.017 Contractor: Means the individual, firm, corporation, or other business entity identified as such in the Agreement, including its successors and its authorized representatives, with whom Owner has entered into the Contract for performance of the Work. The Contractor may also be referred to as the "Bidder" or "Offeror" in the Contract Documents, both of which will be understood to mean the "Contractor" as identified in the Agreement.

1.018 Construction Phase: Means the implementation and execution of the Work required by the Contract Documents, commencing with the Notice to Proceed for the Work.

1.019 Contract: The binding legal agreement between the Owner and the Contractor including all documents that have been incorporated into the agreement between Owner and Contractor for performance of the Work, as evidenced by the Contract Documents, and into which these General Conditions of the Contract (General Conditions) have been incorporated.

1.020 Contract Amount: The monetary amount stated in the Agreement as it may be adjusted by Change Order or Change Directive, payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents.

1.021 Contract Awarding Authority: The SJRA Board of Directors. When authorized by the SJRA Board of Directors, the SJRA General Manager may enter into Contracts on behalf of the SJRA.

1.022 Contract Documents: Those items so designated in the Agreement. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of physical subsurface, geotechnical or environmental conditions are not Contract Documents.

1.023 Contract Time Requirements: Means those requirements for the timely performance of the Work as set forth in the Agreement, including Milestones and the required dates for Mechanical Completion, Substantial Completion and Final Completion.

1.024 Cost of the Work: Has the meaning set forth in Article 11.5.

1.025 Critical Path: The longest series of tasks that runs consecutively from the beginning to the end of the Work, as determined by duration and workflow sequence. This longest path determines how quickly the Work can be completed, given appropriate resources.

1.026 Day: Means that twenty-four hour period measured from midnight to the next midnight. When any period is referred to in days, it will be computed to exclude the first and include the last day of such period.

1.027 Defective: Means with respect to any Work, failing to conform in any respect to any one or more requirements of the Contract Documents.

1.028 Delay: Means a delay, disruption, hindrance, interference, acceleration, recovery effort, or loss of productivity or efficiency, or any other impact whatsoever with respect to the Critical Path of the Work.

1.029 Discrepancies: Means any error, omission, conflict, inconsistency, discrepancy, or lack of clarity in the Contract Documents discovered by the Contractor or that should reasonably have been discovered by the Contractor in fulfilling its obligations arising from the Contract and based upon its applicable standard of care as a Contractor and not as a design professional. The Discrepancy must be determinable by the Contractor through an evaluation of one or more drawings or specifications which are part of the Construction Documents, the above-grade Site conditions, geotechnical reports, surveys or other information provided to Contractor by Owner or any combination thereof.

1.030 Division 01: Means the General Requirements (Division One) of the Specifications made a part of the Construction Documents, whether such Specifications are set out in a separate document or are part of the Project Manual.

1.031 Document Control: This is the process of generating, transmitting, receiving, recording, filing and distributing documents and records generated by the Project Team Members and others during the execution of the Project. The process may utilize an electronic or paper format, or both.

1.032 Drawings: Those portions of the Contract Documents which are graphic and pictorial representations of the scope, extent and character of the Work to be furnished and performed by Contractor and which have been approved by Owner. Drawings may include plans, elevations, sections, details, schedules and diagrams. Shop Drawings are not Drawings.

1.033 Due Date: The date and time specified for receipt of Bids/Proposals or any other required submittal from the Contractor.

1.034 Equal: The terms "equal" or "approved equal" shall have the same meaning.

1.035 Execution Date: Date of last signature of the parties to the Agreement.

1.036 Field Order: A written authorization by the Owner for a minor variation in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Amount or Contract Time Requirements and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

1.037 Final Completion: The point in time when Owner determines that all Work has been completed and the Contract fully performed except for those obligations that survive final payment.

1.038 Force Account: A basis of payment for the direct performance of Work with payment based on the Cost of the Work and consideration for overhead and profit, as set forth in Section 11.5.

1.039 Force Majeure: For purposes of this Contract, events of "force majeure" shall consist of the following, to the extent that they are beyond the reasonable control of Contractor and also cause Delay to the Critical Path of the Project: acts of God, acts of war, terrorist acts, civil unrest, riots, labor disputes (excluding

disputes with laborers on the Project), unavoidable material shortages, fire or other casualty loss (not attributable to the acts or omissions of Contractor or any Subcontractor of any tier), newly announced or enacted governmental restrictions, or acts or inactions of governmental agencies other than the Owner and outside of the Owner's responsibility and control.

1.040 Hazardous Conditions: Are any materials, wastes, substances, and chemicals deemed to be hazardous under applicable Legal Requirements or the handling, storage, remediation, or disposal of which are regulated by applicable Legal Requirements.

1.041 Not used.

1.042 Legal Requirements: Are all applicable federal, state, and local laws, codes, ordinances, rules, regulations, orders, and decrees of any governmental or quasi-governmental entity having jurisdiction over the Project or Site, the practices involved in the Project or Site or any Work.

1.043 Legal Holidays:

.1 The following are recognized by the Owner:

Holiday Observed	Date
New Year's Day	January 1
Martin Luther King Day	Third Monday in January
Presidents' Day	Third Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4
Labor Day	First Monday in September
Veterans Day	November 11
Thanksgiving Day	Fourth Thursday in November
Friday after Thanksgiving	Friday after Thanksgiving
Christmas Eve	December 24
Christmas Day	December 25

.**2** If a Legal Holiday falls on Saturday, it will be observed on the preceding Friday. If a Legal Holiday falls on Sunday, it will be observed on the following Monday.

1.044 Major Subcontractor: Means a Subcontractor of the Contractor whose Subcontract amount with the Contractor exceeds or is reasonably expected to exceed the sum of $50,000.00.

1.045 Manufacturer: An individual or entity who produces goods, materials, or equipment for use or sale and has a direct contract with Contractor or Supplier or any Subcontractor or Sub-Subcontractor to furnish materials or equipment to be incorporated in the Work.

1.046 Master Project Schedule: Is the most recent version of the Contractor's Project Schedule which has been formally accepted by the Owner.

1.047 Mechanical Completion: Means when the specified Work has been delivered, constructed, installed, and Contractor has successfully completed all required local functional testing, obtained Manufacturers' certificates of proper installation, and completed operations readiness testing such that all improvements and equipment are ready for performance testing.

1.048 Milestones: Means a significant event specified in the Owner's Project Schedule or the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

1.049 Modification: Means a written amendment to the Contract, including but not limited to (1) a Change Order, or (2) a Change Directive.

1.050 **Notice to Proceed:** A Written Notice given by Owner to Contractor fixing the date on which the Contract Time Requirements will commence to run by establishing Date of Commencement of the Work covered by the Written Notice and on which Contractor shall start to perform Contractor's obligations under the Contract Documents for such Work.

1.051 **Owner:** The San Jacinto River Authority (the "SJRA" or the "Owner"), a public entity, organized and existing under the laws of the State of Texas, acting through the SJRA Board of Directors, the SJRA General Manager or his/her designee, officers, agents or employees to administer design and construction of the Project.

1.052 **Owner's Independent Contractor:** A contractor who has been employed separately by the Owner and is not a Subcontractor of the Contractor.

1.053 **Owner's Project Schedule:** Means the dates indicated in the Instructions to Bidders/Offerors and all Contract Time Requirements.

1.054 **Owner's Representative:** The designated representative or representatives of the Owner. Owner's Representative may be designated from the Owner's staff, the Principal Architect/Engineer, an Owner's Independent Contractor(s), or an Owner's consultant(s) employed for the purpose of representing the Owner on a given Project or Projects.

1.055 **Partial Occupancy or Use:** Use by Owner of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work, provided Owner and Contractor have, with respect to such part of the Work, accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, utilities, corrective work, insurance and warranties.

1.056 **Pre-construction Conference:** Is the required meeting between the Owner and the Contractor before Work can be initiated in the field. Contractor will have made all of the required submittals prior to the date of the Pre-construction Conference in accordance with Section 2.4.2.

1.057 **Preliminary Project Schedule:** Is the initial Contractor's Schedule for the Work required under Section 2.4.2 and must conform to and be integrated with the Milestones contained in the Owner's Project Schedule for the Work and is subject to Owner's approval.

1.058 **Principal Architect/Engineer (Engineer)**: The Owner's design professional identified as such in the Contract. The terms "Principal Architect/Engineer" and "Engineer", as indicated with initial capital letters, mean the same entity, as defined in the Agreement. References to Principal Architect/Engineer in these General Conditions shall refer to the Owner's Principal Architect/Engineer (Engineer), except as otherwise expressly provided herein. Nothing contained in the Contract Documents shall create any contractual or agency relationship between the respective Principal Architect/Engineer and Contractor. References can be singular or plural and will apply to all of the Principal Architects or Engineers as may be applicable.

1.059 **Project:** Total construction, of which the Work performed under Contract may be the whole or part, and which may include construction by the Owner or by Owner's Independent Contractors.

1.060 **Project Manual:** That portion of the Contract Documents which may include the following: introductory information; bidding requirements, Contract forms, Agreement, General Conditions, Supplemental General Conditions; General Requirements; Specifications; Drawings; Project Safety Manual; and Addenda.

1.061 **Project Schedule:** Is the Contractor's most recent schedule submitted to the Owner.

1.062 **Project Team:** Means the Owner, the Owner's Representative, the Contractor, the Principal Architect/Engineer, any consultants of the Principal Architect/Engineer designated by the Owner, any Owner's Independent Contractors, and any Owner's consultants employed for the purpose of programming, design, and construction of the Project. The constitution of the Project Team may vary at different stages of the Work. The Project Team will be designated by Owner and may be modified from time to time by Owner.

1.063 **Not used.**

1.064 **Recovery Schedule:** Means a short duration schedule implemented to bring the Work back on schedule to achieve the Contract Time Requirements for the Project.

1.065 **Rental Rate Blue Book:** Is the document published by EquipmentWatch which identifies the rental rates for equipment in the construction industry.

1.066 **Resident Project Representative:** The authorized representative of the Owner's staff, the Principal Architect/Engineer, or an Owner's consultant who may be assigned to the Site or any part thereof. Not all Projects will utilize a Resident Project Representative.

1.067 **Schedule of Values:** Is a schedule, prepared and maintained by the Contractor, allocating portions of the Contract Amount to various portions of the Work, including a tabulation of all of the costs of the various Subcontracts and materials which in the aggregate make up the Contract Amount. The Schedule of Values shall be subject to Owner's approval and, after such approval, be used as the basis for reviewing the Contractor's Applications For Payment.

1.068 **Scope of Work:** Is the entire Work which is included within the Contract for this Project. This term can also be used to describe the subset of Work which is included within a particular Trade Subcontract.

1.069 **Shop Drawings:** All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled for the Work by or for Contractor, subcontractor or supplier and submitted by Contractor as required by the Contract Documents.

1.070 **Site:** Is the land or premises on which the Project is located.

1.071 **Specifications:** Those portions of the Contract Documents furnished by Owner through its respective Principal Architects/Engineers consisting of written technical descriptions as applied to the Work, which set forth to Contractor, in detail, the requirements which must be met by all materials, equipment, construction, systems, standards, workmanship, and services as applied to the Work and certain administrative requirements and procedural matters.

1.072 **Start-Up:** This is the subset of Commissioning at which time the Project equipment and / or systems are placed in full operation in preparation for the operational testing phase of the Project.

1.073 **Stipulated Sum:** Single lump sum amount stated for the completion of the Work or a portion thereof required by this Contract.

1.074 **Substantial Completion:** The stage in the progress of the Work when the Work, or designated portion thereof, is sufficiently complete in accordance with the Contract Documents so Owner can occupy or utilize the Work for its intended use, as evidenced by a Certificate of Substantial Completion approved by Owner, as further defined in Article 14.07.

1.075 **Subcontractor (or Trade Subcontractor):** An individual, firm, corporation, or other business entity having a direct contract with the Contractor for the performance of a portion of the Work under the Contract. A Subcontractor includes a supplier of tools, equipment or materials as well as an individual or entity renting tools or equipment to the Contractor. For purposes of this

Contract, unless designated otherwise, the term "Subcontractor" shall include all Sub-Subcontractors and Suppliers in contractual privity to the Subcontractor.

1.076 Sub-Subcontractor: An individual, firm, corporation, or other business entity who has a direct or indirect contract with a Subcontractor of any tier to perform a portion of the Work, to furnish tools, equipment or materials, or to rent tools or equipment. For purposes of this Contract, unless designated otherwise, the term "Sub-Subcontractor" shall include all lower tier subcontractors and Suppliers in contractual privity to the Sub-Subcontractor.

1.077 Superintendent: The representative of Contractor authorized in writing to receive and fulfill instructions from the Owner's Representative, and who shall supervise and direct construction of the Work.

1.078 Supplemental General Conditions: The part of the Contract Documents which amends or supplements the General Conditions, but only to the extent provided therein. Not all Projects will utilize Supplemental General Conditions. All General Conditions which are not so amended or supplemented remain in full force and effect.

1.079 Supplier: An individual or entity having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment or products, or services to be incorporated in the Work by Contractor or any Subcontractor.

1.080 Surety: Corporate entity that is bound by one or more Bonds, and is responsible for the completion of the Work, including during the correction period, and for payment of debts incurred by Contractor or Subcontractors for work, services, labor, materials or equipment provided in connection with the Work. Surety shall include any co-surety or reinsurer, as applicable.

1.081 Underground Improvements: Is defined in Section 4.2.3 of these General Conditions.

1.082 Unit Price: An amount stated in the Contract for an individual, measurable item of work, which, when multiplied by actual quantity incorporated into the Work, amounts to full compensation for completion of the item, including work incidental to it.

1.083 Unit Price Quantities: Quantities indicated in the Contract that are approximations made by the Owner for contracting purposes.

1.084 Unit Price Work: Is any Work which is to be executed based upon a Unit Price for that Work which has been agreed upon in advance between the Parties in accordance with Section 11.6 of these General Conditions.

1.085 Unusual Inclement Weather: Is defined in Section 12.2 of these General Conditions.

1.086 Value Analysis: Means the systematic application of recognized techniques by a multi-disciplined team to identify the function of a product or service, establish a worth for that function, generate alternatives through the use of creative thinking, and provide the needed functions to accomplish the original purpose of the Project, reliably, without sacrificing safety, necessary quality, or environmental attributes of the Project.

1.087 Work: The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents, including all labor, products, equipment, material, supervision, insurance, temporary facilities and services provided by Contractor to fulfill Contractor's obligations. The Work may constitute the whole or a portion of the Project.

1.088 Working Day: Any day of the week, not including Saturdays, Sundays, or Legal Holidays in which conditions under the Contractor's control will permit work for a continuous period of not less than seven (7) hours during Working Hours. Upon agreement with Owner, work on Saturdays, Sundays and/or Legal Holidays may be allowed and will be considered a Working Day.

1.089 Working Hours: Those hours in which the Work shall be performed. Except as otherwise authorized in writing by Owner's, all Work shall be done between 7:00 a.m. and 6:00 p.m. However, emergency work may be done without prior permission as indicated in Section 6.11.07. Night Work may be revoked at any time by Owner if Contractor fails to maintain adequate equipment and supervision for the prosecution and control of the night Work.

1.090 Written Notice: Written communication between Owner and Contractor. Written Notice shall be deemed to have been duly served if delivered in person to Owner's Representative or Contractor's duly authorized representative, or if delivered at or sent by registered or certified mail with proper postage affixed to the attention of Owner's Representative or Contractor's duly authorized representative at the last business address known to the party giving notice, or by facsimile to the facsimile number known to the party giving notice, provided any notice delivered by facsimile after 5:00PM shall be deemed delivered on the next business day.

ARTICLE 2 - PRELIMINARY MATTERS

2.1 Delivery of Contract, Bonds, Insurance, etc.: After written notification to Contractor of anticipated award of Contract, and at least ten (10) days prior to the SJRA Board of Directors Meeting at which a contract award is anticipated, Contractor shall deliver to Owner original, hard copies of the signed Agreement, unsigned Bond forms, required evidence of insurance, including without limitation, all certificates of insurance and endorsements, signed disclosure of interested parties (Form 1295), signed Conflict of interest Questionnaire, and signed and notarized Verification Company Does Not Boycott Israel, as identified in the Bid/Proposal Documents. Within three (3) days of Contractor's receipt of the fully executed Agreement, the Contractor shall deliver the original, hard copy fully executed Bonds to Owner. The requirements of this Section 2.1 apply regardless of whether or not the Agreement is also executed using electronic signatures or transmitted electronically. Any violation of this Section 2.1 by Contractor shall render the Contract voidable by Owner.

2.2 Copies of Documents: Owner shall furnish to Contractor up to ten (10) copies of the Contract Documents unless otherwise specified. Additional copies will be furnished, upon request, at a cost to be specified by the Owner.

2.3 Commencement of Contract Time Requirements; Notice to Proceed: The applicable Contract Time Requirements will begin to run on the day indicated in the Notice to Proceed for the Work covered in such Notice.

2.4 Before Starting Construction:

2.4.1 No Work shall be done at the Project Site prior to the Pre-construction Conference without Owner's written approval. Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents to check and verify pertinent figures shown thereon and compare them accurately to all applicable field measurements and conditions and other information known to Contractor and other information made available to Contractor by Owner. Contractor shall promptly report in writing to Owner's Representative any conflict, error, ambiguity or Discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Owner's Representative before proceeding with any Work affected thereby. Contractor shall be liable to Owner for failure to report any conflict, error, ambiguity or

Discrepancy in the Contract Documents about which Contractor knew or reasonably should have known.

2.4.2 Successful completion of the Work within the applicable Contract Time Requirements is of primary importance. **Time is of the essence to this Contract.** Therefore, the Contractor hereby agrees to submit to the Owner's Representative for review and approval, or acceptance, as appropriate, all information required by this section, including a Preliminary Project Schedule for the Work within thirty (30) days from date of the Owner's issuance of the Notice To Proceed with the Work or at the scheduled Pre-construction Conference, whichever is later. The Owner's Representative will schedule the Pre-construction Conference upon the timely submittal of the required documents, unless the allowable time for providing the required submittals is extended by written mutual agreement. Prior to the date scheduled for the Pre-construction Conference, the Contractor will submit the following to the Owner:

.01 A proposed Preliminary Project Schedule (the "Preliminary Project Schedule") for the Work developed using the scheduling software authorized in Section 6.03 of the General Conditions, unless otherwise approved by Owner, to confirm that all Work will be completed within the respective Contract Time Requirements. The Preliminary Project Schedule must satisfy the requirements of Section 6.03 of these General Conditions and must be prepared in accordance with Division 01 - Section 01 32 16, Construction Progress Schedules. Such Preliminary Project Schedule shall also conform to the Owner's Project Schedule. This Preliminary Project Schedule must contain sufficient detail to indicate that the Contractor has properly identified required Work elements and tasks, has provided for a sufficient and proper workforce and integration of Subcontractors and Suppliers, has provided sufficient resources and has considered the proper sequencing of the Work required to result in a successful Project that can be completed within the Contract Time Requirements. The Project Schedule and Schedule of Values shall be developed together to permit the Work progress to be accurately reflected in the Contractor's Applications for Payment.

.02 An organizational chart showing the principals and management personnel who will be involved with the Work, including each one's responsibilities for the Work;

.03 A complete listing of the Contractor's key employees proposed for the Work. List each one by name and job title, and show length of employment with Contractor.

.04 Emergency contact telephone numbers for the Project Manager and the project Superintendent.

.05 A discussion and confirmation of the Contractor's commitment to health, safety and environment by providing a copy of its Health, Safety and Environmental Policies, employee's safety handbook and the safety records for the past three years of Contractor's proposed project manager and Superintendent;

.06 A preliminary schedule of Shop Drawings and sample submittals;

.07 A preliminary Schedule of Values for all of the Work, subdivided into component parts in sufficient detail to serve as the basis for progress payments during construction. At a minimum, the schedule of values

shall be broken out by trade and split between materials and labor as commented on and accepted by Owner. Such prices will include overhead and profit applicable to each item of Work;

.08 A letter designating Contractor's Superintendent and project manager, and a confirmation of past project experience for the Contractor's Superintendent and project manager specifically applicable to the Work;

.09 A letter designating the "Competent Person(s)" on general safety and excavation safety measures along with certifications or other documentation of the safety representative's qualifications;

.10 If applicable, an excavation safety system plan;

.11 If applicable, a plan illustrating proposed locations of temporary facilities;

.12 A letter designating the Texas Registered Professional Land Surveyor for layout of the Work, if the Work requires the services of a licensed surveyor.

2.4.3 Neither the rejection, acceptance, comment on nor the approval of any of the submittals required in Section 2.4.2, above, will constitute either the adoption, affirmation, or direction of the Contractor's means and methods of the performance of the Work which remain the sole responsibility of the Contractor. Owner shall not be responsible for, and will not have control or charge of, construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and shall not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. Owner shall not be responsible for or have control or charge over the acts or omissions of Contractor, Subcontractors or any of their agents or employees or any other persons performing any of the Work.

2.5 Pre-construction Conference: Prior to commencement of Work at the Site, Contractor must attend a Pre-construction Conference with Owner's Representative and others required by Owner, and participate in an inspection of the Project Site if required by Owner.

2.6 Initially Acceptable Schedules: Unless otherwise provided in the Contract Documents, Contractor shall obtain approval of Owner of the Preliminary Project Schedule submitted in accordance with Section 2.4.2.01 before the first progress payment will be made to Contractor. The Preliminary Project Schedule must provide for an orderly progression of the designated portion of the Work to completion within the Contract Time Requirements, including any specified Milestones, and shall permit the Work progress to be accurately reflected in the Contractor's Applications for Payment. Approval of the Preliminary Project Schedule by Owner will not impose on Owner responsibility or liability for the sequencing, scheduling or progress of the Work, nor shall it constitute interference with, nor shall it relieve Contractor from Contractor's full responsibility for the Work. Contractor's schedule of Shop Drawings and sample submissions shall provide adequate time, in Owner's opinion, for properly reviewing and processing the required submittals. Contractor's Schedule of Values must conform to the requirements set forth in the Contract. The process of approving Preliminary Project Schedule and updates to the Master Project Schedule shall not constitute a warranty by the Owner that any non-Contractor milestones or activities will occur as set out on the Preliminary Project Schedule or the Master Project Schedule, or approval of the logic set out in the Preliminary Project Schedule

or Master Project Schedule. Approval of the Preliminary Project Schedule, the Master Project Schedule or any updates thereto does not constitute a warranty by the Owner to furnish any Owner-furnished information or services any earlier than Owner would otherwise be obligated to furnish that information or services under the Contract Documents. Failure of the Work to proceed in the sequence scheduled by Contractor shall not serve as any basis for a Claim for additional compensation or adjustment of the Contract Time Requirements.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 Intent: The intent of the Contract Documents is to include all information necessary for the proper execution and timely completion of the Work by Contractor. The Contractor will execute the Work described in and reasonably inferable from the Contract Documents as necessary to produce the results intended by the Contract Documents.

3.1.1 The Contract Documents are complementary in nature, and what is shown in one location on the Drawings or Specifications shall be construed to apply to all other similar locations of the Drawings and Specifications. In the event of any internal inconsistency in either the Drawings or Specifications, or with each other, the Owner shall resolve such inconsistency and Contractor shall perform in accordance with the Owner's determination. In the determination of the Contract Amount, the Contractor has provided for such further development consistent with the Contract Documents and reasonably inferable therefrom. It is the intent and understanding of Contractor that the Contract Amount includes the construction of completed and tested Work by the Contractor, including all devices, fasteners, materials or other work not shown in the Drawings and Specifications but which are reasonably inferable therefrom and any and all incidental accessories necessary to make the Work complete and operable in all respects (even if not specified in the description of the Work, but necessary for proper installation and operation of the Work under the Drawings and Specifications), all of which shall be included in the Contract Amount.

3.1.2 The expression "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising the care, skill and diligence of the Contractor required by the Contract Documents. Such further development does not include such things as changes in scope, systems, kinds and quality of materials, finishes or equipment, all of which, if required, shall be incorporated by Change Order or Change Directive. The Contract Documents shall be interpreted with the understanding that a common sense approach will be utilized as necessary so that the Contract Documents produce the intended results for the benefit of the Owner as follows:

.1 The Contract Documents are intended to be complimentary and interpreted in harmony so as to avoid conflict. Words and phrases will be interpreted in a manner consistent with construction and design industry standards. What is required by any Contract Document shall be required by all of them;

.2 In the event of any inconsistency, conflict or ambiguity between or among the Contract Documents that cannot be harmonized so as to avoid conflict, the Contract Documents shall take precedence in the

following order: Modifications, documents amending, modifying or supplementing the Contract Documents pursuant to Article 3.3 of the General Conditions, the Agreement, Exhibits to the Agreement, the Supplemental Conditions (if any), the General Conditions, Instructions to Bidders/Offerors, Notice to Proceed, Addenda, Specifications, Drawings, Contractor's Bid/Proposal, Documentation submitted by Contractor prior to Notice of Award and attached to the Agreement, Performance, Payment and Maintenance Bonds; and

.3 The definitions of terms herein shall apply equally to the singular and plural forms of the terms defined. Whenever the context may require, any pronoun shall include the corresponding masculine, feminine and neuter forms. The words "include", "includes" and "including" shall be deemed to be followed by the phrase "without limitation". Unless the context requires otherwise (a) any definition of or reference to any agreement, instrument or other document herein shall be construed as referring to such agreement, instrument or other document as from time to time amended, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein), (b) any reference herein to any Party shall be construed to include such Party's successors and assigns (subject to the restrictions contained herein), and (c) the words "herein", "hereof" and "hereunder", and words of similar import, shall be construed to refer to the entirety of the Contract Documents and not to any particular provision, unless the context clearly dictates otherwise. No provision of this Agreement shall be interpreted or construed against any Party because such Party or its legal representative drafted such provision.

3.1.3 Standards, Specifications, Codes, Laws, and Regulations

.1 Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Legal Requirements, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Legal Requirements in effect at the time of opening of Bids/Proposals (or on the Effective Date of the Agreement if there were no Bids/Proposals) and as amended, modified, codified or reenacted, in whole or in part, and in effect from time to time, except as may be otherwise specifically stated in the Contract Documents.

.2 No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or the Principal Architect/Engineer, or any of their related entities any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.2 Reporting and Resolving Discrepancies: If, during the performance of the Work, Contractor discovers any Discrepancy within the Contract Documents or

between the Contract Documents and any provisions of any Legal Requirements or of any such standard, specification, manual or code or instructions of any Supplier, Contractor shall report it to Owner's Representative in writing at once, and Contractor shall not proceed with the Work affected thereby until a clarification, an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Section 3.3.1 or Section 3.3.2 below. Contractor shall be liable to Owner for failure to report any such Discrepancy that Contractor knew about or should reasonably have discovered in fulfilling its obligations arising from the Contract.

3.3 Clarifying, Amending and Supplementing Contract Documents:

3.3.1 The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

.1 Change Order.
.2 Change Directive.

3.3.2 In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work that do not affect the Contract Amount or Contract Time Requirements may be authorized, in one or more of the following ways:

.1 Field Order.
.2 Shop Drawing or sample approved in accordance with the Contract Documents.
.3 Written interpretation or clarification issued in accordance with the Contract Documents.

3.4 Reuse of Documents Prohibited: Contractor and any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with Owner: (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of Principal Architect/Engineer or Principal Architect/Engineer's consultant, and (ii) shall not reuse any of such Drawings, Specifications, other documents or copies on extensions of the Project or any other project without written consent of Owner and Principal Architect/Engineer. Contractor may retain one (1) set of such documents for its records.

3.5 Not Used.

3.6 Electronic Data: Owner utilizes Microsoft SharePoint or similar document management software (the "Program") for its projects. Contractor will be provided access to the Program solely for purposes of Contractor's performance of its obligations under the Contract, at no cost to Contractor. The Program may be used to handle management, distribution and submission of all Project documents (including without limitation drawings, specifications, submittals, RFIs, schedules, etc.). Contractor must access the Program for all such Project documents, unless otherwise directed in writing by Owner. Contractor is responsible for all of the content contained in the Program related to the Project, including but not limited to all periodic updates, revisions and additions to the Project documents contained therein. All Project documents contained in the Program shall be deemed delivered to Contractor. Contractor is responsible for ensuring and maintaining compatibility of

Contractor's computer systems with the Program. Contractor shall take all necessary precautions to prevent any unauthorized access to the Program and the Project documents contained therein, and to prevent any virus or malware infiltration of the Program. **CONTRACTOR SHALL COMPLY WITH ALL MICROSOFT OR OTHER SIMILAR DOCUMENT MANAGEMENT SOFTWARE VENDOR TERMS AND CONDITIONS APPLICABLE TO CONTRACTOR'S USE OF THE PROGRAM, AND SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS OWNER FROM AND AGAINST ANY AND ALL CLAIMS, DAMAGES, LIABILITY, LOSS, COST AND EXPENSE, INCLUDING BUT NOT LIMITED TO ATTORNEYS' FEES, INCURRED AS A RESULT OF ANY CONTRACTOR BREACH OF SUCH TERMS AND CONDITIONS (COLLECTIVELY "CLAIMS" AS USED IN THIS SECTION 3.6), EVEN IF SUCH CLAIMS ARE CAUSED IN PART BY, BUT NOT TO THE EXTENT CAUSED BY, THE NEGLIGENCE OR FAULT, THE BREACH OR VIOLATION OF A STATUTE, ORDINANCE, GOVERNMENTAL REGULATION, STANDARD, OR RULE, OR THE BREACH OF CONTRACT OF OWNER, ITS AGENT OR EMPLOYEE, OR ANY THIRD PARTY UNDER THE CONTROL OR SUPERVISION OF OWNER, OTHER THAN CONTRACTOR OR ITS AGENT, EMPLOYEE OR SUBCONTRACTOR OF ANY TIER**. Any use, interpretation, conclusion or information obtained or derived from such Program information and documents will be at the user's sole risk. If there is a conflict or inconsistency between the Program information or documents and any hard copies furnished to Contractor, Contractor shall promptly notify Owner and Principal Architect/Engineer in writing, and shall not rely upon such Program information or documents or the hard copies furnished to Contractor until such conflict or inconsistency is resolved in writing by Owner or Principal Architect/Engineer. When distributing documents in electronic media format, Owner makes no representations as to compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those which are used by Owner or the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

4.1 Availability of Lands: The Owner will provide access to all land and interests in land required for the Work and will notify Contractor of any known restrictions in such access. Contractor may make a Claim if, after having received seventy-two hours' prior written notice, the Owner fails to provide timely access to the Work. Contractor is solely responsible for and must obtain any additional temporary construction facilities, stockpiling or storage sites not otherwise provided by the Owner.

4.1.1 In the event that Owner has agreed to provide any special licenses or easement(s) relating to the Work and in the event that Delays in the Work that are the responsibility of the Contractor cause the Work to be Delayed to the point that the ending date of such a license or easement has been exceeded, the Contractor shall reimburse the Owner for any additional costs and/or expenses incurred by Owner (including but not limited to reasonable attorneys' fees) in endeavoring to extend or renew the duration of any such license or easement in order to facilitate the completion of the Work.

4.2 Subsurface and Physical Conditions:

4.2.1 Contractor specifically represents that it has carefully examined the plans, the geotechnical report, if any, and the Site of the proposed Work and is thoroughly familiar with all of the conditions surrounding construction of the Project, having had the opportunity to conduct any and all additional inquiry, tests and investigation that he/she deems necessary and proper, to satisfy itself as to conditions, including but not limited to subsurface conditions, at the Site of the Work, and to inform itself by its independent research, tests and investigations of the difficulties to be encountered and to judge for itself the accessibility of the Work and all attending circumstances affecting the cost of doing the Work or time required for its completion. Contractor acknowledges the receipt of the geotechnical report, if any, and agrees that the report is not a guarantee of specific Site conditions which may vary between boring locations and over time, and is not a Contract Document. Contractor may not rely upon or make any Claim against Owner with respect to any Contractor interpretation of or conclusion drawn from any data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings. Contractor shall make no claims against the Owner and shall bear all risk of losses, if any, resulting on account of the amount and character of the Work, or because the conditions under which the Work must be done vary or differ from conditions or information contained in the Contract Documents, or are different from what were estimated or anticipated by it.

4.2.2 Except as provided in Section 4.2.5 below, Contractor must notify Owner in writing as soon as reasonably possible, but no later than three (3) calendar days, if unforeseen conditions are encountered at the Site which are (i) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or other information provided by Owner to Contractor or (ii) unknown physical conditions of an unusual nature, that differ materially from those normally encountered in the type of Work being performed under this Contract. Contractor may not disturb the conditions until Owner conducts an investigation of such conditions. Upon receipt of notice from the Contractor, the Owner's Representative will promptly investigate such conditions with the Principal Architect/Engineer.

4.2.3 Notwithstanding any other provision of this Contract, Contractor is solely responsible for the location and protection of any and all underground utilities, pipelines, facilities and improvements, whether public or private, and whether utility_distribution, supply or collection systems, or lines connecting customers to utility distribution, supply or collection systems, and including but not limited to all electric, telecommunication, gas, water, storm sewer and sanitary sewer lines, and all pipes, conduits, cables, wires, manholes, vaults, tanks, and tunnels (collectively "Underground Improvements"). Contractor shall notify "One Call" and shall retain a private underground locator service, and shall exercise due care to locate, mark, uncover and otherwise protect all Underground Improvements in the construction zone and any of Contractor's Work or storage areas. Contractor's responsibility for the location and protection of Underground Improvements is primary and non-delegable. **Contractor shall defend and indemnify Owner from and against any losses, Claims, expenses, costs or penalties (including fines that may be levied against Owner) that may result from damage to any Underground Improvements in the Work area.** Owner reserves the right to repair any damage Contractor causes to such Underground Improvements

at Contractor's expense or to offset the cost of such repairs against funds then or thereafter due Contractor pursuant to the Contract. If any Underground Improvements are damaged by Contractor, Contractor shall give verbal notice to the Owner's Representative within one (1) hour and written notice within twenty-four (24) hours after such damage occurs.

4.2.4 Contractor shall take reasonable precaution to avoid disturbing primitive records and antiquities of archaeological, paleontological or historical significance. No objects of this nature shall be disturbed without written permission of Owner and Archeology Division, Texas Historical Commission. When such objects are uncovered unexpectedly, Contractor shall stop all Work in close proximity and immediately notify the Owner's Representative and Archeology Division, Texas Historical Commission of their presence. Contractor shall reference Texas Water Development Board Emergency Conditions for cultural resources in the event of accidental discoveries. Contractor shall not disturb them until written permission and permit to do so is granted by the governing authorities and Owner. All primitive rights to antiquities uncovered on Owner's property shall remain property of State of Texas, Archeology Division, Texas Historical Commission in accordance with the Texas Natural Resources Code. If it is determined by Owner, in consultation with Archeology Division, Texas Historical Commission, that exploration or excavation of primitive records or antiquities on Project Site is necessary to avoid loss, Contractor shall cooperate in salvage work attendant to preservation. If the Work stoppage or salvage work causes an increase in Contractor's cost of, or time required for, performance of the Work, the Contract Amount and/or Contract Time Requirements will be equitably adjusted.

4.2.5 Environmental Conditions: Contractor shall immediately stop all Work and must notify Owner in writing as soon as reasonably possible, but no later than one (1) calendar day after any significant environmental conditions are encountered at the Site which are or may be subject to any Legal Requirements. Contractor shall reference Texas Water Development Board Emergency Conditions for threatened and endangered species in the event of accidental discoveries. Contractor shall not disturb the conditions until Owner conducts an investigation. Owner's Representative and Principal Architect/Engineer will promptly investigate such conditions. If it is determined that such conditions are subject to Legal Requirements, did not result from any Hazardous Conditions brought to the Site by Contractor or any Subcontractor, and cause an increase or decrease in the Contractor's cost of or time required for performance of any part of the Work, Owner's Representative will recommend an equitable adjustment in the Contract Amount or Contract Time Requirements, or both. If it is determined that such conditions are not subject to Legal Requirements or resulted from any Hazardous Conditions brought to the Site by Contractor or any Subcontractor, Owner's Representative will notify Contractor in writing of such findings and the Contract Amount and Contract Time Requirements will not be adjusted. Contractor may dispute such a determination in accordance with Article 16.

4.3 Reference Points: Unless otherwise specified, primary control lines and bench marks suitable for use in layout will be furnished by Owner. Lay out of the Work shall be performed in accordance with the requirements of Division 01. Controls, bench marks and property boundary markers shall be carefully preserved by

Contractor by use of flags, staffs or other visible devices and in case of destruction or removal by Contractor, any Subcontractor or their employees, such controls and bench marks shall be replaced by a Texas Registered Professional Land Surveyor at Contractor's expense. Any SJRA survey monuments damaged by Contractor will be reestablished by Owner at Contractor's expense.

4.4 Hazardous Conditions:

4.4.1 Contractor shall not be responsible for any Hazardous Conditions uncovered or revealed at the Site which were not shown, indicated or identified in the Contract Documents to be within the scope of the Work, and which were not brought onto the Site by the Contractor or the Subcontractors. Contractor shall immediately notify Owner's Representative of any such suspected Hazardous Conditions encountered at the Site before or during performance of the Work, and shall stop Work immediately in the affected area, and take all necessary precautions to avoid disturbance of the Hazardous Conditions.

4.4.2 Contractor shall be responsible for any Hazardous Conditions brought to the Site by Contractor, Subcontractor, Suppliers or anyone else for whom Contractor is responsible.

4.4.3 No asbestos-containing materials or lead-based paint shall be incorporated into the Work or brought on the Project Site without prior written approval of Owner. The Contractor shall not knowingly use, specify, request or approve for use any asbestos containing materials or lead-based paint without the Owner's written approval. When a specific product is specified, the Contractor shall endeavor to verify that the product does not include asbestos containing material or lead-based paint.

4.4.4 Refer to Section 1.040 Hazardous Conditions definitions and to Division 01 for procedures related thereto.

.1 Not used.

.2 Upon receiving notice of the presence of suspected Hazardous Conditions, Owner shall take the necessary measures required to ensure that the Hazardous Conditions are remediated or rendered harmless. Such necessary measures shall include Owner retaining qualified independent consultants to (i) ascertain whether Hazardous Conditions have actually been encountered, and, if they have been encountered, (ii) prescribe the remedial measures that Owner must take either to remove the Hazardous Conditions or render the Hazardous Conditions harmless.

.3 Contractor shall be obligated to resume Work at the affected area of the Project only after Owner or its qualified independent consultant provides written certification that (i) the Hazardous Conditions have been removed or rendered harmless and (ii) all necessary approvals have been obtained from all government and quasi-government entities having jurisdiction over the Project or Site. The Contractor shall be responsible for continuing the Work in the unaffected portion of the Project and Site.

.4 Contractor will be entitled, in accordance with these General Conditions, to an adjustment in its Contract Amount and/or Contract Time Requirements to the extent Contractor’s cost of performance is

actually increased and/or the Critical Path of the Work has been delayed by the presence of Hazardous Conditions discovered at the Site.

.5 Notwithstanding anything in the Contract Documents to the contrary, Owner, its officers, directors, agents and employees, and the Owner's Representative, the Principal Architect/Engineer, the Principal Architect/Engineer's Consultants and Subconsultants and their respective officers, directors, partners, employees and agents are not responsible for Hazardous Conditions introduced to the Site by Contractor, Subcontractors or anyone for whose acts they may be liable. Contractor shall be responsible for use, storage and remediation of any Hazardous Conditions brought to the Site by Contractor, Subcontractors, Suppliers or anyone else for whom Contractor is responsible. **Contractor shall defend, indemnify and hold harmless Owner and Owner's officers, directors, employees and agents and the Owner's Representative, the Principal Architect/Engineer, the Principal Architect/Engineer's Consultants and Subconsultants and their respective officers, directors, partners, employees and agents from and against any and all claims, losses, damages, liabilities and expenses, including attorneys' fees and court costs, arising out of or resulting from Hazardous Conditions introduced to the Site by Contractor, Subcontractors or anyone for whose acts they may be liable. Notwithstanding the foregoing, if Subchapter C of Chapter 151 of the Texas Insurance Code applies to the Contract, the obligation to defend, indemnify and hold harmless set forth in this Section 4.4.4.5 shall not apply to the extent prohibited by Subchapter C of Chapter 151 of the Texas Insurance Code.**

ARTICLE 5 - BONDS AND INSURANCE

5.1 Surety and Insurance Companies: All Bonds and insurance required by the Contract Documents shall be obtained from solvent surety or insurance companies that are duly admitted and licensed by the State of Texas and authorized to issue bonds or insurance policies for the limits and coverages required by the Contract Documents. Bonds shall be in a form acceptable to Owner and shall be issued by a surety which complies with the requirements of Chapter 3503 of the Texas Insurance Code. The Surety must obtain reinsurance for any portion of the risk that exceeds 10% of the Surety's capital and surplus. For bonds exceeding $100,000, the Surety must also hold a certificate of authority from the U.S. Secretary of the Treasury or have obtained reinsurance from a reinsurer that is authorized as a reinsurer in Texas and holds a certificate of authority from the U.S. Secretary of the Treasury and has an A.M. Best rating of A-, X or better.

5.2 Workers' Compensation Insurance Coverage:

5.2.1 Definitions:

.1 Certificate of coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the

division, or a coverage agreement (DWC Form-81, DWC Form-82, DWC Form-83, or DWC Form-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on the Project, for the duration of the Project.

.2 Duration of the Project - includes the time from the beginning of the Work on the Project until the Contractor's/person's Work on the Project has been completed and accepted by Owner.

.3 Persons providing services on the Project includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the Project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, Subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the Project.

.4 Services include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

5.2.2 Contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the Contractor providing services on the Project, for the duration of the Project.

5.2.3 Contractor must provide a certificate of coverage to Owner prior to being awarded the Contract.

5.2.4 If the coverage period shown on the Contractor's current certificate of coverage ends during the Duration of the Project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with Owner showing that coverage has been extended.

5.2.5 Contractor shall obtain from each person providing services on the Project, and provide to Owner:

.1 A certificate of coverage, prior to that person beginning Work on the Project, so Owner will have on file certificates of coverage showing coverage for all persons providing services on the Project; and

.2 No later than seven (7) days after receipt by Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the Duration of the Project.

5.2.6 Contractor shall retain all required certificates of coverage for the Duration of the Project and for one (1) year thereafter.

5.2.7 Contractor shall notify Owner in writing by certified mail or personal delivery, within ten (10) days after Contractor knew or should have known,

of any change that materially affects the provision of coverage of any person providing services on the Project.

5.2.8 Contractor shall post on each Project Site a notice, in the text, form and manner prescribed by the Texas Department of Insurance, Division of Workers' Compensation, informing all persons providing services on the Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

5.2.9 Contractor shall contractually require each person with whom it contracts to provide services on the Project, to:

.1 Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the Project, for the Duration of the Project;

.2 Provide to Contractor, prior to that person beginning Work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project, for the Duration of the Project;

.3 Provide Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the Duration of the Project;

.4 Obtain from each other person with whom it contracts, and provide to Contractor: a) a certificate of coverage, prior to the other person beginning Work on the Project; and b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the Duration of the Project;

.5 Retain all required certificates of coverage on file for the Duration of the Project and for one (1) year thereafter;

.6 Notify Owner in writing by certified mail or personal delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and

.7 Contractually require each person with whom it contracts, to perform as required by these Section 5.2.9.1 through Section 5.2.9.7, with the certificates of coverage to be provided to the person for whom they are providing services.

5.2.10 By signing this Contract or providing or causing to be provided a certificate of coverage, Contractor is representing to Owner that all employees of the Contractor who will provide services on the Project will be covered by workers' compensation coverage for the Duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the division. Providing false or misleading information may subject Contractor to administrative penalties, criminal penalties, civil penalties or other civil actions.

5.2.11 Contractor's failure to comply with any of these provisions is a breach of the Contract by Contractor which entitles Owner to declare the Contract void if Contractor does not remedy the breach within ten (10) days after receipt of notice of breach from Owner.

5.3 Additional Insurance Requirements:

5.3.1 Contractor And Subcontractor Provided Insurance: Contractor and Subcontractors shall obtain and maintain insurance coverages described in Sections 5.3.1.01 through 5.3.1.08 and, to the extent applicable, Sections 5.3.1.09 through 5.3.1.11 through the end of the warranty period (with the exception of Builders' Risk, which is required to remain in effect at least until final payment) or such longer periods of time as may be set forth herein; except that Subcontractors' limits of coverage for Commercial General Liability shall be no less than $1,000,000 per occurrence and $2,000,000 in the aggregate, Subcontractors shall not be required to maintain separate Builder's Risk Insurance, Subcontractors shall not be required to maintain Environmental Impairment Liability or Pollution Liability Insurance unless their Scope of Work involves Hazardous Conditions in which event such Subcontractors shall maintain such insurance with limits of coverage not less than $1,000,000 per occurrence and $2,000,000 in the aggregate, Subcontractors shall not be required to maintain Professional Liability coverage unless their Scope of Work includes professional services in which event such Subcontractors shall maintain such insurance with limits of coverage not less than $1,000,000 per occurrence and in the aggregate, and Subcontractors' limits of coverage for Umbrella Liability shall be no less than $3,000,000. All insurance secured by Contractor, Subcontractors and Sub-Subcontractors pursuant to Owner's requirements under this provision shall be in accordance with Article 5 of the General Conditions and Section 5.3.1.01 as follows.

5.3.1.01 General Requirements.

.01 Contractor shall carry insurance in the types and amounts indicated below for the Duration of the Project or such longer periods of time set forth below, and shall include coverage for items owned by Owner in the care, custody and control of Contractor prior to and during construction and the warranty period.

.02 Contractor shall forward Certificates of Insurance evidencing the coverage and limits of insurance required herein to Owner with copies to each additional insured and loss payee listed in the Supplemental Conditions (if any), before the Contract is executed. Contractor shall also provide copies of policy endorsements and excerpts from policies to evidence the required coverages. Contractor shall not commence Work until the required insurance is obtained and until such insurance has been reviewed and approved by Owner. Approval of insurance by Owner shall not relieve or decrease the liability of Contractor hereunder and shall not be construed to be a limitation of liability on the part of Contractor. Contractor must also forward new Certificates of Insurance to Owner whenever a previously identified policy period has expired as verification of continuing coverage.

.03 Contractor's insurance coverage is to be written by companies licensed to do business in the State of Texas at the time the policies are issued and shall be written by companies with A.M. Best ratings of A-, X or

better, except for pollution liability or environmental impairment liability insurance which shall be written by companies with A.M. Best ratings of A- or better.

.04 All endorsements naming the Owner as an additional insured, waivers of subrogation in favor of Owner, and notices of cancellation endorsements as well as the Certificates of Insurance shall specify Owner's name and address as: the San Jacinto River Authority, 1577 Dam Site Road, Conroe, Texas 77304.

.05 The "other" insurance clause shall not apply to the Owner where the Owner is an additional insured shown on any policy. Insurance policies required by the Contract shall be primary and non-contributing with respect to any other insurance coverage maintained by or available to the Owner and/or other additional insureds. The policies shall be endorsed to provide severability of interests.

.06 If underlying insurance policies are not written with coverage limits for at least the amounts specified below, Contractor shall carry Umbrella or Excess Liability Insurance for any differences in amounts specified. If Excess Liability Insurance is provided, it shall follow the form of the primary coverage and have the same inception and termination dates as the primary coverage.

.07 Owner shall be entitled, upon request and without expense, to receive certified copies of policies and endorsements thereto and may make any reasonable requests for deletion or revision or modification of particular policy terms, conditions, limitations, or exclusions except where policy provisions are established by law or regulations binding upon either of the parties hereto or the underwriter on any such policies. Failure of Contractor to provide certified copies, as requested, is a material breach of the Contract.

.08 Owner reserves the right to review the insurance requirements set forth during the effective period of this Contract and to make reasonable adjustments to insurance coverage, limits, and exclusions when deemed necessary and prudent by Owner based upon changes in statutory law, court decisions, the claims history of the industry or financial condition of the insurance company as well as Contractor.

.09 All insurance policies required to be maintained will contain a provision or endorsement stating that the coverage afforded will not be cancelled until at least 30 days' prior written notice has been provided to the Contractor and to the Owner. Contractor shall not cause any insurance to be canceled nor permit any insurance to lapse during the term of the Contract or as required in the Contract.

.10 Contractor shall be responsible for premiums, deductibles and self-insured retentions, if any, stated in policies. The amounts of all deductibles or self-insured retentions shall be disclosed on the Certificates of Insurance. Any deductible or self-insured retention in excess of $25,000 is subject to the written approval of Owner.

.11 Contractor shall provide Owner thirty (30) days written notice of erosion of the aggregate limits below occurrence limits for all applicable coverages required by the Contract.

.12 If Owner-owned property is being transported or stored off-site by Contractor, then the appropriate property policy will be endorsed for transit and storage in an amount sufficient to protect Owner's property.

.13 The insurance coverages required under this contract are required minimums and are not intended to limit the responsibility or liability of Contractor. The inclusion of required minimum insurance limits in this Contract shall not be construed as limiting the Owner's or other additional insured's rights under any policy with higher limits. The minimum insurance limits set forth in this Contract shall be deemed to be amended to any higher limits actually contained in Contractor's insurance policies.

.14 The Contractor hereby waives its rights of recovery from the Owner, its officers, directors, agents and employees, and the Owner's Representative, the Principal Architect/Engineer, the Principal Architect/Engineer's Consultants and Subconsultants and their respective officers, directors, partners, employees and agents with regard to all causes of property and/or liability loss covered by insurance required by this Contract, and shall cause a waiver of subrogation endorsement to be provided in favor of the Owner, its officers, directors, agents and employees, and the Owner's Representative, the Principal Architect/Engineer, the Principal Architect/Engineer's Consultants and Subconsultants and their respective officers, directors, partners, employees and agents on all insurance coverage carried by the Contractor, whether required herein or not.

.15 Failure to obtain and maintain the required insurance shall constitute a material breach of, and default under, this Contract. If Contractor shall fail to remedy such breach, Contractor will be liable for any and all costs, liabilities, damages and penalties resulting to Owner from such breach, unless a written waiver of the specific insurance requirement(s) is provided to Contractor by Owner. In the event of any failure by Contractor to comply with the provisions of this Contract, Owner may, without in any way compromising or waiving any right or remedy at law or in equity, on notice to Contractor, purchase such insurance, at Contractor's expense, provided that Owner shall have no obligation to do so and if Owner shall do so, Contractor shall not be relieved of or excused from the obligation to obtain and maintain such insurance amounts and coverages.

.16 Additional insured status shall be provided in favor of the Owner, its officers, directors, agents and employees, and the Owner's Representative, the Principal Architect/Engineer, the Principal Architect/Engineer's Consultants and Subconsultants and their respective officers, directors, partners, employees and agents on all insurance policies other than Workers' Compensation, Professional Liability and Builder's Risk, on ISO forms CG 20 10 10 01 and CG 20 37 10 01 or their combined equivalent. It is the intent of the parties to this Contract that this Additional Insured status shall include coverage for completed operations and for the additional insureds' concurrent and sole negligence. Notwithstanding the foregoing, if Subchapter C of Chapter 151 of the Texas Insurance Code applies to the Contract, this additional insured obligation shall not require or provide coverage the scope of which is prohibited under Subchapter C of Chapter 151 of the Texas Insurance Code.

.17 Contractor's obligations under this Contract to defend, indemnify and/or hold harmless Owner or other parties shall not be limited in any way by any insurance required of Contractor by this Contract or otherwise provided or maintained by

Contractor. Any insurance obligations of Contractor under this Contract are independent from Contractor's obligations under this Contract to defend, indemnify and/or hold harmless Owner or other parties.

5.3.1.02 Business Automobile Liability Insurance: Provide coverage for all owned, non-owned and hired vehicles. The policy shall provide coverage in the following types and amounts:

.1 A minimum combined single limit of $1,000,000 per occurrence for bodily injury and property damage.
.2 A minimum combined single limit of $1,000,000 minimum per occurrence for bodily injury and property damage.
.3 The policy shall contain the following endorsements in favor of Owner:
  .a Waiver of Subrogation endorsement; and
  .b 30 day Notice of Cancellation endorsement; and
  .c Additional Insured endorsement.

5.3.1.03 Workers' Compensation And Employers' Liability Insurance: Coverage shall meet or exceed statutory limits and all other benefits outlined in the Texas Workers' Compensation Act (Section 401). The minimum policy limits for Employers' Liability Insurance coverage shall be $500,000 bodily injury per accident, $500,000 bodily injury by disease policy limit and $500,000 bodily injury by disease each employee.

.1 Contractor's policy shall cover all States in which Work is performed and apply to the State of Texas and shall include these endorsements in favor of Owner:
  .a Waiver of Subrogation; and
  .b 30 day Notice of Cancellation.

5.3.1.04 Commercial General Liability Insurance: Provide coverages with minimum limits as follows: combined bodily injury and property damage limit of $2,000,000 minimum per occurrence and $5,000,000 aggregate. The Contractor's policy shall include coverage for:

.1 Blanket contractual liability coverage for liability assumed under the Contract and all contracts relative to this Project; and
.2 Completed Operations/Products Liability for at least three years after Substantial Completion; and
.3 Explosion, Collapse and Underground (X, C & U) coverage; and
.4 Independent Contractors coverage; and
.5 Aggregate limits of insurance per project; and
.6 Additional insureds as required in 5.3.1.01.16; and
.7 30 day notice of cancellation in favor of Owner; and
.8 Waiver of Transfer of Recovery Against Others in favor of all required additional insureds; and
.9 Primary and non-contributing endorsement.

5.3.1.05 Builder's Risk Insurance: Contractor shall maintain Builder's Risk Insurance or Installation Insurance on an all-risk physical loss form in the Contract Amount plus the value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Work at the site on a replacement cost basis without optional

deductibles. Coverage shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, explosion, tornado, malicious mischief, collapse, earthquake, flood, surface water, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements and shall cover reasonable compensation for Principal Architect/Engineer's and Contractor's services and expenses required as a result of any insured loss. Coverage shall continue until final payment for the Work is made by the Owner. Coverage shall allow for partial occupancy/use by the Owner. Owner shall be an additional named insured on the policy. Policy must include expenses incurred in the repair or replacement of any insured property, including but not limited to fees and charges of the Principal Architect/Engineer and any other engineers and architects and their respective subconsultants. If off-site storage is permitted by the Owner, coverage shall include materials in transit and storage in an amount sufficient to protect property being transported or stored. Any losses covered by the Builder's Risk or Installation Insurance shall be adjusted by the Owner.

5.3.1.06 Environmental Impairment Liability or Pollution Liability Insurance:
Contractor shall comply with the following insurance requirements in addition to those specified above:

.1 Provide an Environmental Impairment Liability policy with minimum limits of $2,000,000 each occurrence and $5,000,000 aggregate. Coverage shall contain a "per project" aggregate, 30 day notice of cancellation to Owner and waiver of subrogation in favor of Owner. Coverage to include non-owned disposal sites. Coverage shall include clean-up costs, bodily injury, property damage and defense costs.

.2 Policy shall contain proper endorsement wording to comply with Federal or TCEQ requirements. Policy will also cover vessels and marine operations. Contractor shall submit complete copies of the policy providing pollution liability coverage to Owner.

5.3.1.07 Professional Liability Insurance: For Work which requires professional engineering or architectural or professional survey services to meet the requirements of the Contract, including but not limited to excavation safety systems, traffic control plans, and construction surveying, the Contractor or Subcontractors, responsible for performing the professional services shall provide Professional Liability Insurance with a minimum limit of $1,000,000 each occurrence and $3,000,000 aggregate to pay on behalf of the assured all sums which the assured shall become legally obligated to pay as damages by reason of any negligent act, error, or omission committed in connection with professional services provided for or in connection with the Work of this Contract.

5.3.1.08 Umbrella Liability: Umbrella Liability with a limit of $5,000,000, with the Owner as an additional insured and with waiver of subrogation and 30 day notice of cancellation. The Umbrella Liability policy shall follow form, be excess over and be no less broad than all coverages described above (with the exception of Workers' Compensation, Professional

Liability and Pollution Liability), shall include a drop-down provision and contain a per job aggregate. This policy shall have the same inception and expiration dates as the Commercial General Liability insurance required above. Contractor shall maintain such insurance in identical coverage, form and amount, including required endorsements, for at least three (3) years following Date of Substantial Completion of the Work to be performed under the Contract.

5.3.1.09 Protection and Indemnity: Protection and Indemnity coverage for any over water operations, vessels, barges, divers. This policy shall have limits of $1,000,000 each occurrence, $2,000,000 aggregate and policy endorsed to provide

5.3.1.10 Excess P&I: Excess P&I in the amount of $20,000,000 each occurrence with additional insured, waiver of subrogation and 30 day notice of cancellation to the Owner.

5.3.1.11 Marine: Contractor and/or any Subcontractors shall have appropriate workers compensation insurance to provide coverage for USL&H and Jones Act exposures.

5.3.2 Waiver of Rights

5.3.2.1 All policies purchased in accordance with Section 5.3.1.05 shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional named insureds thereunder. Owner and Contractor waive all rights of recovery for damages against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, the Principal Architect/Engineer, the Principal Architect/Engineers Consultants and Subconsultants and Owner's Representative and any named insured or additional named insured or loss payee to the extent (a) of losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work and (b) that such losses and damages are actually paid by such policies or other property insurance applicable to the Work None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as adjuster or recipient thereof or otherwise payable under any such policy.

5.3.3 Receipt and Application of Insurance Proceeds

5.3.3.1 Any insured loss under the policies of insurance required by Section 5.3.1.05 will be adjusted with Owner and made payable to Owner for the named insureds, additional named insureds, and loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Section 5.3.3.2. Owner shall deposit any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof, to the extent of loss payments received, covered by an appropriate Change Order.

5.3.3.2 Owner shall have power to adjust and settle any loss with the builder's risk or other property insurers.

5.3.4 Partial Utilization, Acknowledgment of Property Insurer:

5.3.4.1 If Owner desires to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Section 14.08, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Section 5.3.1.05 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, and the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

5.4 Bonds:

5.4.1 General:

.1 Contractor shall furnish performance, payment, and one-year maintenance Bonds, each in an amount at least equal to the Contract Amount as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents, as well as a second year maintenance Bond, in an amount equal to ten percent (10%) of the Contract Amount. The one-year maintenance Bond shall remain in effect until completion of the correction period specified in Section 13.7.1. The second year maintenance Bond shall remain in effect until 2-years from the date of Substantial Completion. Contractor shall also furnish such other Bonds as are required by the Contract Documents.

.2 Bonds shall be executed on forms furnished by Owner, as included in the Specifications. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each Bond.

.3 If the Surety on any Bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Texas or it is placed into receivership, Contractor shall within ten (10) days thereafter substitute other Bonds and Surety, each of which must be acceptable to Owner.

.4 The Performance Bond and Payment Bond shall be issued in an amount of one hundred percent (100%) of the Contract Amount as security for the faithful performance and/or payment of all Contractor's obligations under the Contract Documents. All Bonds, including but not limited to the Performance Bond and Payment Bond shall be issued by a solvent corporate surety company authorized to do business in the State of Texas, and shall meet any other requirements established by law or by Owner pursuant to applicable law. Any surety duly authorized to do business in Texas may write Performance and Payment Bonds on a project without reinsurance to the limit of ten percent (10%) of its capital and surplus. Such a surety must reinsure any obligations over the ten percent (10%) limit.

5.4.2 Performance Bond:

.1 Contractor shall furnish Owner with a Performance Bond in the form set out in the Contract Documents.

.2 The Performance Bond shall include the one (1) year warranty correction period obligation from the date of Substantial Completion of the Work.

5.4.3 Payment Bond:

.1 Contractor shall furnish Owner with a Payment Bond in the form set out in the Contract Documents.

5.4.4 One-Year Maintenance Bond:

.1 Contractor shall furnish Owner with a One-Year Maintenance Bond in the form set out in the Contract Documents.

5.4.5 Second-Year Maintenance Bond:

.1 Contractor shall furnish Owner with a Second-Year Maintenance Bond in the form set out in the Contract Documents.

.2 The Second-Year Maintenance Bond shall be in an amount equal to ten percent (10%) of the Contract Amount, and shall remain in effect until 2-years from the date of Substantial Completion.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 Supervision and Superintendence:

6.01.1 Contractor shall supervise, inspect and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. Contractor shall be responsible to see that the completed Work strictly complies with the Contract Documents.

6.01.2 Contractor shall have an English-speaking, competent Superintendent on the Work at all times that Work is in progress. The Superintendent will be Contractor's representative on the Site and shall have the authority to act on the behalf of Contractor. All communications given to the Superintendent shall be as binding as if given to Contractor. Contractor's Superintendent and Project Manager shall provide cellular telephone numbers and emergency and home telephone number(s) at which one or the other may be reached if necessary when Work is not in progress. Telephone or cellular phone number(s) shall be to a live person having responsible authority for the Work and not an answering machine or answering service. The Superintendent must be an employee of the Contractor, unless such requirement is waived in advance in writing by the Owner. If the Contractor proposes a management structure with a Project Manager supervising, directing, and managing construction of the Work in addition to or in substitution of a Superintendent, the requirements of these

Construction Documents with respect to the Superintendent shall likewise apply to any such Project Manager:

.1 Contractor shall present the resume of the proposed Superintendent to the Owner's Representative showing evidence of experience and successful superintendence and direction of Work of a similar scale and complexity. If, in the opinion of the Owner, the proposed Superintendent does not have sufficient experience in line with the Work, he/she will not be allowed to be the designated Superintendent for the Work.

.2 The Superintendent shall not be replaced without prior Written Notice to Owner's Representative. If Contractor deems it necessary to replace the Superintendent, Contractor shall provide the necessary information for approval, as stated above, on the proposed new Superintendent.

.3 A qualified substitute Superintendent may be designated in the event that the designated Superintendent is temporarily away from the Work, but not to exceed a time limit acceptable to the Owner's Representative.

.4 Contractor shall replace the Superintendent upon Owner's request in the event the Superintendent is unable to perform to Owner's satisfaction.

6.02 Labor, Materials and Equipment:

6.02.1 Contractor shall maintain a work force adequate to accomplish the Work within the Contract Time Requirements. Contractor agrees to employ only orderly and competent workers, skillful in performance of the type of Work required under this Contract. Contractor, Subcontractors, Sub-Subcontractors, and their employees may not use or possess any alcoholic or other intoxicating beverages, illegal drugs or controlled substances while on the job or on Owner's property, nor may such workers be intoxicated, or under the influence of alcohol or drugs, on the job. Subject to the applicable provisions of Texas law, Contractor, Subcontractors, Sub-Subcontractors, and their employees may not use or possess any firearms or other weapons while on the job or on Owner's property. If Owner or Owner's Representative notifies Contractor that any worker or representative of Contractor is incompetent, disorderly, abusive, or disobedient, has knowingly or repeatedly violated safety regulations, has possessed any firearms in contravention of the applicable provisions of Texas law or this Contract, or has possessed or was under the influence of alcohol or drugs on the job, Contractor shall immediately remove such worker or representative, including any officer or owner of Contractor, from performing Contract Work, and may not employ such worker or representative again on Contract Work without Owner's prior written consent. Contractor shall at all times maintain good discipline and order on or off the Site in all matters pertaining to the Project. Contractor shall pay workers no less than the applicable wage rates established for the Contract, and maintain weekly payroll reports as evidence thereof, in accordance with the requirements of Chapter 2258 of the Texas Government Code.

6.02.2 Except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular Working Days and regular Working Hours.

Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without the Owner's prior written consent given after the Contractor has provided 48-hour advanced written notice to the Owner's Representative.

6.02.3 Unless otherwise specified in Division 01, Contractor shall provide and pay for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work, provided the Owner's CMT Consultant shall provide certain inspection services, the Owner shall provide testing of construction materials engineering and the verification testing services necessary for acceptance of the Work by Owner, as required by Section 2267.058(a) of the Texas Government Code.

6.02.4 All materials and equipment shall be of good quality and new (including new products made of recycled materials, pursuant to Section 361.426 of the Texas Health & Safety Code), except as otherwise provided in the Contract Documents. If required by Owner's Representative, Contractor shall furnish satisfactory evidence (reports of required tests, Manufacturer's certificates of compliance with material requirements, mill reports, etc.) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Manufacturer or Supplier, except as otherwise provided in the Contract Documents.

6.02.5 Substitutes and "Approved Equal" Items:

.1 Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Manufacturer or Supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains words reading that no like, equivalent or "approved equal" item or no substitution is permitted, other items of material or equipment of other Manufacturers or Suppliers may be submitted by Contractor, at Contractor's sole risk, including potential impacts and disruptions to the Critical Path of the Project Schedule, to Principal Architect/Engineer for their review and approval through Owner's Representative under the following circumstances:

(a) "Approved Equal": If in Principal Architect/Engineer's and Owner's sole discretion an item of material or equipment proposed by Contractor is functionally equal and of equivalent type and quality to that named, and sufficiently similar so that no change in related Work, time of performance or Contract Amount will be required, it may be approved by Principal Architect/Engineer and Owner through the submittal process as an "approved equal" item. Contractor shall provide Principal Architect/Engineer and Owner with all necessary documentation required for Principal Architect/Engineer and Owner to make their evaluation, and shall identify the item of material or

equipment proposed by Contractor as a variation in accordance with Section 6.20.5.

(b) Substitute Items: Contractor may submit an item of material or equipment which does not qualify as an "approved equal" item under Subsection 6.02.5.1(a), or may resubmit an item of material or equipment proposed by Contractor and rejected by Principal Architect/Engineer or Owner as an "approved equal" item under Subsection 6.02.5.1(a), as a proposed substitute item. All of Contractor's requests for substitutions must be clearly identified as a "**Request For Substitution**" on the face of the document. Contractor shall submit sufficient information as provided in Division 01 to allow Principal Architect/Engineer and Owner to evaluate the item of material or equipment proposed as a substitute for the item named.

.2 Substitute Construction Methods and Procedures: If a specific means, method, technique, sequence or procedure of construction is shown or indicated in and expressly required by the Contract Documents, Contractor may, at Contractor's sole risk, including potential impacts and disruptions to the Critical Path of the Project Schedule, with prior approval of Principal Architect/Engineer, furnish or utilize a substitute means, method, technique, sequence, or procedure of construction. All such proposed substitutions must be clearly identified as being a "**Substitution**" in all of the Contractor's submittals. Contractor shall submit sufficient information to Owner's Representative to allow Principal Architect/Engineer's, in Principal Architect/Engineer's sole discretion, evaluation of the proposed substitute as an equivalent to that method or procedure expressly called for by the Contract Documents. The procedure for review by Principal Architect/Engineer will be same as that provided for substitute items in Division 01.

.3 Principal Architect/Engineer's Evaluation: Principal Architect/Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Subsections 6.02.5.1(a), 6.02.5.1(b), and 6.02.5.2. Principal Architect/Engineer and Owner will be the judge of acceptability. No "approved equal" or substitute shall be ordered, installed, or utilized until Principal Architect/Engineer's and Owner's review is complete, and any "approved equal" is approved through the submittal process, or any approved substitute is evidenced by either a Change Order, or a Change Directive. Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety Bond with respect to any approved substitute. Owner shall not be responsible for any Delay due to review time for any "approved equal" or substitute.

.4 Contractor's Expense: All data and documentation to be provided by Contractor in support of any proposed "approved equal" or substitute item will be at Contractor's expense.

.5 The approval of the Principal Architect/Engineer and/or Owner will not relieve the Contractor from primary responsibility and liability for the suitability and performance of any proposed substitute item, method or procedure and will not relieve Contractor from its primary responsibility and liability for curing Defective Work and performing warranty work, which the Contractor shall cure and perform,

regardless of any claim the Contractor may choose to advance against the Owner, the Principal Architect/Engineer or Manufacturer.

.6 Notwithstanding the foregoing, it is agreed and understood that the Contract Amount shall not be adjusted as a result of the Contractor's use of the cost of any possible substitute or "approved equal" items in calculating its Bid/Proposal price.

6.02.6 Contractor agrees to assign and hereby assigns to Owner any rights it may have to bring antitrust suits against its Manufacturers or Suppliers for overcharges on materials incorporated in the Project growing out of illegal price fixing agreements. Contractor further agrees to cooperate with Owner should Owner wish to prosecute suits against Manufacturers or Suppliers for illegal price fixing.

6.03 Project Schedule Requirements: Unless otherwise provided in Division 01, Contractor shall adhere to the Owner's Project Schedule as provided by the Owner, which shall be further developed by the Contractor to become first the Contractor's Preliminary Project Schedule and then, upon acceptance by the Owner, become the Master Project Schedule, as it may be adjusted from time to time as provided below:

6.03.1 Preliminary Project Schedule: Within thirty (30) days from the issuance of a Notice To Proceed by the Owner, the Contractor shall submit to the Owner's Representative a Preliminary Project Schedule to be used as the Contractor's baseline schedule for the Project. This Preliminary Project Schedule shall be initially based on and shall include and be consistent with all of the Milestones contained in Division 01, Work Covered By Contract Documents Specification, and shall be presented in a form reasonably acceptable to the Owner. The Preliminary Project Schedule shall be a Critical Path Method (CPM) schedule depicting all significant activities which will occur on the Project; the durations for all major items of Work to be performed; the start and finish dates of such activities; the Contract Time Requirements as set out in the Contract Documents; and the precedence logic of such activities. The Contractor's Preliminary Project Schedule shall include, at a minimum:

.1 Duration and milestone dates for all equipment, materials delivery, and operations efforts that may affect the timely completion of the Project.

.2 Duration and milestone dates for each anticipated construction activity.

.3 Pre-purchase of materials and equipment with a "long lead" time.

.4 Permitting and regulatory milestones.

.5 Dates associated with the activities leading to delivery milestones from others including for offsite roadways and utilities.

6.03.2 The Contractor shall coordinate the Preliminary Project Schedule with the Contractor's Submittal Schedules for Shop Drawings and Samples as required by Division 01 of the Project Manual. The Contractor's Submittal Schedule must provide an adequate duration for reviewing and processing the required Submittals acceptable to Owner and the Principal Architect/Engineer.

6.03.3 The Contractor shall provide Owner with an electronic version (by disk or CD) of the Preliminary Project Schedule and of each subsequent Master

Project Schedule, including all subsequent electronic schedule revisions and updates, created without password protection, in latest version of Microsoft Project (.MPT, .MPX or .MPD suffix) or a format approved by Owner. Failure to furnish Owner, Owner's Representative, and Principal Architect/Engineer with a revised Project Schedule in one of the above formats within ten (10) days of receipt of a written request shall constitute a breach of the Contract by Contractor, and shall be considered to be adequate cause for termination of the Contractor by Owner.

6.03.4 Master Project Schedule: Once the Contractor's Preliminary Project Schedule has been accepted by Owner, it shall become the Master Project Schedule (Baseline Schedule) for the Project. The Contractor shall update the Master Project Schedule monthly or more often by the submission of a revised Master Project Schedule or when circumstances develop which make it beneficial to the Project, or as may be required by Owner. Once the most recently revised Master Project Schedule has been accepted by Owner, the Master Project Schedule shall be considered to have been updated. The updated Master Project Schedule shall then be distributed by the Contractor to Owner's staff, the Principal Architect/Engineer, each consultant, and other appropriate parties. The Master Project Schedule shall be reviewed at the monthly team meeting at a summary level, including for a three month look-ahead and anticipated Project completion.

6.03.5 Changes to the Master Project Schedule: A copy of the accepted Master Schedule shall be maintained unaltered. The Contractor shall thereafter submit to Owner's Representative an updated Project Schedule each month with its Application for Payment, to reflect actual progress that has been made and to forecast future progress of the Work. The monthly Project Schedule update shall be based upon the accepted Master Project Schedule. Contractor shall submit to Owner's Representative for review and acceptance by Owner any proposed changes or adjustments in its monthly Project Schedule that modify either the Master Project Schedule or the previous month's approved Project Schedule. Any such proposed adjustments must be substantiated with a written narrative containing an explanation of any changes to the underlying logic of the subject schedule. Contractor's proposed changes to the schedule must show how the Contractor will consistently advance the progress of the Work in accordance with the Critical Path of the Work and the Contract Time Requirements, including all required contractual Milestones. Such adjustments will conform generally to the Master or monthly Project Schedule then in effect and additionally will comply with any provisions of Division 01 applicable thereto.

6.03.6 Proposed adjustments indicated by the Project Schedule that will change the Contract Time Requirements, including Milestones, shall be submitted in accordance with the requirements of Article 12. Any such proposed adjustments must be substantiated with documentation of any changes to the underlying logic of the Master Project Schedule. Such adjustments may only be made by a Change Order or Change Directive in accordance with Article 12.

6.03.7 Contractor shall keep a current schedule of submittals that coordinates with the Master Project Schedule, and shall submit the initial schedule of

submittals to Owner's Representative for acceptance along with the Preliminary Project Schedule.

6.04 Concerning Subcontractors, Suppliers and Others:

6.04.1 Assignment: Contractor shall retain direct control of and give direct attention to the fulfillment of this Contract. Contractor shall not assign, transfer, or convey this Contract or any portion thereof, or any right, title or interest in, to or under same, or any causes of action or claims for damages arising under this Contract or any breach thereof, without the prior written consent of Owner. In addition, without Owner's written consent, the Contractor will not subcontract the performance of the entire Work or the supervision and direction of the Work.

6.04.2 Award of Subcontracts for Portions of the Work: Contractor shall not employ any Subcontractor, Supplier or other person or organization, whether initially or as a substitute, against whom Owner may have reasonable objection. Owner will communicate such objections by Written Notice. If Owner requires a change without good cause of any Subcontractor, person or organization previously accepted by Owner, the Contract Amount shall be increased or decreased by the difference in the cost caused by any such change, and an appropriate Change Order shall be issued. Contractor shall not substitute any Subcontractor, person or organization that has been accepted by Owner, unless the substitute has been accepted in writing by Owner. No acceptance by Owner of any Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of Owner to reject Defective Work. Contractor shall comply with the applicable requirements set forth in the Bid/Proposal Documents and Contract Documents with respect to Subcontractors and the subcontracting process.

6.04.3 Contractor shall enter into written agreements with all Subcontractors and Suppliers which specifically bind the Subcontractors, Manufacturers and Suppliers to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Principal Architect/Engineer. The Owner reserves the right to specify that certain requirements shall be adhered to by all Subcontractors, Manufacturers and Suppliers as indicated in other portions of the Contract Documents and these requirements shall be made a part of the agreements between Contractor and Subcontractors, Manufacturers and Suppliers.

6.04.4 Contractor shall be fully responsible to Owner for all acts and omissions of the Subcontractors, Manufacturers, or Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Manufacturer, or Supplier or other person or organization any contractual relationship between Owner and any such Subcontractor, Supplier, Manufacturer or other person or organization, nor shall it create any obligation on the part of Owner or Principal Architect/Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Manufacturer, or Supplier or other

person or organization except as may otherwise be required by laws and regulations.

6.04.5 Contractor shall be solely responsible for efficiently scheduling and coordinating the Work of Subcontractors, Manufacturers, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor in order to avoid any Delays or inefficiencies in the prosecution of the Work. Contractor shall require all Subcontractors, Manufacturers, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with Owner's Representative through Contractor.

6.04.6 The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing or delineating the Work to be performed by any specific trade.

6.04.7 Contractor shall pay each Subcontractor, Manufacturer and Supplier their appropriate share of payments made to Contractor not later than ten (10) Calendar Days from Contractor's receipt of payment from Owner.

6.04.8 To the extent allowed by Texas law, the Owner shall be deemed to be a third party beneficiary to each subcontract and may, if Owner elects, following a termination of the Contractor, require that the Subcontractor(s) perform all or a portion of unperformed duties and obligations under its subcontract(s) for the benefit of the Owner, rather than the Contractor; however, if the Owner requires any such performance by a Subcontractor for the Owner's direct benefit, then the Owner shall be bound and obligated to pay such Subcontractor the reasonable value for all Work performed by such Subcontractor to the date of the termination of the Contractor, less previous payments to Contractor for such Subcontractor's work, and for all Work performed by Subcontractor thereafter. In the event that the Owner elects to invoke its right under this section, Owner will provide written notice of such election to the terminated Contractor and the affected Subcontractor(s).

6.05 Patent Fees and Royalties:

6.05.1 Contractor shall be responsible at all times for compliance with applicable patents or copyrights encompassing, in whole or in part, any design, device, material, or process utilized, directly or indirectly, in the performance of the Work or the formulation or presentation of its Bid/Proposal.

6.05.2 Contractor shall pay all royalties and license fees and shall provide, prior to commencement of Work hereunder and at all times during the performance of same, for lawful use of any design, device, material or process covered by letters patent or copyright, suitable legal agreement with the patentee, copyright holder, or their duly authorized representative, whether or not a particular design, device, material, or process is specified by Owner.

6.05.3 Contractor shall defend Owner in all suits or claims for infringement of any patent or copyright and shall indemnify and save Owner harmless from any loss or liability, direct or indirect, arising with respect to Contractor's process in the formulation of its Bid/Proposal or the performance of the

Work or otherwise arising in connection therewith, with the exception that the Contractor will not be responsible to defend or indemnify the Owner for such loss or liability when a particular design, process or product of a particular Manufacturer or Manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Principal Architect/Engineer, unless Contractor knew or reasonably should have known of the patent or copyright violation and failed to notify Owner of same. Owner reserves the right to provide its own defense to any suit or claim of infringement of any patent or copyright in which event Contractor shall, to the extent provided in this Subsection, indemnify and save harmless Owner from all costs and expenses of such defense as well as satisfaction of all judgments entered against Owner.

6.05.4 Owner shall have the right to stop the Work and/or terminate this Contract at any time in the event Owner discovers that Contractor's work methodology includes the use of any infringing design, device, material or process.

6.06 Permits, Fees: Contractor shall obtain and pay for all construction permits, licenses and fees required for prosecution of the Work. However, Owner or Owner's Representative will obtain and pay for the following permits, licenses and/or fees:

.1 Site Development Permit; and
.2 Initial Corp of Engineer Permits (404, Letter of Permission only, if applicable).

6.07 Laws and Regulations:

6.07.1 Contractor shall give all notices and comply with all Legal Requirements applicable to furnishing and performing the Work, including arranging for and obtaining any required inspections, tests, approvals or certifications from any governmental entity or public body having jurisdiction over the Work or any part thereof. Except where otherwise expressly required by applicable laws and regulations, neither Owner, Owner's Representative, nor Principal Architect/Engineer shall be responsible for monitoring Contractor's compliance with any Legal Requirements.

6.07.2 Maintaining clean water, air and earth or improving thereon shall be regarded as of prime importance. Contractor shall plan and execute its operations in compliance with all applicable Legal Requirements concerning control and abatement of water pollution and prevention and control of air pollution.

6.07.3 If Contractor performs any Work knowing or having reason to know that it is contrary to applicable Legal Requirements, Contractor shall bear all claims, costs, losses and damages arising therefrom; however, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with all Legal Requirements, but this does not relieve Contractor of the Contractor's obligations under the terms of the Contract.

6.07.4 This Work is subject to the Texas Pollution Discharge Elimination System (TPDES) permitting requirements for the installation and maintenance of temporary and permanent erosion and sediment controls and storm water pollution prevention measures throughout the construction period.

Contractor's responsibilities are as follows.

.01 Contractor must prepare a Storm Water Pollution Prevention Plan (SWPPP), or make modifications if SWPPP is already completed and as required, prior to filing the NOI form.

.02 Contractor must file a Notice of Intent (NOI) form with the TCEQ at least two (2) days prior to start of construction activity and pay for the permit. The required NOI form is available from the Internet at https://www.tceq.texas.gov/assets/public/permitting/waterquality/forms/20022.pdf.
The form shall be mailed or submitted online to the TCEQ. If submitting online, the web address is https://www3.tceq.texas.gov/steers/. If Contractor has not already registered to use the TCEQ online application submittal service, it will take up to ten (10) working days to receive a user name and password. Contractor shall take this timeframe into consideration if applying online. A Time Extension shall not be granted for this timeframe. The mailing address is:

Texas Commission on Environmental Quality
Stormwater Processing Center (MC-228)
P.O. Box 13087
Austin, TX 78711-3087

For overnight mail: Stormwater Processing Center (MC-228)
12100 Park 35 Circle
Austin, TX 78753

.03 Contractor must mail a copy of the completed Notice of Intent (NOI) form to the local Municipal Separate Storm Sewer Systems (MS4) representative.

.04 Contractor must obtain a signed certification statement from all Subcontractors responsible for implementing the erosion and sediment control measures. This statement shall indicate that the Subcontractor understands the permit requirements. The certified statement forms shall be attached to and become part of the SWPPP.

.05 Contractor must post a notice near the main entrance of the Work with the following information.

.1 The TPDES permit number for the Work or a copy of the NOI if a permit number has not yet been assigned,

.2 The name and telephone number of a local contact person,

.3 A brief description of the Work, and

.4 The location of the SWPPP if the Site is inactive or does not have an on-site location to store the plan.

.5 If posting this information near a main entrance is infeasible due to safety concerns, the notice must be posted in a local public building. If the Work is linear (pipeline, highway, etc.), the notice must be placed in a publicly accessible location near

where construction is actively underway and moved as necessary. For linear Work, multiple postings of the information may be required by Owner (e.g. postings at both ends of the Work).

.06 Contractor must maintain all erosion and sediment control measures and other protective measures identified in the SWPPP in effective operating condition.

.07 Contractor must retain weekly inspection reports and be available for audit by the Owner, the TCEQ or the EPA.

.08 Contractor must perform inspections every seven (7) calendar days and after every ½ inch rainfall event, noting the following observations on an inspection form provided by Owner:

.1 Locations of discharges of sediment or other pollutants from the Site.

.2 Locations of storm water / erosion / sedimentation controls that are in need of maintenance.

.3 Locations of storm water / erosion / sedimentation controls that are not performing, failing to operate, or are inadequate.

.4 Locations where additional storm water / erosion / sedimentation controls are needed.

.09 Contractor must maintain at Work Site at all times a copy of the SWPPP (with all updates, as described below) and inspection reports.

.10 Contractor must update the SWPPP as necessary to comply with TPDES permitting requirements, which includes noting changes in erosion / sedimentation controls and other best management practices that are part of the SWPPP and which may be necessary due to the results of inspection reports.

.11 Contractor must file a Notice of Termination with the TCEQ within thirty (30) days of final stabilization on all portions of the Work Site. Form is available from Owner or on the Internet at: https://www.tceq.texas.gov/assets/public/permitting/waterquality/forms/10443.docx.

The notice shall be mailed to:

Texas Commission on Environmental Quality
Storm Water & General Permits Team;

.12 Upon completion of the Work, the Contractor must provide copies of all TPDES records to Owner.

6.07.6 Contractor shall abide by all Legal Requirements including, but not limited to, the Endangered Species Act.

6.07.7 Contractor warrants and represents that: (i) Contractor does not have any contracts with and does not provide supplies or services to any organization designated as a foreign terrorist organization by the United States secretary of state as authorized by 8 U.S.C. Section 1189 (a "Foreign Terrorist Organization"); or (ii) the United States government has affirmatively declared Contractor to be excluded from its federal sanctions regime relating to Sudan, its federal sanctions regime relating to Iran, or any federal sanctions regime relating to a Foreign Terrorist Organization.

6.08 Taxes:

6.08.1 Contractor shall pay only those sales, consumer, use and other similar taxes required to be paid by Contractor in accordance with the laws and regulations of the State of Texas in the performance of this public works contract.

6.08.2 Owner is an exempt organization as defined by Chapter 11 of the Property Tax Code of Texas and is thereby exempt from payment of Sales Tax under Chapter 151, Limited Use Sales, Excise and Use Tax, Texas Tax Code, and Article 1066 (C), Local Sales and Use Tax Act, Revised Civil Statutes of Texas.

6.08.3 In addition, if the Project is construction of a water or wastewater system certified by the Texas Commission on Environmental Quality as a regional system, equipment, services and supplies used solely to construct the Project are exempted from taxes imposed by Chapter 151, Limited Sales, Excise and Use Tax, Texas Tax Code.

6.09 Use of Premises:

6.09.1 Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by laws and regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor assumes full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of or in connection with the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. Any such settlement shall not include any admission of liability on the part of Owner and shall be subject to Owner's approval, which approval shall not be unreasonably withheld.

6.09.2 Contractor shall defend, indemnify and hold harmless the Owner, the Owner's Representative, the Principal Architect/Engineer, Principal Architect/Engineer's Consultants and anyone directly or indirectly employed by any of them from and against all claims, costs, losses and damages (including court costs and reasonable attorneys' fees) arising out of or resulting from any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Owner's Representative, Principal Architect/Engineer or any other party indemnified hereunder arising out of the Work except to the extent such claims, costs, losses or damages are caused by negligence or fault, breach or violation of a statute, ordinance, governmental regulation, standard or rule or breach of contract of the Owner, the Owner's Representative, the Principal Architect/Engineer, Principal Architect/Engineer's Consultants or any third party under the control or supervision of them other than Contractor or its agent or employee or Subcontractors of any tier.

6.09.3 During the progress of the Work and on a daily basis, Contractor shall keep the premises free from any accumulations of waste materials, rubbish and

other debris resulting from the Work. Contractor shall provide such personnel, waste containers and or equipment necessary to maintain an orderly, clean and safe work site. Contractor shall keep all streets, access streets, driveways, and areas of public access, walkways, and other designated areas clean and open at all times. At the completion of the Work, Contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials. Contractor shall have the Site clean and ready for occupancy by Owner at Substantial Completion of the Work. Contractor shall, at a minimum, restore to original condition all property not designated for alteration by the Contact Documents. If the Contractor fails to clean up or restore at the completion of the Work, Owner may do so and the cost thereof will be charged against the Contractor.

6.09.4 Contractor shall not load or permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.10 Record Documents: Contractor shall maintain in a safe place at the Site, or other location acceptable to Owner, one (1) record copy of all red line Record Drawings, Specifications, Addenda, Change Orders, Change Directives, Field Orders and written interpretations and clarifications in good order and annotated to show all changes made during construction. These record documents together with all final samples and all final Shop Drawings and submittals will be available to Owner, Owner Representative, and Principal Architect/Engineer for reference during performance of the Work. Upon Substantial Completion of the Work, these record documents, samples, Shop Drawings and submittals shall become the property of the Owner and shall be neatly labeled and organized per the Owner's direction and promptly delivered in containers acceptable to the Owner, to Owner's Representative. Record drawings must also include an electronic format that is either ".dwg" or ".dxf".

6.11 Safety and Protection:

6.11.01 Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Prior to commencement of the Work, Contractor shall submit a site security plan for approval by Owner. By reviewing the plan or making recommendations or comments, Owner will not assume liability nor will Contractor be relieved of liability for damage, injury or loss. Contractor shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury or loss to:

.1 all persons on the Work Site or who may be affected by the Work;
.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
.3 other property at the Site or adjacent thereto, including, but not limited to, trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Improvements not designated for removal, relocation or replacement in the course of construction.

6.11.02 The Contractor will provide a Safety Manager for this Project. The Safety Manager will be responsible for the safety of the entire Work and the prevention of accidents in connection with the Work. The Safety Manager shall be competent and qualified to perform his/her duties, including but not limited to having received all appropriate Occupational Safety and Health Act of 1970, as amended ("OSHA") and other safety training, and experienced in managing safety programs on construction projects comparable in scope and complexity.

6.11.03 **Specific Duties of the Contractor's Safety Manager:** This person will ensure compliance with all provisions of the Contract Documents, OSHA, other governmental agencies, industry safety requirements and standards. The Contractor Safety Manager will prepare and enforce a site-specific safety plan for the Work.

.1 Additional duties of the Contractor's Safety Manager shall include the following:

(a) Be responsible for safety over-sight of the entire Work.

(b) Review and direct immediate action to correct all substandard safety conditions.

(c) Be responsible for providing any necessary additional safety personnel with support in carrying out the duties and responsibilities of that position.

(d) Conduct regular supervisory safety meetings, including the discussion of observed unsafe work practices or conditions, a review of accidents experienced and corrective actions, and encouragement of safety suggestions from employees.

(e) Investigate all accidents and implement immediate corrective action.

(f) Cooperate with the insurance carrier(s) and Owner's safety personnel.

(g) Provide timely reports in writing of any observed unsafe conditions or practices, or violations of job security regarding safety issues and take corrective actions.

(h) Report all injuries and accidents in a timely manner to the Contractor and safety personnel in accordance with Contract Documents, federal, state and local laws and regulations.

(j) Ensure that the necessary competent safety persons are on Site as required in the Contract.

(k) Comply with insurance carriers requirements in all accident investigation and reporting procedures.

(m) Coordinate safety activities with insurance carriers, and take necessary steps to promptly implement safety recommendations or directives issued thereby.

(n) Be responsible for the availability and proper use of all necessary safety equipment including personal protective equipment and apparel for the employees.

(p) Ensure that adequate first-aid supplies are available at the Work Site and that personnel are qualified and identified to administer first-aid as required.

(r) Be on the Site at all times while Work is in progress. If the Safety Manager has to leave the Site, the Contractor is required to provide an alternate competent and qualified Safety Manager.

.2 The Contractor Safety Manager shall stop Work as necessary in the event of imminent danger or in situations where they deem necessary to protect a person from injury or prevent property damage.

6.11.04 Contractor shall comply with all applicable Legal Requirements, including but not limited to all laws and regulations of any governmental entity or public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Improvements, and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by Contractor or any Subcontractor, Supplier or any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except to the extent of damage or loss attributable to errors or omissions in the Drawings or Specifications, or to the acts or omissions of Owner, the Owner's Representative, or the Principal Architect/Engineer, or Principal Architect/Engineer's Consultant or anyone employed by any of them or anyone for whose acts any of them may be liable other than Contractor or its agent, or employee, or Subcontractors of any tier). Contractor's duties and responsibilities for safety and protection of the Work shall continue until such time as all the Work is completed and Owner's Representative has issued a notice to Owner and Contractor in accordance with Article 14 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion). Without limitation, Contractor shall comply with the following specific provisions:

.1 It shall be the duty and responsibility of Contractor and all of its Subcontractors to be familiar with and comply with 29 USC Section 651, et seq., the Occupational Safety and Health Act of 1970, as amended ("OSHA") and to enforce and comply with all provisions of this Act.

.2 The Contractor and all of its Subcontractors shall comply with all applicable requirements of Subpart P of Part 1926 of 29 C.F.R, OSHA Safety and Health Standards, Texas Health and Safety Code Section 756.023, as amended, and shall submit a unit price for the particular excavation safety systems to be utilized by the Contractor for all excavations which exceed a depth of five feet (5').

6.11.05 Before commencing any excavation which will exceed a depth of five feet (5'), the Contractor shall prepare and employ detailed drawings and specifications regarding the safety systems to be utilized. Said plans and specifications shall include a certification from a registered Texas professional engineer indicating full compliance with the OSHA provisions cited above.

6.11.06 Hazard Communication Programs: Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with applicable laws and regulations.

6.11.07 Emergencies:

.1 In emergencies affecting the safety or protection of persons or the Work at the Site or adjacent thereto, Contractor, without special instruction or authorization from Owner, Owner Representative, or Principal Architect/Engineer, is obligated to act reasonably to prevent threatened damage, injury or loss and to mitigate damage or loss to the Work. Contractor shall give Owner's Representative telephone notification as soon as reasonably practical and a prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If Owner determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Change Directive or Change Order will be issued to document the consequences of such action.

.2 Authorized agents of Contractor shall respond immediately to call-out at any time of any day or night when circumstances warrant the presence on Project Site of Contractor or his agent to protect the Work or adjacent property from damage, injury or loss, or to take such action or measures pertaining to the Work as may be necessary to provide for the safety of the public. Should Contractor and/or its agent fail to respond and take action to alleviate such an emergency situation, Owner may direct other forces to take action as necessary to remedy the emergency condition, and Owner will deduct any cost of such remedial action from the funds due Contractor under this Contract, or Contractor shall reimburse Owner for same on demand.

.3 In the event there is an accident involving injury to any individual or damage to any property on or near the Work, Contractor shall provide to Owner's Representative verbal notification within one (1) hour and written notification within twenty-four (24) hours of the event and shall be responsible for recording the location of the event and the circumstances surrounding the event through photographs, interviewing witnesses, obtaining medical reports, police accident reports and other documentation that describes the event. Copies of such documentation shall be provided to Owner's Representative, for Owner's and Principal Architect/Engineer's records, within forty-eight (48) hours of the event. Contractor shall cooperate with Owner on any Owner investigation of any such incident.

6.12 Continuing the Work: Contractor shall carry on the Work and adhere to the Project Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as Owner and Contractor may otherwise agree in writing.

6.13 Contractor's General Warranty and Guarantee:

6.13.1 Contractor warrants and guarantees to Owner that all Work will conform to the drawings and specifications, be performed in a good and workmanlike manner in accordance with the Contract Documents and will not be Defective and that the whole and entire Work will function and operate as expressed or required by the Contract Documents. This warranty will survive the termination or expiration of the Contract. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

.1 abuse, modification or improper maintenance or operation by persons other than Contractor, Subcontractors or Suppliers; or
.2 normal wear and tear under normal usage.

6.13.2 Nothing in this warranty is intended to limit any Manufacturer's warranty which provides Owner with greater warranty rights than set forth in this Section or the Contract Documents. Further, nothing in this warranty shall be limited by the Contractor's obligation to cure defects within any specific corrective or warranty period as required in the Contract Documents, including Section 13.7 below.

6.13.3 Contractor's obligation to perform and complete the Work in a good and workmanlike manner in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

.1 observations by Owner's Representative, Owner's CMT Consultant, and/or Principal Architect/Engineer;
.2 recommendation of any progress or final payment by Owner's Representative;
.3 the issuance of a certificate of Substantial Completion or any payment by Owner to Contractor under the Contract Documents;
.4 use or occupancy of the Work or any part thereof by Owner;
.5 any acceptance by Owner or any failure to do so;
.6 any review of a Shop Drawing or sample submittal;
.7 any inspection, test or approval by others;
.8 any correction of Defective Work by Owner; or
.9 progress payments or final payment by Owner.

6.13.4 Except as otherwise agreed in writing by the Parties, partial occupancy or use of some or all of the Work or any part thereof shall not commence the corrective period under Section 13.7 below.

6.13.5 Independent from Contractor's warranty and corrective work obligations, Contractor shall be responsible for maintenance of the Work prior to Owner's occupancy or use of same, such that the Work shall be capable of being started-up and operated as designed without any additional

maintenance, or any repair or replacement of, or additional work or services on, the equipment, materials or systems.

6.13.6 Not used.

6.14 INDEMNIFICATION BY CONTRACTOR:

6.14.1 Contractor shall defend, indemnify and hold harmless (collectively, "Indemnify") Owner, the Owner's Representative, the Principal Architect/Engineer, Principal Architect/Engineer's Consultants and Subconsultants and their respective officers, directors, partners, employees, agents and other Consultants (the "INDEMNIFIED PARTIES") from and against all claims, costs, losses, demands, injuries, liabilities, damages, causes of action and expenses (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or other dispute resolution costs) arising out of or resulting from the Work, provided that any such claim, cost, loss, demand, injury, liability, damage or cause of action:

.1 Is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, and

.2 Is caused in whole or in part by any negligent act or omission of Contractor, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, even if caused in part by any negligence or omission of one or more of the INDEMNIFIED PARTIES; save and except that Contractor's obligation to Indemnify shall not apply to the extent such claims, costs, losses, demands, injuries, liabilities, damages, causes of action or expenses are caused by negligence or fault, breach or violation of a statute, ordinance, governmental regulation, standard or rule or breach of contract of an Indemnified Party or any third party under the control or supervision of an Indemnified Party other than Contractor or its agent or employee or Subcontractors of any tier.

6.14.2 Notwithstanding Subsection 6.14.1, **CONTRACTOR AGREES TO AND SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS (COLLECTIVELY "INDEMNIFY") OWNER, THE OWNER'S REPRESENTATIVE, THE PRINCIPAL ARCHITECT/ENGINEER, PRINCIPAL ARCHITECT/ENGINEER'S CONSULTANTS AND SUBCONSULTANTS AND THEIR RESPECTIVE OFFICERS, DIRECTORS, PARTNERS, MEMBERS, EMPLOYEES, AGENTS AND OTHER CONSULTANTS (COLLECTIVELY THE "INDEMNIFIED PARTIES" OR INDIVIDUALLY AN "INDEMNIFIED PARTY") FROM AND AGAINST ANY AND ALL CLAIMS, COSTS, LOSSES, DEMANDS, INJURIES, LIABILITIES, DAMAGES, AND CAUSES OF ACTION, INCLUDING BUT NOT LIMITED TO ALL EXPENSES OF LITIGATION, COURT COSTS AND ATTORNEYS' FEES (COLLECTIVELY, IN THIS SUBSECTION 6.14.2, "EMPLOYEE CLAIMS"), FOR BODILY INJURY OR DEATH OF ANY EMPLOYEE OF CONTRACTOR, ITS AGENTS, OR ITS SUBCONTRACTORS OF ANY TIER**

(COLLECTIVELY "EMPLOYEE" FOR THE PURPOSE OF THIS SECTION 6.14.2), ACTUALLY OR ALLEGEDLY OCCASIONED BY, CONTRIBUTED TO OR ARISING OUT OF, IN WHOLE OR IN PART, THE WORK OR THIS CONTRACT, INCLUDING BUT NOT LIMITED TO CLAIMS DUE TO NEGLIGENCE, GROSS NEGLIGENCE, BREACH OF WARRANTY, BREACH OF CONTRACT, VIOLATION OF ANY STATUTE, RULE OR REGULATION OR OTHER ACT OR OMISSION BY CONTRACTOR, ITS EMPLOYEES, AGENTS OR ANY SUBCONTRACTOR OF CONTRACTOR OF ANY TIER, OR THEIR RESPECTIVE AGENTS OR EMPLOYEES, OR ANY OTHER PARTY FOR WHOSE ACTS CONTRACTOR IS LIABLE. CONTRACTOR'S OBLIGATION TO INDEMNIFY SHALL APPLY EVEN IF SUCH EMPLOYEE CLAIMS ARE ACTUALLY OR ALLEGEDLY CAUSED IN WHOLE OR IN PART BY THE ACTS, OMISSIONS, OR NEGLIGENCE OF AN INDEMNIFIED PARTY, EVEN IF SUCH NEGLIGENCE OR OTHER ACTS OR OMISSIONS ARE ACTIVE OR PASSIVE, DIRECT OR INDIRECT, SOLE OR CONCURRENT. THIS INDEMNITY AGREEMENT IS INTENDED TO INDEMNIFY THE INDEMNIFIED PARTIES FROM THE CONSEQUENCES OF THEIR OWN NEGLIGENCE, AS PROVIDED ABOVE.

6.14.3 The indemnification obligation under Section 6.14.1 and 6.14.2 shall not be limited in any way by any insurance required by or provided in connection with this Contract or otherwise, or by any limitation on the amount or type of damages, or compensation or benefits payable by or for Contractor or any such Subcontractor, Supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

6.14.4 Notwithstanding anything in Section 6.14.1 or 6.14.2 to the contrary, the obligations of Contractor under Section 6.14.1 and 6.14.2 shall not extend to the liability of a registered architect, a licensed engineer, or an agent, servant or employee of a registered architect or a licensed engineer, for damage that is caused by or results from defects in plans, designs or specifications prepared, approved or used by the architect or engineer, or negligence of the architect or engineer in the rendition or conduct of professional duties called for or arising out of the construction contract and the plans, designs or specifications that are a part of the construction contract; and arises from personal injury or death, property injury, or any other expense that arises from personal injury, death, or property injury.

6.14.5 In the event Contractor fails to follow Owner's directives concerning use of the Site, scheduling or course of construction, or engages in other conduct which results in damage to property based on inverse condemnation or otherwise, then and in that event, Contractor shall indemnify Owner against all costs and claims resulting therefrom except to the extent such costs or claims are caused by negligence or fault, breach or violation of a statute, ordinance, governmental regulation, standard or rule or breach of contract of Owner or any third party under the control or supervision of Owner other than Contractor or its agent or employee or Subcontractors of any tier.

6.14.6 Subject to the limitation as set out in Section 6.14.4, in the event Contractor's negligence or breach of contract results in Delay in the progress of the Work or the performance of services being done by others

on the Site or otherwise with regard to the Project (including Owner's separate contractors, design professionals, and consultants) so as to result in loss for which Owner becomes liable to such others, then Contractor shall indemnify Owner from and reimburse Owner for such loss, except to the extent such loss is caused by negligence or fault, breach or violation of a statute, ordinance, governmental regulation, standard or rule or breach of contract of Owner or any third party under the control or supervision of Owner other than Contractor or its agent or employee or Subcontractors of any tier.

6.15 Not used.

6.16 Not used.

6.17 Notice of Claim: Should Contractor suffer injury or damage to person or property because of any error, omission or act of Owner or of any of Owner's employees or agents or others for whose acts Owner is liable, a Claim must be made to Owner within five (5) calendar days of the event giving rise to such injury or damage. The provisions of this Section 6.17 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or statute of repose.

6.18 Liquidated Damages or Economic Disincentives: Contractor and its Surety shall be liable for liquidated damages or economic disincentives as provided in the Contract for the failure of the Contractor to timely complete the Work within the Contract Time Requirements.

6.19 Commissioning: The Contractor will be responsible to provide all of the required commissioning of the mechanical, electrical, instrumentation, and proprietary equipment and systems for the Project. This is the process of verification, preliminary testing, starting up and functional operations testing of all such equipment and systems which are part of the Project. The term "commissioning" shall specifically include the drafting, review and verification of all test plans and test reports for all equipment and systems which are part of the Project. The verification, testing, start-up and commissioning of the mechanical, electrical, instrumentation, and proprietary equipment and systems for the Project can be performed by the Contractor's personnel or it can be part of a subcontract work package with the Contractor managing and supervising that Scope of Work.

6.19.1 At least ninety (90) days prior to the planned dates for the initiation of the preliminary testing of any mechanical, electrical, instrumentation, and proprietary equipment and systems for the Project, or within a time-frame agreed upon at the Pre-Construction Meeting, the Contractor shall prepare and submit an overall Project Testing and Commissioning Program for Owner, Owner's Representative, and Principal Architect/Engineers' review and approval.

6.19.2 Project Testing and Commissioning Program: The Project Testing and Commissioning Program shall cover all aspects of the Project and shall contain as a minimum, all of the following information:

.1 Equipment Test Plans: An individual Equipment Test Plan configured for each piece of mechanical, electrical, instrumentation, and

proprietary equipment and items on the entire Project that identifies how each piece of such equipment or item is to be verified, tested and commissioned including what functional elements must be demonstrated and precisely how those functional elements will be demonstrated to be operational to the Owner, Owner's Representative, and the Principal Architects/Engineers.

6.20 Shop Drawings & Submittals: The Contractor shall be required to provide submittals, samples and Shop Drawings to the Owner's Representative for transmittal to the Principal Architect/Engineer for approval in accordance with the Schedule of Submittals and section 01 33 00 of Division 01 Submittals.

6.20.1 Each submittal shall be identified in a format and in quantities as may be required by the Owner and section 01 33 00 of Division 01 Submittals. Contractor shall utilize Owner's standard forms unless otherwise approved in writing by the Owner.

6.20.2 Where a Shop Drawing or sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Principal Architect/Engineer's review and approval of the pertinent submittal will be at the sole risk and expense of Contractor.

6.20.3 Before submitting each Shop Drawing or sample, Contractor shall have:

.1 reviewed and coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents;

.2 determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

.3 determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

.4 determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

6.20.4 Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's preparation, review and approval of that submittal.

6.20.5 With each submittal, Contractor shall give Principal Architect / Engineer specific written notice of any variations that the Shop Drawing or sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or sample submittal; and, in addition, by a specific notation made on each Shop Drawing or sample submitted to Principal Architect / Engineer for review and approval of each such variation.

6.20.6 Principal Architect/Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Principal Architect/Engineer. Engineer's review and approval will be only to evaluate whether the items covered by the submittals appear that they will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

6.20.7 Principal Architect/Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

6.20.8 Principal Architect/Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Section 6.20.5 and Principal Architect/Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or sample. Principal Architect / Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Section 6.20.3.

6.20.9 Contractor shall make corrections required by Principal Architect / Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Principal Architect/Engineer on previous submittals.

6.21 Operation & Maintenance Manuals: The Contractor shall be required to provide Operations & Maintenance Manuals for all mechanical, electrical, instrumentation, and proprietary equipment and items being installed as part of the Work. The Contractor must compile all specified instructions, maintenance manuals and operating data as defined under this section and in the Specifications. The compilation and assembly of the Operations & Maintenance Manuals for the Work can be performed by the Contractor's personnel or it can be part of a subcontract work package with the Contractor managing and supervising that Scope of Work. The Contractor shall strictly adhere to all of the requirements for the assembly, formatting and printing of the O&M Manuals as more thoroughly defined in the Contract Documents.

6.22 Training of Owner's Personnel: The Contractor shall be required to provide training of the Owner's designated personnel for all mechanical, electrical, instrumentation, and proprietary equipment and items being installed on the Project. The Contractor must provide this training as defined under this section, Division 01 and the Specifications. The training of the Owner's designated personnel for all mechanical, electrical, instrumentation, and proprietary equipment and items being installed on the Project can be performed by the Contractor's personnel or it can be part of a subcontract work package with the Contractor managing and supervising that Scope of Work.

ARTICLE 7 - OTHER WORK

7.1 Owner may perform other work related to the Project at the Site by Owner's own forces, or let other contracts for the other work, or have other work performed by utility owners. Contractor and Owner agree to and shall use best efforts to cooperate and coordinate the Work with others performing work and other work related to the Project in order to avoid conflicts and Delays in the Work.

7.2 Contractor shall afford Owner's Independent Contractors and each utility owner (and Owner, if Owner is performing the additional work with Owner's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, Contractor shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the advance written consent of Owner's Representative and the other contractors whose work will be affected. Unless expressly so consented to by such parties, Contractor shall promptly remedy damage caused by Contractor to completed or partially completed construction or to property of the Owner or separate contractors.

7.3 If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Owner's Representative in writing any Delays, defects or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.4 Owner shall provide for coordination of the activities of the Owner's own forces and of Owner's Independent Contractors with the Work of Contractor, who shall cooperate with them. Contractor shall participate with Owner's Independent Contractors and Owner's Representative in reviewing their construction schedules when directed to do so. On the basis of such review, Contractor shall make any revisions to the Project Schedule agreed upon as necessary after a joint review. The agreed upon construction sequences shall then constitute the Project Schedules to be used by Contractor, separate contractors and Owner until subsequently revised.

7.5 Contractor shall coordinate the activities of all Subcontractors. If Owner performs other work on the Project or at the Site with Owner's Independent Contractors, Contractor agrees to reasonably cooperate and coordinate its activities with those of such separate contractors so that the Project can be completed in an orderly and coordinated manner without unreasonable disruption.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.1 Prior to the start of construction, Owner will designate in writing a person or entity to act as Owner's Representative during construction. The Owner shall retain the right

to communicate directly with the Contractor. However, except as otherwise provided in these General Conditions, the Owner shall issue communications to Contractor through the Owner's Representative. Owner's Representative will be responsible for providing Owner–supplied information and approvals. Owner's Representative will also endeavor to provide Contractor with prompt notice if it observes a failure on the part of the Contractor to fulfill its contractual obligations, including any errors, omissions or defects in the performance of the Work; however, failure of the Owner's Representative to provide Contractor with such notice shall not relieve Contractor of any of its responsibilities under the Contract Documents.

8.2 Owner and Owner's Representative will not supervise, direct, control or have authority over or be responsible for Contractor's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto. Owner and Owner's Representative are not responsible for any failure of Contractor to comply with Legal Requirements applicable to furnishing or performing the Work. Owner and Owner's Representative are not responsible for Contractor's failure to perform or furnish the Work in accordance with the Contract Documents. Failure or omission of Owner or Owner's Representative to discover, or object to or condemn any Defective Work or material shall not relieve Contractor from the obligation to properly and fully perform the Contract.

8.3 Owner and Owner's Representative are not responsible for the acts or omissions of Contractor, or of any Subcontractor, any Manufacturer or Supplier, or of any other person or organization performing or furnishing any of the Work. Contractor acknowledges and agrees that Owner's or Owner's Representative's direction to perform Work in accordance with the approved Master Project Schedule is not a demand for acceleration or a dictation of Contractor's means or methods.

8.4 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness. The Owner or Owner's Representative shall have a reasonable amount of time to investigate Site conditions, review submittals, analyze requests for changes, and to make other decisions in the orderly administration of the Contract. Contractor must notify the Owner and/or Owner's Representative in writing, if the time for the investigation, review, analysis of any submittals, required for changes or otherwise required for Owner's decision, impacts in any way the Critical Path of the approved Master Project Schedule.

8.5 Furnishing of Services and Information

8.5.1 Owner may provide, at its own cost and expense, for Contractor's information and use, any of the following, all of which are not binding on Owner, are not Contract Documents, are not warranted or represented in any manner to accurately show the conditions at the Site of the Work, and shall not be the basis for any Claim for damages, additional compensation or extension of time should the actual conditions in the course of the Work vary or differ from conditions or information contained in or inferable from them:

.1 Surveys describing the property, boundaries, topography and reference points for use during construction, including existing service and utility lines;

.2 Geotechnical studies describing subsurface conditions, and other surveys describing other latent or concealed physical conditions at the Site;

.3 Temporary and permanent easements, zoning and other requirements and encumbrances affecting land use, or necessary to permit the proper design and construction of the Project and enable Contractor to perform the Work;

.4 A legal description of the Site;

.5 As-built and record drawings of any existing structures at the Site; and

.6 Environmental studies, reports and impact statements describing the environmental conditions, including Hazardous Conditions, known by the Owner to be in existence at the Site.

ARTICLE 9 – PRINCIPAL ARCHITECT/ENGINEER'S STATUS DURING CONSTRUCTION

9.1 Principal Architect/Engineer's Authority and Responsibilities:

9.1.1 The duties and responsibilities and the limitations of authority of Principal Architect/Engineer during construction, as set forth in the Contract Documents, may be assigned or assumed by the Owner, but shall not be extended without written consent of Owner and/or Principal Architect/Engineer. The assignment of any authority, duties or responsibilities to Principal Architect/Engineer under the Contract Documents, or under any agreement between Owner and Principal Architect/Engineer, or any undertaking, exercise or performance thereof by Principal Architect/Engineer, is intended to be for the sole and exclusive benefit of Owner and not for the benefit of Contractor, Subcontractor, Supplier, or any other person or organization, or for any surety or employee or agent of any of them.

9.1.2 Principal Architect/Engineer will not supervise, direct, control or have authority over or be responsible for Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto. Principal Architect/Engineer is not responsible for any failure of Contractor to comply with Legal Requirements applicable to the furnishing or performing the Work. Principal Architect/Engineer is not responsible for Contractor's failure to perform or furnish the Work in accordance with the Contract Documents. Failure or omission of Principal Architect/Engineer to discover, or object to or condemn any Defective Work or material shall not relieve Contractor from the obligation to properly and fully perform the Contract.

9.1.3 Principal Architect/Engineer is not responsible for the acts or omissions of Contractor, or of any Subcontractor, any Manufacturer or Supplier, or of any other person or organization performing or furnishing any of the Work.

9.1.4 If Owner and Principal Architect/Engineer agree, Principal Architect/Engineer will review the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, Bonds and certificates of inspection, tests and approvals and other documentation required to be delivered by Article 14, but only to determine generally that their content appears to

comply with the requirements of, and in the case of certificates of inspections, tests and approvals that the results certified indicate compliance with, the Contract Documents.

9.1.5 The limitations upon authority and responsibility set forth in this Section 9.1 shall also apply to Principal Architect/Engineer's Consultants, Resident Project Representative and assistants.

9.2 Visits to Site: If Owner and Principal Architect/Engineer agree, Principal Architect/Engineer will make visits to the Site at intervals appropriate to the various stages of construction as requested by the Owner or the Owner's Representative and as Principal Architect/Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Principal Architect/Engineer will endeavor for the benefit of Owner to determine, in general, if the Work is proceeding in accordance with the Contract Documents. Principal Architect/Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. Principal Architect/Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and on-site observations, Principal Architect/Engineer will keep Owner and Owner's Representative informed of the progress of the Work and will endeavor to guard Owner against Defective Work. Principal Architect/Engineer's visits and on-site observations are subject to all the limitations on Principal Architect/Engineer's authority and responsibility set forth in Section 9.1 above.

9.3 Resident Project Representative: If Owner and Principal Architect/Engineer agree, Principal Architect/Engineer may furnish a Resident Project Representative to assist Principal Architect/Engineer in providing more continuous observation of the Work. Owner may designate another representative or agent to represent Owner at the Site who is not a Principal Architect/Engineer, Principal Architect/Engineer's consultant, agent or employee.

9.4 Clarifications and Interpretations: Principal Architect/Engineer may determine that written clarifications or interpretations of the requirements of the Contract Documents (in the form of drawings or otherwise) are necessary. Such written clarifications or interpretations will be consistent with the intent of and reasonably inferable from the Contract Documents, will be issued by the Principal Architect/Engineer after consultation with the Owner, and the Contractor will comply with same. If Contractor believes that a written clarification or interpretation alters the Scope of Work and justifies an adjustment in the Contract Amount or the Contract Time Requirements, Contractor may make a Claim as provided in Article 11 or 12.

9.5 Rejecting Defective Work: Principal Architect/Engineer will recommend that Owner disapprove or reject Work which Principal Architect/Engineer believes fails to conform to a requirement of the Contract Documents or believes will not produce a completed Project that conforms to the Contract Documents, or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

9.6 The Principal Architect/Engineer shall not have the authority to issue changes in the field without the express written approval of the Owner.

9.7 **Shop Drawings:** Refer to Division 01 for Principal Architect/Engineer's authority concerning Shop Drawings.

ARTICLE 10 - CHANGES IN THE WORK

10.1 Changes:

10.1.1 Without invalidating the Contract and without providing notice to any Surety, Owner may, at any time or from time to time, order additions, deletions or revisions in the Work. Such changes in the Work will be authorized by Change Order, Change Directive or Field Order. In the event that the Owner and the Contractor are unable to negotiate the terms of a Change Order for the performance of additional Work, the Owner may, at its election, perform such additional Work with its own forces or an Independent Contractor and such work will be considered "Other Work" in accordance with Article 7 or issue a Change Directive.

10.1.2 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and Contractor shall proceed promptly, unless otherwise provided in the Change Order, Change Directive or Field Order. Contractor's proposals for changes in the Contract Amount and/or Contract Time Requirements shall be submitted within ten (10) Calendar Days as requested by the Owner, including estimated impacts to the approved Master Project Schedule if any. Owner will review each proposal and promptly respond to Contractor. After initial review of Contractor's proposal by Owner, Contractor shall provide any supporting data requested by Owner, including but not limited to any Subcontractor or Supplier proposal, within seven (7) Calendar Days, unless Owner grants an extension.

10.1.3 Contractor shall not be entitled to an increase in the Contract Amount or an extension of the Contract Time Requirements with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in Sections 3.3.1 and 3.3.2, except in the case of an emergency as provided in Section 6.11.15 or in the case of uncovering Work as provided in Section 13.4.

10.1.4 Except in the case of an emergency as provided in Section 6.11.15, a Change Order or Change Directive is required before Contractor commences any activities associated with a change in the Work which, in Contractor's opinion, will result in a change in the Contract Amount and/or Contract Time Requirements. Any Work performed prior to Contractor's receipt of a Change Order or Change Directive, will be at Contractor's sole risk and expense, including potential cost impacts and any Delay to the Critical Path of the Master Project Schedule.

10.1.5 Not used.

10.1.6 Contractor shall provide to the Owner's Representative's all Contractor documentation/records deemed necessary by Owner or Owner's Representative to evaluate the Contractor's Claim including, but not limited

to certified payroll, receipts, bills of lading, invoices, schedules, contractor daily reports, and equipment logs. Other documents, if any, shall be provided pursuant to the Contract Documents.

10.2 Change Orders:

10.2.1 Owner and Contractor shall execute appropriate written Change Orders covering:

.1 a change in the Work, subject to limitations in Article 10 and elsewhere in the Contract;
.2 the amount of the adjustment in the Contract Amount, if any; and
.3 the extent of the adjustment in the Contract Time Requirements, if any.

10.2.2 An executed Change Order shall constitute a settlement of and represent the complete, equitable, and final amount of adjustment in the Contract Amount and/or Contract Time Requirements owed to Contractor or Owner as a result of the occurrence or event causing the change in the Work encompassed by the Change Order.

10.3 Change Directives:

10.3.1 Owner may, by written Change Directive, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Amount and Contract Time Requirements being adjusted as the Owner may deem necessary. A Change Directive may be used in the absence of complete and prompt agreement on the terms of a Change Order, or as otherwise may be deemed to be necessary by the Owner. Where practicable, any items or elements of changed Work that may be agreed upon, prior to the performance of Work under this Article, will be included in a separate Change Order.

10.3.2 If the Change Directive provides for an adjustment to the Contract Amount, the adjustment shall be based on one of the methods provided in Article 11.4.1.

10.3.3 A Change Directive signed by Contractor indicates the agreement of Contractor with the proposed basis of adjustment in the Contract Amount and Contract Time Requirements as described within that Change Directive. Such agreement shall be effective immediately and shall be recorded later by preparation and execution of an appropriate Change Order.

10.3.4 The Contractor is not obligated to execute a Change Directive, but that Change Directive still constitutes valid direction to the Contractor from the Owner. The refusal by the Contractor to accept the terms incorporated within a Change Directive does not invalidate the content of the Change Directive or undermine in any manner the Owner's right to provide the directive contained within that Change Directive. Upon receipt of a Change Directive, Contractor shall promptly proceed with the change in the Work involved, provided, prior to the commencement of any Work under this section, the Contractor must submit its proposed Work plan, anticipated schedule, and a list of its work force and equipment proposed to be used in

such Work for Owner's approval. Upon such approval, Contractor must promptly commence and make continuous progress in the Change Directive Work. The Owner reserves the right to withhold payment for low production or lack of progress.

10.3.5 The Owner will allow the Contractor to bill for all portions of a Change Directive for which the Work has been successfully completed, if and to the extent the Change Directive provides for an adjustment to the Contract Amount.

10.4 Field Order:

10.4.1 Owner may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Amount or the Contract Time Requirements and are compatible with the design concept of the completed Project as a functioning whole as intended by the Contract Documents. These minor variations shall be accomplished by written Field Order and shall be binding on Owner and on Contractor who shall perform the Work involved promptly. Contractor shall promptly acknowledge in writing the receipt of a Field Order.

10.4.2 If Contractor believes that a Field Order justifies an adjustment in the Contract Amount and/or Contract Time Requirements, Contractor shall make a prompt written request to Owner for a Change Order or Change Directive. Any request by Contractor for an adjustment in Contract Amount and/or Contract Time Requirements must be made in writing prior to the Contractor or the Contractor's Subcontractors beginning the Work covered by the Field Order.

10.5 Limitation on Damages for Delay:

10.5.1 Contractor shall receive no compensation or damages for Delays except when, and only to the extent that, Contractor demonstrates to the reasonable satisfaction of Owner that direct and unavoidable extra cost to Contractor is caused by: (a) Change Orders or Change Directives (not attributable to Contractor's failure to comply with the Contract Documents or other fault or negligence) that Delay the Work; or (b) specific orders given by Owner to stop or suspend Work (not attributable to Contractor's failure to comply with the Contract Documents or other fault or negligence) that Delay the Work; or (c) failure of Owner to:

.1 provide permits or material, which is to be furnished by Owner, or
.2 provide access to the Work,

and only to the extent that such circumstances continue after the Contractor furnishes Owner with written notice of such failure, such circumstances are not attributable to Contractor's failure to comply with the Contract Documents or other fault or negligence, and such failure causes Delay;
(a "Compensable Delay").

10.5.2 When extra compensation or damages are claimed for a Compensable Delay, Written Notice and support shall be delivered to the Owner as Provided in Section 12.1.1, and a written statement thereof shall be

presented by Contractor to Owner's Representative for Owner's Representative and Owner's review and consideration. Contractor's application for extra compensation or damages shall, however, be subject to review and approval by the Owner. In no event other than a Compensable Delay shall the Contractor be entitled to any compensation or recovery of any damages in connection with any Delays, including without limitation: consequential damages, lost opportunity costs, lost profits, unabsorbed home office overhead or other similar damages, and Contractor hereby expressly waives and releases any and all rights to claim or recover any such compensation or damages. The Owner's exercise of any of its rights or remedies under the Contract Documents (including without limitation ordering changes in the Work, or directing suspension, rescheduling, or correction of the Work), regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be construed as active interference in the Contractor's performance of the Work.

10.5.3 In the event of a Compensable Delay, Contractor's sole and exclusive remedy (other than as provided in Section 10.5.4) shall be recovery of Contractor's General Conditions Costs for the period of time during any Working Day that Contractor is prevented from performing Work on the Critical Path, and Contractor hereby expressly waives and releases any and all rights to claim or recover any other compensation or damages arising out of or related to a Compensable Delay. "General Conditions Costs" consist only of actual and direct costs necessarily incurred by the Contractor and which Contractor was unable to mitigate despite the exercise of reasonable diligence, for standby costs of facilities, machinery, and equipment on Site ("Standby Equipment Costs"), and "Jobsite Overhead" as defined below, calculated as follows:

.1 Standby Equipment Costs will not be claimable, due or paid for periods when the facilities, machinery or equipment would have otherwise been idle. Claims for Standby Equipment Costs time are limited to no more than eight (8) hours per twenty-four (24) hour day, forty (40) hours per week, and one hundred seventy-six (176) hours per month. Standby Equipment Costs will be payable at 50 percent (50%) of the applicable Blue Book Rental Rates and calculated by dividing the monthly rate by one hundred seventy-six (176), multiplying the result by the number of standby hours, and multiplying that number by the regional adjustment factor and the rate adjustment factor contained in the Blue Book. Operating costs will not be claimable or payable.

.2 Jobsite Overhead will be claimable and payable based on actual costs that the Contractor will be required to document. "Jobsite Overhead" is defined as the wages or salaries of the Contractor's on-Site administrative and supervisory personnel (when unable to perform other services for Contractor), and reasonable office expenses incurred at the Site office, and will not include any element of home office labor, employees or overhead expenses.

10.5.4 Except as otherwise provided in this Section 10.5, an extension of the Contract Time Requirements, to the extent permitted under Article 12, shall be the sole remedy of the Contractor for any claimed Delays, or loss, costs, expenses or damages incurred as a result of same.

10.5.5 This Section 10.5 is intended as a limitation on damages available to Contractor and as a defense in favor of Owner against damages not compensable in accordance with its terms, in both cases pursuant to Section 271.155 of Subchapter I of Chapter 271 of the Texas Local Government Code. Contractor and Owner agree that such limitation and defense shall apply even if Owner is found to have breached the Contract.

ARTICLE 11 - CHANGE OF CONTRACT AMOUNT

11.1 The Contract Amount is stated in the Contract and, including authorized adjustments, is the total amount payable by Owner to Contractor for performance of the Work in accordance with the Contract Documents.

11.2 Contractor agrees and acknowledges that, unless otherwise permitted by law, the original Contract Amount may not be increased by more than twenty-five percent (25%).

11.3 The Contract Amount shall only be changed by a Change Order or Change Directive. Any Claim by Contractor for an adjustment in the Contract Amount shall be made by Written Notice delivered to Owner promptly (but in no event later than fifteen (15) calendar days) after the start of the occurrence or event giving rise to the Claim and stating the general nature of the Claim. Notice of the amount of the Claim with supporting data shall be delivered within thirty (30) calendar days after Written Notice of Claim is delivered by Contractor, and shall represent that the adjustment claimed covers all known amounts to which Contractor is entitled as a result of said occurrence or event. If Owner and Contractor cannot otherwise agree, all Claims by Contractor for adjustment in the Contract Amount shall be determined as set out in Article 16.

11.4 Determination of Value of Change Order or Change Directive Work:

11.4.1 The value of any Work covered by a Change Order or Change Directive for an adjustment in the Contract Amount will be determined by one of the following methods:

.1 by application of unit prices contained in the Contract Documents or subsequently agreed upon to the quantities of the items involved.
.2 by a mutually agreed lump sum properly itemized and supported by sufficient substantiating data to permit evaluation.
.3 by a cost which has been determined in a manner agreed upon by the Parties and mutually acceptable fixed or percentage fee; or
.4 as provided in Subsection 11.5.

11.4.2 No cost will be included in the Change Order or Change Directive for the Contractor's time spent preparing the Change Order or responding to the Change Directive, nor will costs be included for the time to negotiate the Change Order or Change Directive costs for machinery, tools, or equipment as described in Subsection 11.5.3.

11.4.3 Before using the method described in Section 11.4.1.4, Owner and Contractor agree to attempt to negotiate a Change Order or Change Directive using the methods identified in Sections 11.4.1.1 through

11.4.1.3, as appropriate, to determine the adjustment in the Contract Amount.

11.5 Determination of Value of Change Order or Change Directive Work When No Agreement: If none of the methods defined in Sections 11.4.1.1, 11.4.1.2 or 11.4.1.3 can be agreed upon before a change in the Work is commenced which will result in an adjustment in the Contract Amount, then the change in the Work will be performed by Change Directive, and the appropriate adjustment determined using the Force Account method set forth below in Subsections 11.5.1 through 11.5.6. The "Cost of the Work" consists only of those items specified in Subsections 11.5.1 through 11.5.5, below.

11.5.1 For all personnel, Contractor or Subcontractors will be entitled to reimbursement for wages or salaries and employee benefit costs for extra Work performed using the employees' actual wages or salaries and a forty percent (40%) burden rate. No charge for additional superintendence will be permitted unless considered necessary and ordered by Owner;

11.5.2 Contractor will be entitled to the actual cost, including freight charges, of the materials used and installed on such Work. In case material invoices indicate a discount may be taken, the actual cost will be the invoice price minus the discount;

11.5.3 For machinery, trucks, power tools, or other similar equipment (the "equipment") agreed to be necessary by Owner and Contractor, Contractor will be entitled to reimbursement for actual rental costs;

11.5.4 Contractor will be entitled to the actual cost of Contractor's premiums for Bond(s) and insurance on the extra Work, based on invoices from Surety and insurance carriers. Contractor shall provide Owner's Representative or Owner with invoices from Surety and insurance carriers indicating such cost when requested by Owner's Representative or Owner;

11.5.5 Contractor will be entitled to reimbursement for actual, direct additional General Conditions Costs, but without duplication of any costs otherwise recoverable under this Subsection 11.5, reasonably and necessarily incurred by Contractor in the performance of the extra Work and which can be reasonably demonstrated to the Owner to be necessary to implement the changed Work; and

11.5.6 Contractor will be entitled to allowances for overhead and profit as stated below.

.1 The maximum allowance for overhead and profit on increases due to Change Orders and Change Directives:

	Overhead	Profit
To Contractor for change in the Work performed by Subcontractors:	10 percent	0 percent
To first tier Subcontractors for change in the Work performed by its Subcontractors:	10 percent	0 percent

To Contractor and Subcontractor for change in the Work performed by their respective firms:	10 percent	5 percent

.2 For changes in the Work performed by Contractor and Subcontractors, allowance for overhead and profit will be applied to an amount equal to cost of all additions less cost of all deletions to the Work. Allowance for overhead to Contractor and first tier Subcontractors on changes performed by Sub-Subcontractors are applied to an amount equal to the sum of all increases to the Work by applicable Sub-Subcontractors, less any decreases in such Sub-subcontractors' Work.

11.5.7 If Owner deletes Work or makes a change which results in a net decrease in the Contract Amount, the Owner is entitled to a credit calculated in accordance with Subsections 11.4.1.1 through 11.4.1.4.

11.5.8 The compensation, as herein provided for, shall be received by Contractor and any affected Subcontractor as payment in full for Work done by Change Directive and will include use of small tools, and total overhead expense and profit. Contractor shall maintain in accordance with generally accepted accounting principles a documented, itemized accounting, evidencing the expenses and savings, including overhead and profit, associated with such changes, both for expenses and savings, in the performance of the Work resulting from the change. Contractor shall submit to Owner's Representative records of Work done by Change Directive at the end of each day, which records will be made upon forms provided for this purpose by Owner, and Contractor shall request that Contractor and Owner's Representative compare records of Work done by Change Directive at the end of each day. Any record of such comparison shall be signed by both Owner's Representative and Contractor, with one copy being retained by Owner and one by Contractor. Refusal by Contractor to sign these records within two (2) working days of presentation does not invalidate the accuracy of the record.

11.6 Unit Price Work:

11.6.1 The following Sections 11.6.1 through 11.6.7 apply only to those elements of the Work which are identified in the Contract Documents as being "Unit Price Work".

11.6.2 Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Amount will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as set forth in the Bid/Proposal. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids/Proposals and determining an initial Contract Amount. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Owner's Representative. Owner's Representative will review with Contractor the determinations on such matters before rendering a written decision thereon (by recommendation of payment on an Application for Payment or otherwise).

11.6.3 When "plan quantity" is indicated for a Bid/Proposal item, Contractor shall be paid the amount specified in the Contract Documents without any measurements.

11.6.4 Contractor agrees each Unit Price includes amounts for all overhead and profit associated with performing the units of Work for which the Unit Prices applies.

11.6.5 A Major Item is any individual Bid/Proposal item in the Bid/Proposal that has a total cost equal to or greater than five percent (5%) of the original Contract Amount or $50,000, whichever is greater, computed on the basis of Bid/Proposal quantities and Contract Unit Prices.

11.6.6 Owner or Contractor may make a Claim for an adjustment in the Contract Amount in accordance with Article 11 if:

.1 the actual quantity of any Major Item should become as much as twenty five percent (25%) more than or twenty five percent (25%) less than that in the Bid/Proposal; or

.2 Contractor presents documentation contesting accuracy of a "plan quantity" and Owner verifies actual quantity and determines the "plan quantity" is in error by five percent (5%) or more;

11.6.7 Provided, however, in the event a Major Item is reduced by twenty-five percent (25%) or more relative to the quantity amount in the Bid/Proposal, no additional Article 11.5.6 profit or overhead will be added, if, due to other additions in the Work, the net value of the Contract Amount is not reduced.

ARTICLE 12 - CHANGE OF CONTRACT TIMES

12.1 Requisites for Changes in Contract Time Requirements:

12.1.1 The Contract Time Requirements (including Milestones) may only be changed by Change Order duly executed by both Contractor and Owner or by Change Directive. Any Claim for an adjustment of the Contract Time Requirements (including Milestones) or adjustment of the Contract Amount due to any Compensable Delay as provided in Section 10.5 shall be made by Written Notice delivered by the party making the Claim to the other party promptly (but in no event later than five (5) calendar days after the start of the occurrence or event giving rise to the Delay) and stating the general nature of the Delay. Notice of the extent of the Delay and any requested adjustment of the Contract Amount due to any Compensable Delay as provided in Section 10.5, with supporting data, shall be delivered within thirty (30) calendar days after Written Notice of Claim is delivered by claimant, and shall represent that the adjustment claimed is the entire adjustment to which claimant is entitled as a result of said occurrence or event. If Owner and Contractor cannot otherwise agree, all Claims for adjustment in the Contract Time Requirements (including Milestones) and/or adjustment of the Contract Amount due to any Compensable Delay as provided in Section 10.5 shall be determined in accordance with and

subject to the requirements of Article 16. Notwithstanding anything in the Contract Documents to the contrary, no Claim for an adjustment in the Contract Time Requirements (including Milestones) and/or adjustment of the Contract Amount due to any Compensable Delay as provided in Section 10.5 will be valid if not submitted in accordance with the requirements of this Article.

12.1.2 When Contractor is at fault and Owner stops the Work so that corrections in the Work can be made by Contractor, no extensions of time will be allowed.

12.1.3 In the event of a Delay attributable to Force Majeure, an extension of the Contract Time Requirements (including Milestones) in an amount equal to the time lost due to such Delay shall be Contractor's sole and exclusive remedy for such Delay. "Force Majeure" is circumstances beyond the control of both Owner and Contractor, and not attributable to the fault or negligence of Contractor, any Subcontractor or any other party for whose acts Contractor is liable, and includes an Act of God, war, riot, terrorism, civil commotion, sovereign conduct, industry-wide delays or disruptions in manufacture or delivery of materials or equipment required for the Work, and Unusual Inclement Weather and the direct effects thereof such as standing water or loss of Site power. In such an event, Contractor shall take all commercially reasonable action to mitigate the Delay, and Owner and Contractor will meet no later than three (3) business days after cessation of the event to establish a proposed new Project Schedule for the Project. Any claimed Force Majeure Delay attributable to industry-wide delays or disruptions in manufacture or delivery of materials or equipment required for the Work shall be supported by the following documentation:

- **(a)** By copies of purchase orders for Delayed item(s) indicating date ordered by Contractor/Subcontractor and date of purchase order receipt by Supplier;
- **(b)** If item(s) require Shop Drawings or other submittal information in accordance with the Contract Documents, by providing records of dates Contractor forwarded submittal(s) to Owner's Representative, dates Owner or Principal Architect/Engineer returned submittal(s) to Contractor, and dates submittal(s) were forwarded to Manufacturer or Supplier;
- **(c)** By copies of document(s) from Manufacturer or Supplier, on Manufacturer's or Supplier's letterhead, indicating date(s) item(s) would be ready for shipment and/or actual shipment date(s);
- **(d)** By copies of correspondence between Contractor / Subcontractor and Manufacturer or Supplier indicating Contractor / Subcontractor's efforts to expedite item(s); and
- **(e)** If item(s) are being purchased by a Subcontractor, by providing correspondence, meeting notes, etc., that reflect Contractor's efforts with the Subcontractor to expedite delivery of the item(s).

12.1.4 The Contractor will only be entitled to an extension of time for Delays that can be demonstrated by the Contractor through critical path analysis as causing Delay, and only for any Delay caused by Force Majeure, Changes ordered in the Work by the Owner through Change Order or Change Directive which justify additional time, or other Delays as described in Section 10.5. No extension of time shall relieve Contractor or Surety on its performance Bond from all of

Contractor's obligations hereunder which shall remain in full force and effect.

12.2 Weather Delays:

12.2.1 Contractor may be granted an extension of time because of"Unusual Inclement Weather", as defined below. However, the Contractor will not be granted an extension of time for "Normal Rain Days", as defined below.

12.2.2 "Unusual Inclement Weather" is defined as a rain event, or extreme temperatures, high winds, hail or lightning, which occurs at the Site and is of sufficient magnitude to prevent Contractor from performing units of Work critical to maintaining the Master Project Schedule on a day when Work is scheduled to be performed and is otherwise capable of being performed, and which is beyond the Normal Rain Days as defined in Section 12.2.3 below.

12.2.3 Baseline Rain Day Determination. "Normal Rain Days" are based on U.S. Weather Bureau Records available for the most immediate area of the Site of the Work, and are included in Owner's Project Schedule, are not a justification for an extension of time, and are broken down by the number of calendar days in each month as follows:

January	7 days	July	6 days
February	6 days	August	7 days
March	7 days	September	6 days
April	7 days	October	7 days
May	8 days	November	6 days
June	8 days	December	6 days

12.2.4 Not used.

12.2.5 Rainfall will be measured with the Owner's Representative's approval at the Site using an approved rain gauge or with the Owner's Representative's approval at the nearest operational public weather data collection facility to the Site.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.1 Notice of Defects: All Defective Work may be rejected, corrected or accepted as provided in Article 13. Contractor must give Owner, Owner's Representative, and Principal Architect/Engineer prompt notice of any Defective Work of which Contractor has actual knowledge. Prompt notice of all Defective Work of which Owner, Owner's Representative, Owner's CMT Consultant, or Principal Architect/Engineer has actual knowledge may be given to Contractor. Payment may be withheld by the Owner for identified Defective Work until such time as the Owner, Owner's Representative, or

Principal Architect/Engineer has determined the Defective Work has been corrected such that it complies with all applicable Contract requirements.

13.2 Access to Work: Owner, Owner's Representative, Owner's CMT Consultant, Principal Architect/Engineer, Principal Architect/Engineer's Consultants, other representatives and personnel of Owner, independent testing laboratories and governmental agencies having jurisdiction will have access to the Work at reasonable times for observing, inspecting and testing. Contractor shall provide them proper and safe conditions for such access, and advise them of Contractor's site safety procedures and programs so that they may comply therewith as applicable.

13.3 Tests and Inspections:

13.3.1 Contractor shall give at least twenty-four (24) hours advance notice of readiness of the Work for all required inspections, tests or approvals, and shall coordinate and cooperate with inspection and testing personnel to facilitate the required inspections or tests.

13.3.2 Owner shall employ and pay for services of an independent testing laboratory to perform all inspections, tests or approvals required by the Contract Documents except:

.1 for inspections, tests or approvals covered by Section 13.3.3 and 13.3.4 below;
.2 for costs incurred with tests or inspections conducted pursuant to Section 13.4.3 below shall be paid as provided in Section 13.4.3;
.3 for reinspecting or retesting Defective Work; and
.4 as otherwise specifically provided in the Contract Documents.

All testing laboratories shall meet the requirements of ASTM E-329.

13.3.3 If Legal Requirements require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of any governmental entity or public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, pay all costs in connection therewith and furnish Owner's Representative the required certificates of inspection or approval.

13.3.4 Contractor shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for Owner's, Owner's CMT Consultant's, Owner's Representative's, and Principal Architect/Engineer's review of materials or equipment to be incorporated in the Work, or of materials, mix designs or equipment submitted for review prior to Contractor's purchase thereof for incorporation in the Work.

13.4 Uncovering Work:

13.4.1 If any Work that is to be inspected, tested or approved is covered by Contractor without prior written concurrence of Owner's Representative, or if any Work is covered contrary to the written request of Owner's Representative, Contractor must, if requested by Owner's Representative,

uncover and recover the Work at Contractor's expense, except as provided in Section 13.4.2.

13.4.2 Uncovering Work as provided in Section 13.4.1 shall be at Contractor's expense unless Contractor has given Owner's Representative timely notice of Contractor's intention to cover the same and Owner's Representative has not acted within five (5) working days of receipt of such notice.

13.4.3 If Owner's Representative considers it necessary or advisable that permissibly covered Work be observed, inspected or tested, Contractor shall uncover, expose or otherwise make available for observation, inspection or testing that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is Defective, Contractor shall pay or otherwise bear all claims, costs, losses and damages arising out of or resulting from such uncovering, exposure, observation, inspection and testing and satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others). If, however, such Work is not found to be Defective, Contractor shall, subject to Section 13.4.1, be allowed an increase in the Contract Amount or an extension of the Contract Time Requirements (including Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction.

13.5 Owner May Stop the Work:

13.5.1 If the Work is Defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty or obligation on the part of Owner to exercise this right for the benefit of Contractor or any Surety or other party.

13.5.2 If Contractor fails to correct Defective Work or submit a plan that is satisfactory to Owner for taking corrective action, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated, or Owner may take any other action permitted by this Contract. A notice to stop the Work, based on defects, shall not stop Calendar or Working Days charged against the Contract Time Requirements.

13.6 Correction or Removal of Defective Work: If required by Owner, Contractor shall promptly, as directed, either correct all Defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by Owner or Owner's Representative, remove it from the Site and replace it with Work that is not defective. Contractor shall correct or remove and replace Defective Work, or submit a plan of action detailing how the deficiency will be corrected, within the time frame identified in the notice of Defective Work. Contractor shall pay all claims, costs, losses and damages arising out of or resulting from such correction or removal (including but not limited to all costs of repair or replacement of Work of others, and all costs of reinspecting and/or retesting such Defective Work).

13.7 Corrective period:

13.7.1 If within one (1) year after the date of Substantial Completion or such longer period of time as may be prescribed by Legal Requirements or by the terms of any applicable special guarantee or express warranty required by the Contract Documents or by any specific provision of the Contract Documents (including but not limited to Section 14.11.2), any Work, including Work performed after the Substantial Completion date, is found to be Defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

(a) correct such Defective Work, or, if it has been rejected by Owner, remove it from the Site and replace it with Work that is not Defective, and

(b) satisfactorily correct or remove and replace any damage to other Work or the work of others, or damage to other property, whether personal or real property, resulting from the correction, removal or replacement of such Defective Work.

Such one (1) year or longer period will renew and recommence for Work requiring correction upon the completion of correction of such Work.

13.7.2 If Contractor does not promptly comply with the terms of Owner's corrective action instructions, or in an emergency where Delay would result in unreasonable risk of loss or damage, Owner may have the Defective Work corrected or the rejected Work removed and replaced, and all claims, costs, losses and damages arising out of or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid or otherwise borne by Contractor.

13.7.3 In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the corrective period for that item will still start to run from the date of Substantial Completion of the Work.

13.7.4 If correction of Defective Work will affect the function or use of the facility, Contractor shall not proceed with correction of Defective Work without prior coordination with and approval of Owner.

13.7.5 The obligations of the Contractor to perform warranty and corrective work will survive the acceptance of the Work and any termination of the Contract.

13.7.6 Owner will utilize the "Warranty Item Form" a copy of which is attached hereto for the purpose of providing written notice of defects discovered during the corrective period. Contractor will acknowledge receipt of the notice by dating, signing, completing and returning the form to Owner when the defect is corrected, including such information on or attached to the form to describe the nature of the repairs or corrections that were made. If the defect cannot be corrected within seven (7) Calendar Days of receipt of notice, Contractor shall promptly provide a written explanation to Owner (or Owner's Representative) describing the repairs or other correction needed and the time required to complete the repairs or other correction.

13.7.7 Establishment of the required period for correction of Work as described in Subsection 13.7.1 above relates only to the specific obligation of the Contractor to correct defects in Work discovered during the corrective period, and has no relationship to the time within which any obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to any failure by Contractor to have complied with its obligations under the Contract Documents.

13.7.8 All Manufacturer and extended Manufacturer warranties shall be assigned to Owner as a condition of Final Completion.

13.8 Acceptance of Defective Work: If, instead of requiring correction or removal and replacement of Defective Work, Owner decides to accept it, Owner may do so. Contractor shall pay or otherwise bear all claims, costs, losses and damages attributable to Owner's evaluation of and determination to accept such Defective Work. If any such acceptance occurs prior to recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents and compensating Owner for the diminished value of the Defective Work. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner after a calculation by Owner of the diminution in value of the Defective Work.

13.9 Owner May Correct Defective Work: If Contractor fails within a reasonable time after Written Notice of Owner to correct Defective Work, or to remove and replace rejected Work, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven (7) calendar days' Written Notice to Contractor, correct any such deficiency. If, in the sole discretion of the Owner, significant progress has not been made by Contractor during this seven (7) calendar day period to correct the deficiency, the Owner may exercise any actions necessary to remedy the deficiency. In exercising the rights and remedies under this paragraph, Owner may proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work, and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, its agents and employees, Owner's other contractors, Principal Architect/Engineer and Principal Architect/Engineer's consultants access to the Site or any such offsite storage facility to enable Owner to exercise the rights and remedies under this paragraph. All claims, costs, losses and damages incurred or sustained by Owner in exercising such rights and remedies will be paid or otherwise borne by Contractor and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work. Such claims, costs, losses and damages will include but not be limited to all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of Contractor's Defective Work. Contractor shall not be allowed an extension of the Contract Time Requirements (including Milestones), or entitled to make any claim for damages resulting from any Delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies hereunder.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Application for Progress Payment:

14.01.1 No more often than once a month, Contractor shall submit to Owner or if directed by Owner, to Owner's Representative, for review an Application for Payment, in a form acceptable to Owner, filled out and signed by Contractor covering the Work completed as of the last day of the month for which an Application for Payment is being made. Application for Payment shall be accompanied by such supporting documentation as is required by the Contract Documents. The Application for Payment shall constitute Contractor's representation that the Work has been performed in accordance with the Contract Documents, has progressed to the point represented in the Application for Payment, and that title to all Work has passed or will pass to Owner free and clear of all claims, encumbrances, and security interests upon the incorporation of the Work into the Project, or upon Contractor's receipt of payment, whichever occurs earlier.

14.01.2 Such applications shall not include requests for payment on account of changes in the Work which have been properly authorized by Change Directives, if the Change Directive does not provide for an adjustment to the Contract Amount, or if the changes in the Work are not yet included in Change Orders.

14.01.3 Such applications shall not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or Manufacturer or Supplier because of a dispute or other reason.

14.01.4 If payment is requested on the basis of materials or equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall be accompanied by such bills of sale, data and other information satisfactory to Owner and Owner's Representative substantiating Owner's title to such materials or equipment or otherwise protecting Owner's interests therein. Payment on account of such materials or equipment will not include any amount for Contractor's overhead or profit or relieve Contractor of its obligation to protect and install such materials or equipment in accordance with the requirements of the Contract and to correct or restore damaged or Defective Work and shall in no event exceed eighty five percent (85%) of the line item valuation for such materials or equipment in the Schedule of Values. If materials or equipment are stored at another location, at the direction of the Owner they shall be stored in a bonded and insured facility, accessible to Owner's Representative and Principal Architect/Engineer, CMT Consultant, and Owner, and shall be clearly marked as property of Owner. Contractor shall insure such materials and equipment while so stored and in transit to the Site. Title to materials delivered to the Site of the Work or a staging area will pass to Owner upon payment by Owner without the necessity for further documentation. Risk of loss for all such materials and equipment will not pass to Owner until final payment.

14.01.5 In making progress payments, ten percent (10%) of the approved amount shall be retained until final completion and acceptance of the Contract Work. However, if the Owner at any time after fifty percent (50%) of the

work has been completed finds that satisfactory progress is being made, Owner may authorize any of the remaining progress payments to be made in full. Also, if the Contractor has achieved Substantial Completion of the Work and the Owner finds the amount retained to be in excess of the amount adequate for the protection of the Owner, Owner, at its sole discretion, may release to the Contractor all or a portion of such excess amount. The Owner is not obligated to pay interest on amounts retained except as provided in the Agreement. The interest rate to be paid on such retainage shall be the rate of interest paid by the Owner's depository bank on interest bearing accounts of similar amounts during the period of time interest accrues as provided herein.

14.01.6 Applications for Payment shall include the following documentation:

.1 an updated Project Schedule and narrative;
.2 an Affidavit of all bills paid to Subcontractors and Suppliers in the Monthly Subcontractor Payment Reporting Form included in the Specifications;
.3 conditional waivers and releases from Contractor upon progress and final payments, in the forms included in the Specifications; and
.4 a Contractor's Monthly Report;

14.02 Contractor's Warranty of Title: Contractor warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner free and clear of all claims no later than the time of payment to Contractor.

14.03 Review of Applications for Progress Payment:

14.03.1 Contractor shall submit its Application for Payment to the Owner's Representative not later than three (3) days after the first day of each month. The Owner's Representative will, within seven (7) calendar days after receipt of each Application for Payment, either indicate a recommendation for payment and forward the Application for Payment for processing by Owner, or return the Application for Payment to Contractor indicating Owner's Representative's reasons for refusing to recommend payment. In the latter case, Contractor shall make the necessary corrections and resubmit the Application for Payment.

14.03.2 Owner's Representative's recommendation of any payment requested in an Application for Payment will constitute a representation by Owner's Representative, based upon Owner's Representative's on-site observations of the executed Work and on Owner's Representative's review of the Application for Payment and the accompanying schedules and other information, that to the best of Owner's Representative's knowledge, information and belief:

.1 the Work has progressed to the point indicated; and
.2 the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for unit price Work, and to any other qualifications stated in the recommendation).

14.03.3 By recommending any such payment, Owner's Representative will not be deemed to have represented that:

.1 exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work;
.2 examination has been made to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Amount;
.3 Contractor's construction means, methods, techniques, sequences or procedures have been reviewed; or
.4 that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment from Contractor.

14.04 Decisions to Withhold Payment:

14.04.1 Owner may withhold or nullify the whole or part of any payment to such extent as may be necessary on account of:

.01 Defective Work not remedied;
.02 third party Claims filed or reasonable evidence indicating probable filing of such Claims;
.03 failure of Contractor to timely or properly make payments to Subcontractors or for labor, materials or equipment;
.04 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Amount;
.05 damage to Owner or another contractor for which Contractor is responsible;
.06 reasonable evidence that the Work will not be completed within the Contract Time Requirements, and that the unpaid balance would not be adequate to cover actual or liquidated damages or economic disincentives for the anticipated Delay;
.07 failure of Contractor to submit a Schedule of Values in accordance with the Contract Documents;
.08 failure of Contractor to submit a submittal schedule in accordance with the Contract Documents;
.09 failure of Contractor to submit and update the construction Project Schedule in accordance with the Contract Documents;
.10 failure of Contractor to maintain a record of changes on drawings and documents;
.11 failure of Contractor to maintain weekly payroll reports and, as applicable, provide copies of reports in a timely manner upon request of Owner;
.12 Contractor's neglect or unsatisfactory prosecution of the Work, including failure to clean up;
.13 property damage claims that are the responsibility of the Contractor; or
.14 failure of Contractor to comply with any provision of the Contract Documents.

14.04.2 When the above reasons for withholding payment are remedied or no longer exist, Contractor shall resubmit a statement for withheld amounts. Payment will be made within forty-five (45) calendar days of receipt by

the Owner of an approved Application for Payment, subject to Article 14.05 and Government Code, Section 2251.025(b).

14.05 Delayed Payments: Owner shall endeavor to, but shall not be obligated to, make payment to Contractor within thirty (30) calendar days of receipt of an Application for Payment in acceptable form, including all supporting documents and information required. However, Contractor agrees that should Owner fail to make payment to Contractor of the sum due on any such Application for Payment within forty-five (45) calendar days after the day on which Owner received the Application for Payment, then Owner will pay to Contractor, in addition to the sum due on such Application for Payment, interest thereon at the rate specified in Government Code, Section 2251.025(b) from date due until fully paid, which shall fully liquidate and shall be Contractor's sole and exclusive remedy for any injury to or damages incurred by Contractor arising out of such delay in payment.

14.06 Arrears: No money shall be paid by Owner upon any claim, debt, demand or account whatsoever, to any person, firm or corporation who is in arrears to the Owner for taxes; and the Owner shall be entitled to counterclaim and automatically offset against any such debt, claim, demand or account in the amount of taxes so in arrears and no assignment or transfer of such debt, claim, demand or account after said taxes are due, shall affect the right of Owner to so offset said taxes, and associated penalties and interest if applicable, against the same.

14.07 Substantial Completion:

14.07.1 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify Owner's Representative and request a determination as to whether the Work or designated portion thereof is substantially complete. If Owner, Owner's Representative or the Principal Architect/Engineer does not consider the Work substantially complete, Owner's Representative will notify Contractor giving reasons for that position. After performing any required Work, Contractor shall then submit another request for Owner's Representative to determine Substantial Completion. If Owner considers the Work substantially complete, Owner's Representative will prepare and deliver a certificate of Substantial Completion which shall establish the date of Substantial Completion, shall include a punch list of items to be completed or corrected before final payment, shall establish the time within which Contractor shall complete or correct the punch list items, and shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, warranties, corrective periods, and insurance.

Failure to include an item on the punch list does not alter the responsibility of Contractor to complete all Work in accordance with the Contract Documents. If a Certificate of Occupancy or Certificate of Compliance is required by governmental entities or public authorities having jurisdiction over the Work, said certificate shall be issued before the Work or any portion thereof is considered to have achieved Substantial Completion. The certificate of Substantial Completion shall be signed by Owner and Contractor to evidence acceptance of the responsibilities assigned to them in such certificate.

.1 For water and wastewater lines construction, Substantial Completion means, in addition to the definition at Section 1.072, that the Work, including all testing and disinfection, have been completed and accepted and the line(s) placed into service. A certificate of Substantial Completion may not be issued. Work that remains after Substantial Completion could include the final pavement of roadways, adjustment of structures to final grade and re-vegetation. Owner's Representative will issue a notice specifying what portion of the Work is partially completed for the purpose of payment and what Work remains to be done on the portion being accepted as having achieved Substantial Completion.

.2 For water and wastewater lines construction that includes roadway construction and/or reconstruction, a certificate of partial Project Substantial Completion may be given for the Work described and deemed substantially complete per Article 14.07.1.1, exclusive of any Project roadway construction and/or reconstruction. Having received a certificate of partial Substantial Completion on the water and wastewater lines construction, a certificate of Substantial Completion of the entire or balance of the Project may be given when the roadway construction and/or reconstruction is found to be substantially complete as per Article 14.07.1.3. The requirements of Article 14.08 Partial Utilization, shall also apply.

.3 For roadway construction and/or reconstruction, Substantial Completion means, in addition to the definition at Section 1.072, that the Work, including the final surface course, all permanent traffic control devices (pavement markings, signs, etc.), punch list items, and final cleanup has been completed, accepted, and placed into service, and, any street lighting conduit that has been installed, lowered or relocated must be inspected for usability by, and must have received written approval from, the Owner as well as having been completed, accepted, and placed into service. A certificate of Substantial Completion may not be issued. Work that remains after Substantial Completion could include final clean up. The Owner's Representative will issue a notice specifying what portion of the Work is partially completed for the purpose of payment and what Work remains to be done on the portion being accepted as having achieved Substantial Completion.

.4 Substantial Completion shall also comprise the completion of Work associated with the Project so that the utilities, systems, equipment, and/or facilities are operating properly and functioning per their intended use, as designed. Work that can be completed between Substantial Completion and Final Completion includes finish work such as cleanup, finish painting, landscape repairs, and final documentation. However, Contractor shall provide all Owner required equipment and system operation and maintenance training and Manufacturer certifications, and shall submit all spare parts and final O&M Data in order for Substantial Completion to be deemed achieved.

14.07.2 Owner shall have the right to exclude Contractor from the Work after the date of Substantial Completion, but Owner will allow Contractor

reasonable access to complete or correct items on the punch list and perform and complete warranty or corrective work.

14.07.3 Unless otherwise provided in the Contract Documents, for all periods prior to the issuance of a Certificate of Substantial Completion for the Project or for any designated area within the Project, the Contractor shall be responsible for the cost of all temporary and permanent utility charges necessary to maintain the progress and quality of the construction Work which is under the Contractor's control.

14.07.4 Unless otherwise provided in the Contract Documents, for all periods prior to the issuance of a Certificate of Substantial Completion for the Project or for any designated area within the Project, the Contractor shall be responsible for the cost of all temporary structural support systems necessary for the safe execution of the Work. Such systems shall be the sole responsibility of the Contractor.

14.08 Partial Utilization: Use by Owner, at Owner's option, of any substantially completed part of the Work which: (i) has specifically been identified in the Contract Documents, or (ii) Owner and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work in accordance with the following:

14.08.1 Owner at any time may request Contractor to permit Owner to use any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If Contractor agrees that such part of the Work is substantially complete, Contractor shall certify to Owner's Representative that such part of the Work is substantially complete and request Owner's Representative to issue a notice specifying what portion of the Work is substantially complete for the purpose of payment and what Work remains to be done on the portion being accepted. Contractor at any time may notify Owner's Representative that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Owner's Representative to issue a notice specifying what portion of the Work is substantially complete for the purpose of payment and what Work remains to be done on the portion being accepted. The provisions of Sections 14.7.1 and 14.7.2 will apply with respect to notice specifying what portion of the Work is substantially complete for the purpose of payment and what Work remains to be done on the portion being accepted.

14.08.2 Such partial utilization must be authorized to the extent required by any governmental entities or public authorities having jurisdiction over the Work.

14.08.3 Warranty and corrective period requirements for such partial utilization shall be in accordance with Section 13.7.3 above.

14.09 Final Inspection: Upon Written Notice from Contractor that the entire Work or an agreed portion thereof is complete, Owner will make a final inspection with Contractor and provide Written Notice of all particulars in which this inspection

reveals that the Work is incomplete or Defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies. Owner's Representative, Principal Architect/Engineer, CMT Consultant and other third party consultants and any other governmental entity or public authority with jurisdiction over the Project may assist Owner in the inspection and testing of the Work and Contractor agrees to and shall cooperate with any such consultants or authorities with respect to any such inspections and tests.

.

14.10 Final Application for Payment: Contractor may make application for final payment following the procedure for progress payments after Contractor has completed all such corrections to the satisfaction of Owner (and Owner's Representative) and delivered the following documents:

14.10.01 Affidavit by Contractor certifying the payment of all debts and claims;

14.10.02 Architect's/Engineer's Certificate of Completion;

14.10.03 Three (3) complete final operating and maintenance manuals, each containing maintenance and operating instructions, schedules, guarantees, and other documentation required by the Contract Documents;

14.10.04 Record documents (as provided in Section 6.10);

14.10.05 Complete releases or waivers (satisfactory to Owner) of all claims arising out of or filed in connection with the Work;

14.10.06 Certificate evidencing that insurance required by the Contract, if any, will remain in force after final payment and through the warranty and corrective periods and any longer period of time required by the Contract;

14.10.07 Non-Use of Asbestos Affidavit (After Construction) and lead based paints;

14.10.08 TPDES records in accordance with Section 6.07.4;

14.10.09 Consent of Surety, if any, to final payment; and

14.10.10 Any other documentation required by the Contract Documents.

14.11 Final Payment and Acceptance:

14.11.1 If, on the basis of observation of the Work during construction, final inspection, and review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Owner's Representative and Owner are satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled and there are no outstanding claims, Owner's Representative will recommend the final Application for Payment and thereby notify the Owner, who, if it accepts such recommendation, will pay to Contractor the balance due Contractor under the terms of the Contract. If the sole remaining unfinished item

to complete the Work is the reestablishment of vegetation, Owner has the right to require Contractor to execute and deliver to Owner a re-vegetation letter with a reasonable fiscal amount posted via an irrevocable, callable on demand letter of credit issued by a financial institution acceptable to Owner and at no cost to Owner to ensure completion of this item, as a condition of final payment. This Work must be accomplished within one hundred twenty (120) Calendar Days of the date of Final Completion of the Work. When the permanent erosion control has been established, Owner will initiate an inspection for final acceptance of the erosion controls. If the re-vegetation is not completed within the one hundred twenty (120) Calendar Days, Owner, at its option, may draw upon and complete the Work using the proceeds of the postedre-vegetation letter of credit.

14.11.2 Owner will issue a certificate of Final Completion to Contractor which establishes the Final Completion date. If the sole remaining unfinished item to complete the Work is the reestablishment of vegetation, and Contractor has executed the above-described re-vegetation letter of credit to ensure completion of this item, the Owner will issue a certificate of conditional acceptance to Contractor which establishes the Final Completion date.

14.11.3 Final payment is considered to have taken place when Contractor or any of its representatives negotiates Owner's final payment check, whether labeled final or not, for cash or deposits the check in any financial institution for its monetary return.

14.12 Waiver of Claims by Contractor: The making and acceptance of final payment will constitute A waiver of all claims by Contractor against Owner other than those previously made in writing and still unsettled at the time of the final payment.

14.13 Contractor's Payment Obligations Contractor will pay the Subcontractors, in accordance with its contractual obligations to such parties, all the amounts Contractor has received from Owner on account of their work. Contractor will impose similar requirements on the Subcontractors to pay those parties with whom they have contracted. Contractor will defend and indemnify Owner from and against any claims for payment by any such parties.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.1 Owner May Suspend Work Without Cause: At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than one hundred twenty (120) calendar days by Written Notice to Contractor, or such longer period of time as agreed to in writing by Owner and Contractor. Contractor shall promptly resume the Work upon Owner's written direction to proceed. Contractor shall be allowed an adjustment in the Contract Amount or an extension of the Contract Time Requirements, or both, directly attributable to any such suspension if Contractor makes an approved Claim therefor as provided in Articles 10.5 and 12.1.

15.2 Owner May Terminate Without Cause: Upon seven (7) calendar days' Written Notice to Contractor, Owner may, without cause and without prejudice to any right

or remedy of Owner, elect to terminate the Contract. In such case, Contractor shall be paid (without duplication of any items):

15.2.1 for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination;

15.2.2 for reasonable demobilization costs;

15.2.3 for reasonably anticipated profits on completed and accepted Work not previously paid and not included in separate pay items calculated to date of termination but not for anticipated profit on unperformed Work or unabsorbed overhead, or lost opportunity; and

15.2.4 for all costs reasonably incurred in settlement of terminated contracts with Subcontractors, Manufacturers, Suppliers and others, including for reasonably anticipated profits on completed and accepted Work not previously paid and not included in separate pay items calculated to date of termination but not for anticipated profit on unperformed Work or unabsorbed overhead, or lost opportunity. Contractor agrees to negotiate in good faith with Subcontractors, Manufacturers, Suppliers and others to mitigate its and Owner's costs.

15.3 Owner May Terminate With Cause:

15.3.1 Upon the occurrence of any one or more of the following events (each, a "default"):

.1 if Contractor persistently fails to perform the Work in accordance with the Contract Documents;
.2 if Contractor disregards Legal Requirements;
.3 if Contractor disregards the authority of Owner or Owner's Representative;
.4 if Contractor makes fraudulent statements;
.5 if Contractor fails to maintain a work force adequate to accomplish the Work within the Contract Time Requirements;
.6 if Contractor fails to make adequate progress and endangers successful completion of the Contract; or
.7 if Contractor otherwise breaches any provision of the Contract Documents;

Owner may, after giving Contractor (and the performance bond Surety, if any) seven (7) calendar days Written Notice, terminate in whole or in part the Contract or the Contractor's right to perform Work. Owner, at its option, may proceed with negotiation with Surety for completion of the Work. Alternatively, Owner may exclude Contractor from the Site and take possession of the Work (without liability to Contractor for trespass or conversion), incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and finish the Work as Owner may deem expedient. In such case Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Amount exceeds all claims, costs, losses and damages sustained by Owner arising out of or resulting from the Contractor's default and Owner's completion of the Work,

including attorneys' fees and other expenses and additional Owner's Architect/Engineer fees and other expenses in connection with such completion, Owner shall pay Contractor only for the value of unpaid, conforming Work performed by Contractor prior to such termination up to but not more than such excess. If such claims, costs, losses and damages exceed such unpaid balance, Contractor or Surety shall pay the difference to Owner upon demand. In the event that a termination for cause is found to be wrongful, the termination shall be deemed converted to a termination without cause as set forth in Section 15.2 and Contractor's remedy for wrongful termination shall be exclusively limited to the recovery of the payments permitted for termination without cause as set forth in Section 15.2.

15.3.2 Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor and Surety then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

15.4 Contractor May Stop Work or Terminate: If through no act or fault of Contractor, the Work is suspended for a period of more than one hundred and twenty (120) calendar days by Owner or under an order of court or other governmental entity or public authority, or such longer period of time as agreed to in writing by Owner and Contractor, or (except during disputes) Owner's Representative fails to forward to Owner for processing any properly prepared and submitted Application for Payment within seven (7) calendar days after it is submitted, or (except during disputes) Owner fails for forty-five (45) calendar days after it is submitted to pay Contractor any sum finally determined by Owner to be due, then Contractor may, upon forty-five (45) calendar days' Written Notice to Owner, and provided Owner does not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Section 15.2. The provisions of this Section 15.4 are not intended to preclude Contractor from making a Claim under Articles 11 and 12 for an increase in Contract Amount or Contract Time Requirements or otherwise for expenses or damage directly attributable to Contractor's stopping Work pursuant to this Section.

15.5 Discretionary Notice to Cure: In its sole discretion, Owner may, but is not required to, provide a Notice to Cure to Contractor and its Surety to cure an event of default described in Section 15.3.1 above and/or an anticipatory breach of contract and, if required by Owner, the Contractor and Surety shall attend a meeting with Owner, regarding the Notice to Cure, the event of default, and/or the anticipatory breach of contract. If issued, the Notice to Cure will set forth the time limit by which the cure is to be completed or commenced and diligently prosecuted. Upon receipt of any Notice to Cure, Contractor shall prepare a report describing its program and measures to accomplish the cure of the event of default and/or anticipatory breach of contract within the time required by the Notice to Cure. The Contractor's report must be delivered to Owner at least three (3) days prior to any requested meeting with the Owner and Surety.

15.6 Bankruptcy: If Contractor declares bankruptcy or is adjudged bankrupt or makes an assignment for the benefit of creditors or if a receiver is appointed for the benefit of creditors or if a receiver is appointed by reason of Contractor's insolvency, Contractor may be unable to perform this Contract in accordance with the Contract

requirements. In such an event, Owner may demand Contractor or its successor in interest provide Owner with adequate assurance of Contractor's ability to perform in accordance with the terms and conditions of the Contract. If Contractor fails to provide adequate assurance of performance to Owner's reasonable satisfaction within ten (10) days of such a request, Owner may terminate the Contract or the Contractor's right to perform Work for cause or without cause, pursuant to Sections 15.2 or 15.3 above. If Contractor fails to provide timely adequate assurance of its performance and actual performance, Owner may prosecute the Work with its own forces or with other contractors on a time and material or other appropriate basis and the cost of which will be charged against the Contract balance or otherwise borne by Contractor.

15.7 Duty to Mitigate: In the event of any termination or suspension under this Contract, the Contractor agrees to and shall take all reasonable actions to mitigate its damages and any and all claims for damages which may be asserted against the Owner.

15.8 Responsibility during Demobilization: While demobilizing, the Contractor will take all necessary and reasonable actions to preserve and protect the Work, the Site and other property of the Owner or others at the Site.

ARTICLE 16 - DISPUTE RESOLUTION

16.1 Filing of Claims:

16.1.1 All Claims by Contractor shall be made by Written Notice delivered to Owner within fifteen (15) calendar days after the start of the occurrence or event giving rise to the Claim and stating the general nature of the Claim. Notice of the amount of the Claim with supporting data shall be delivered in writing within thirty (30) calendar days after Written Notice of Claim is delivered by Contractor and shall represent that the adjustment claimed covers all known monetary amounts and/or extensions of time to which Contractor is entitled.

16.1.2 Within thirty (30) calendar days of receipt of notice of the amounts and/or time extensions sought by the Claim with supporting data, Owner's Representative and Contractor shall meet to discuss the Claim, after which a written offer of settlement or written notification of no settlement offer may be made to Contractor. If Contractor is not satisfied with any proposal presented, Contractor shall have thirty (30) calendar days in which to: (i) submit additional supporting data requested by the other party along with a written request to re-evaluate the Claim; (ii) modify the initial Claim; or (iii) request Alternative Dispute Resolution.

16.2 Alternative Dispute Resolution:

16.2.1 If a dispute exists concerning a Claim, the parties agree to use the following procedure prior to pursuing any other available remedies except that nothing herein shall preclude the Owner from seeking injunctive or other extraordinary relief in a court of competent jurisdiction prior to the completion of the following procedure. Owner reserves the right to include the Owner's Representative, Principal Architect/Engineer and/or the CMT Consultant as a party. Similarly, Contractor agrees to participate at its own

cost in similar dispute resolution procedures for any dispute between Owner and any such other parties, and Contractor agrees to require its Subcontractors to participate in the following procedures in any dispute between Owner and Contractor, upon Owner's written request, if in Owner's sole discretion the participation of Contractor and/or any Subcontractor is necessary to the resolution of any such dispute.

16.2.2 Negotiating with Previously Uninvolved Personnel: Either party may make a written request for a meeting to be held between representatives of each party within fourteen (14) Calendar Days of the request or such later period that the parties may agree to. Each party shall endeavor to include, at a minimum, one (1) previously uninvolved senior level decision maker (an owner, officer, or employee of each organization) with the authority to negotiate and settle the dispute on behalf of their organization. If a previously involved senior level decision maker is unavailable due to the size of the Contractor's organization or any other reason, the Contractor shall nonetheless provide an appropriate senior level decision maker for the meeting. The purpose of this and any subsequent meetings will be good faith negotiations and resolution of the matters constituting the dispute. Negotiations shall be concluded within thirty (30) Calendar Days of the first meeting, unless mutually agreed otherwise. This step may be waived by a written agreement signed by both parties, in which event the parties may proceed directly to mediation as described below.

16.2.3 Mediation:

.1 If the procedure described in 16.2.2 proves unsuccessful or is waived pursuant to its terms, the parties shall initiate the mediation process. Owner and Contractor agree to select within thirty (30) calendar days a mediator trained in mediation skills, and experienced in the mediation of construction disputes, to assist with resolution of the dispute. Owner and Contractor agree to act in good faith in the selection of the mediator and to give all due consideration to qualified individuals nominated to act as mediator. Should the parties fail to agree on a mediator within thirty (30) calendar days of initiation of the mediation process, the parties agree to ask the American Arbitration Association to select a qualified individual, which selection shall be binding on the parties. If the dispute is technical in nature, the mediator appointed by the American Arbitration Association shall be qualified by at least ten (10) years' experience in construction, engineering, and/or public works projects. If a party refuses to participate in the selection of a mediator or refuses to attend a scheduled mediation, the other party may pursue other remedies available to it.

.2 Mediation is a forum in which an impartial person, the mediator, facilitates communication between parties to promote reconciliation, settlement, or understanding among them. The parties hereby agree that mediation, at a minimum, shall provide for (i) conducting an on-site investigation, if appropriate, by the mediator for fact gathering purposes, (ii) a meeting of all parties for the exchange of points of view and (iii) separate meetings between the mediator and each party to the dispute for the formulation of resolution alternatives. The parties agree to participate in mediation in good faith for up to thirty

(30) calendar days after the date of the first mediation session, unless mutually agreed otherwise. Should the parties fail to reach a resolution of the dispute through mediation, then the parties may pursue other remedies available to them.

ARTICLE 17 – MISCELLANEOUS

17.1 Computation of Times: When any period of time is measured in the Contract Documents in days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or legal holiday, such day will be omitted from the computation.

17.2 Venue; Choice of Law: Venue for any suit at law or in equity involving the Contract or the parties' relationship created by it shall lie exclusively in Montgomery County, Texas. The Contract and any disputes arising out of it shall be construed in accordance with and governed by the laws of the State of Texas, without regard to its conflict of laws principles. Any claims or causes of action arising under or in conjunction with this Contract shall be brought in a court of competent jurisdiction in Montgomery County, Texas. In the event of litigation relating to this Contract or the performance or nonperformance of Work hereunder, the Contractor and the Owner voluntarily and irrevocably consent to the jurisdiction of the applicable courts in Montgomery County, Texas, and hereby waive any argument that such a forum is inconvenient.

17.3 Extent of Contract: This Contract represents the entire and integrated agreement between the Owner and Contractor with respect to the subject matter hereof and supersedes all prior and contemporaneous negotiations, representations or agreements, whether written or oral, and each party disclaims any reliance upon any such prior or contemporaneous negotiation, representation or agreement.

17.4 Remedies Cumulative: Except as limited by this Contract, remedies provided for herein are cumulative, and in addition to and not in lieu of those provided by law or available in equity.

17.5 Severability: If any word, phrase, clause, sentence or provision of the Contract, or the application of same to any person or set of circumstances is for any reason held to be unconstitutional, void, invalid or unenforceable, then such word, phrase, clause, sentence or provision shall be deemed severed herefrom and the remainder of this Contract shall remain in full force and effect.

17.6 Independent Contractor: The Contract shall not be construed as creating an employer/employee relationship, a partnership, or a joint venture. Contractor is an independent contractor and Contractor's work and services shall be those of an independent contractor. Without limiting the generality of the foregoing, Contractor agrees and understands that the Contract does not grant any rights or privileges to any employee of Contractor, its Subcontractors or Suppliers which are established for employees of Owner.

17.7 Prohibition of Gratuities: Owner may, by Written Notice to Contractor, terminate the Contract without liability if Owner determines that gratuities were offered or given by Contractor or any agent or representative of Contractor to any officer or employee of Owner with a view toward securing the Contract or securing

favorable treatment with respect to the awarding or amending or the making of any determinations with respect to the performing of such Contract. In the event the Contract is terminated by Owner pursuant to this provision, Owner shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by Contractor in providing such gratuities, to the extent Contractor attempted to charge Owner for same or included any such costs in the Contract Amount.

17.8 Prohibition Against Personal Interest in Contracts: No officer, employee, independent consultant, or elected official of Owner who is involved in the development, evaluation, or decision-making process of the performance of any solicitation shall have a financial interest, direct or indirect, in the Contract resulting from that solicitation. Any violation of this provision shall render the Contract voidable by Owner.

17.9 Owner's Right to Audit:

17.9.1 "Records" means all records generated by or on behalf of Contractor and each Subcontractor and Supplier of Contractor, whether paper, electronic, or other media, which are in any way related to performance of or compliance with this Contract, including, without limitation:

- **.01** accounting records;
- **.02** written policies and procedures, contractor daily diaries, and pay reports;
- **.03** subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.);
- **.04** original estimates and estimating work sheets;
- **.05** correspondence;
- .**06** Change Order files (including documentation covering negotiated settlements);
- **.07** back charge logs and supporting documentation;
- **.08** general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends;
- **.09** subcontracts, purchase orders or other agreements between Contractor and any Subcontractor or Manufacturer, or Supplier;
- **.10** records necessary to evaluate Contract compliance, Change Order pricing, and any Claim submitted by Contractor or any of its payees;
- **.11** SWP3 Documentation;
- **.12** job cost reports; and
- **.13** any other Contractor record that may substantiate any charge or claim related to this Contract.

17.9.2 Contractor shall allow Owner's agent or its authorized representative to inspect, audit, and/or reproduce, or all three, all Records generated by or on behalf of Contractor and each Subcontractor and Manufacturer or Supplier, upon Owner's written request. Further, Contractor shall allow Owner's agent or authorized representative to interview any of Contractor's employees, all Subcontractors and all Manufacturers and Suppliers, and any of their respective employees.

17.9.3 Contractor shall retain all its Records, and require all its Subcontractors and Manufacturers and Suppliers to retain their respective Records, during the

performance of this Contract and for three (3) years after final payment or any termination, until all audit and litigation matters that Owner has brought to the attention of Contractor are resolved, or as otherwise required by law, whichever is longer. Owner's right to inspect, audit or reproduce Records, or interview employees of Contractor or its respective Subcontractors or Manufacturers and Suppliers exists during the performance of this Contract, and for three (3) years after final payment or any termination, until all audit and litigation matters that Owner has brought to Contractor's attention are resolved, or as otherwise required by law, whichever is longer, and at no cost to Owner.

17.9.4 Contractor must provide sufficient and accessible facilities during its normal business hours for Owner to inspect, audit or reproduce Records, or all three, and to interview any person about the Records.

17.9.5 Contractor shall insert these requirements in each written contract between Contractor and any Subcontractor, Manufacturer or Supplier and require each Subcontractor, Manufacturer and Supplier to comply with these provisions.

17.10 Survival of Obligations: All representations, indemnifications, warranties and guarantees made in, required by or provided pursuant to the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the Work and termination or completion of the Contract.

17.11 No Waiver: The waiver of any provision of this Contract will not be deemed to be a waiver of any other provision of this Contract. No provision of this Contract will be deemed waived whatsoever unless expressly provided in writing, nor will a waiver of any default be deemed a waiver of any subsequent defaults of the same type. The failure at any time to enforce this Contract, whether the default is known or not, shall not constitute a waiver of or estoppel against the right to do so.

17.12 Condition Precedent to Right to Sue: Notwithstanding anything in the Contract Documents to the contrary, the Contractor must have provided at least 90 days prior written notice of a claim for damages as a condition precedent to the right to sue on the Contract.

17.13 WAIVER OF THE RIGHT TO JURY TRIAL. OWNER AND CONTRACTOR HEREBY, KNOWINGLY, IRREVOCABLY AND INTENTIONALLY WAIVE ANY RIGHTS EITHER PARTY MAY HAVE TO A TRIAL BY JURY IN RESPECT TO ANY CLAIM, CAUSE OF ACTION, PROCEEDING OR COUNTER CLAIM BASED UPON THE CONTRACT DOCUMENTS, OR ARISING OUT OF, UNDER OR IN CONNECTION WITH THE CONSTRUCTION OF THE WORK OR ANY COURSE OF CONDUCT, COURSE OF DEALING, STATEMENTS (WHETHER VERBAL OR WRITTEN) OR ACTIONS OF ANY PARTY. HOWEVER, THIS WAIVER OF JURY TRIAL SHALL NOT APPLY TO LITIGATION WHICH MAY BE INITIATED BY ANY THIRD PARTIES.

17.14 Attorneys' Fees and Costs. If Contractor brings any suit against Owner and Contractor does not prevail in such suit, Contractor shall be liable for all attorneys' fees and costs incurred by Owner as a result of such suit.

"Prevail" as used in this Section 17.14 means the Contractor recovers a judgment against Owner for at least eighty percent (80%) of all relief sought by Contractor in Claims against Owner in the Written Notice(s) as provided in Section 16.1.1 above, and the judgment is greater than any relief offered to Contractor by Owner in any written settlement offer.

END OF GENERAL CONDITIONS TERMS

WARRANTY ITEM NO. _____

(PROJECT NAME)

The General Conditions of the Contract require that Defects be corrected within seven (7) days after written notice is received.

TO: _____
name/ address / telephone / fax / email

ATTENTION OF: _____

FROM: _____
project manager name / address / telephone / fax / email

PROJECT: _____
name / location / CIP ID number

END DATE OF WARRANTY OR CORRECTIVE PERIOD:_____

_____

SUBJECT:_____

[ ] If checked, the defect requires immediate attention. The Contractor has been called.
[ ] If checked, the Owner has been asked to consult with the Contractor on the defect.

PLEASE CORRECT THE FOLLOWING ITEM(S):

DATE OF REQUEST_____ **SIGNATURE** _____
Project Manager

[ ] _____Phone No._____

[ ] _____Phone No._____

[ ] _____Phone No._____

RESPONSE FROM Contractor: DATE CORRECTION WAS MADE:_____

The Contractor must endeavor to correct the defect within seven (7) calendar days after written notice is received. If the defect cannot be corrected by that time, Contractor shall provide a written explanation to the Owner describing the repairs or other correction needed and the time required to complete the repairs or corrections.

Description of corrections made:

DATE OF REPLY:_____SIGNATURE:_____

PRINTED NAME:_____

When the repair/correction is complete, the contractor should return a copy to each of the following:

[ ] _____Phone No._____

[ ] _____Phone No._____

[ ] _____Phone No._____

END OF SECTION

4812-4844-0915, v. 1-6602-9900, v. 4-6602-9900, v. 3-6602-9900, v. 2

SECTION 00 73 43
WAGE SCALE FOR CONSTRUCTION

1.1 Contractor and its Subcontractors must pay the general prevailing wage rates for building construction for each craft or type of worker or mechanic employed in the execution of any building construction or repair under the Contract in accordance with Chapter 2258 of the Texas Government Code. The San Jacinto River Authority ("SJRA") has determined the prevailing wage rate in the locality in which the work is being performed, which is set forth in Exhibit "A".

1.2 In bidding, Contractor warrants and represents that it has carefully examined the classifications for each craft or type of worker needed to execute the Contract and determined that such classifications in Exhibit "A" include all necessary categories to perform the work under the Contract.

1.3 If Contractor believes that an additional classification for a particular craft or type of worker is necessary to perform work under the Contract, it must submit with its bid a request to the San Jacinto River Authority to use an additional labor classification not listed in Exhibit "A" and specify the proposed new classification. The SJRA shall determine whether a proposed classification is already covered in Exhibit "A", and, if it is, specify which classification is appropriate. The SJRA's decision is conclusive. If the SJRA decides that a new classification is necessary, it will determine the appropriate prevailing wage rate for any resurveyed, amended, new, or additional craft or type of worker not covered by Exhibit "A". Such determination must be decided in accordance with procedures established by the SJRA, and in compliance with Chapter 2258 of the Texas Government Code.

1.4 Contractor must not use any labor classification not covered by Exhibit "A" until such classification is established and approved for use by the SJRA.

A Contractor or Subcontractor who violates Chapter 2258 of the Texas Government Code must pay to the SJRA $60 per each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates set forth in Exhibit "A".

1.5 The SJRA may withhold money required to be withheld under Chapter 2258 of the Texas Government Code from the final payment to Contractor or earlier payments if the SJRA makes a determination that there is good cause to believe that Contractor has not complied with these provisions and Chapter 2258 of the Government Code, in which

case the SJRA may withhold the money at any time subsequent to the finding by the SJRA.

1.6 Contractor and Subcontractors must keep records as required by Chapter 2258 of the Government Code, and specifying:

(1) the name and classification of each worker employed under the Contract; and

(2) the actual per diem wages paid to each worker, and the applicable hourly rate.

The records must be open at all reasonable hours for inspection by the officers and agents of the SJRA.

1.7 The prevailing wage rate does not prohibit the payment of more than the rates stated.

1.8 The hourly cost of salary for non-exempt workers for labor in excess of 40 hours per worker per week, shall be calculated at 1.5 times the worker's base pay, plus 1.0 times fringe benefits, for the applicable craft and level.

REST OF PAGE INTENTIONALLY LEFT BLANK

EXHIBIT "A"

LABOR CLASSIFICATIONS AND PREVAILING WAGE RATES
FOR
CONSTRUCTION
2019

Heavy Construction Projects

County Name: Montgomery and Waller Counties
Wages based on DOL General Decision: TX1900063 01/04/2019 TX63

CLASSIFICATION	RATE	FRINGES
Sprinkler Fitter (Fire Sprinklers)	$29.03	$15.84
Carpenter	$14.38	
Ironworker, **reinforcing**	$11.29	
Laborers:		
Common Montgomery County	$8.83	$0.94
Common Waller County	$8.97	$0.88
Landscape	$7.35	
Mason Tender Cement	$9.96	
Pipelayer Montgomery County	$10.04	
Pipelayer Waller County	$10.07	
Cement Mason / Concrete Finisher	$11.37	$1.13
Electrician	$18.40	$1.34
Formbuilder / Formsetter	$13.35	$1.17
Pipefitter	$17.00	$0.04
Power Equipment Operator:		
Backhoe	$13.25	
Bulldozer Montgomery County	$13.12	
Bulldozer Waller County	$12.46	
Crane	$14.91	$0.58
Excavator	$16.74	
Front End Loader Montgomery County	$12.30	$0.57
Front End Loader Waller County	11.75	$0.92
Grader	$12.20	$1.48
Tractor	$12.38	$1.51
Truck Driver Montgomery County	$11.82	$0.92
Truck Driver Waller County	12.28	$0.98
Welders – Receive rate prescribed for craft performing operation to which welding is incidental.		

Heavy Construction Projects- Flood Control Only

County Name: Brazoria, Fort Bend, Galveston, Harris, Montgomery and Waller Counties
Wages based on DOL General Decision: TX190046 01/04/2019 TX46

CLASSIFICATION	RATE	FRINGES
Asphalt Distributer	$9.47	
Asphalt Paving Machine	$10.05	
Asphalt Raker	$8.28	
Asphalt Shoveler	$7.45	
Batching Plant Weigher	$11.11	
Broom or Sweeper Operator	$8.01	
Bulldozer	$9.91	
Carpenter	$10.35	
Concrete Curbing Mach.	$8.80	
Concrete Finisher-Paving	$9.87	
Concrete Finisher-Structures	$9.86	
Concrete Finishing Machine	$11.79	
Concrete Joint Sealer	$10.50	
Concrete Paving Float	$9.30	
Concrete Paving Saw	$10.01	
Concrete Paving Spreader	$9.32	
Concrete Rubber	$9.00	
Crane, Clamshell, Backhoe, Derrick, Dragline, Shovel	$11.35	
Crusher or Screening Plant Operator	$11.00	
Electrician	$16.15	
Flagger	$7.25	
Form Builder (Structures)	$9.96	
Form Liner – Paving & Curb	$9.03	
Form Setter (Paving/Curb)	$8.86	
Form Setter – Structures	$9.05	
Foundation Drill Operator, Crawler Mounted	$12.59	
Foundation Drill Operator, Truck Mounted	$12.73	
Front End Loader	$9.29	
Labor Common	$7.45	
Labor – Utility	$8.53	
Lineperson	$7.50	
Manhole Builder (Brick)	$8.49	
Mechanic	$11.38	
Milling Machine Operator	$10.43	
Mixer	$7.94	
Motor Grader:		
Fine Grade	$11.11	
Other	$10.67	
Oiler	$9.56	

Painter - Structures	$14.00	
Pavement Marking Machine	$7.45	
Piledriver	$10.96	
Pipe Layer	$8.49	
Reinforcing Steel Setter Paving	$12.50	
Reinforcing Steel Setter Structures	$12.47	
Roller, Pneumatic, Self Propelled	$7.96	
Roller, Steel Wheel Other Flatwheel or Tamping	$7.61	
Roller, Steel Wheel Plant Mix Pavements	$9.25	
Scraper	$8.69	
Servicer	$9.51	
Sign Erector	$10.06	
Sign Installer	$7.45	
Slipform Machine Operator	$9.20	
Spreader Box Operator	$9.08	
Steelworker Structural	$10.35	
Tractor – Crawler Type	$10.12	
Tractor – Pneumatic	$8.99	
Traveling Mixer	$9.35	
Trenching Machine, Heavy	$13.56	
Trenching Machine, Light	$10.50	
Truck Driver Lowboy Float	$11.29	
Truck Driver Single Axle Heavy	$8.76	
Truck Driver Single Axle, Light	$8.15	
Truck Driver Tandem Axle Semi-Trailer	$8.00	
Wagon Drill, Boring Machine	$10.15	
Welder	$10.43	
Work Zone Barricade	$7.45	
Welders – Receive rate prescribed for craft performing operation to which welding is incidental.		

Highway Construction Projects (for Paving Projects)

County Name: Montgomery County and Harris County
Wages based on DOL General Decision: TX190038 01/04/2019 TX38

CLASSIFICATION	RATE	FRINGES
Cement Mason/Concrete Finisher (Paving and Structures)	$12.98	
Electrician	$27.11	

Form Builder/Form Setter:		
Paving & Curb	$12.34	
Structures	$12.23	
Laborer:		
Asphalt Raker	$12.36	
Flagger	$10.33	
Laborer, Common	$11.02	
Laborer, Utility	$11.73	
Pipelayer	$12.12	
Work Zone Barricade Servicer	$11.67	
Painter (Structures)	$18.62	
Power Equipment Operator:		
Asphalt Distributor	$14.06	
Asphalt Paving Machine	$14.32	
Broom or Sweeper	$12.68	
Concrete Pavement Finishing Machine	$13.07	
Concrete Paving, Curing, Float, Texturing Machine	$11.71	
Concrete Saw	$13.99	
Crane, Hydraulic 80 Tons or Less	$13.86	
Crane, Lattice boom 80 tons or less	$14.97	
Crane, Lattice boom over 80 Tons	$15.80	
Crawler Tractor	$13.68	
Excavator, 50,000 pounds or less	$12.71	
Excavator, Over 50,000 pounds	$14.53	
Foundation Drill, Crawler Mounted	$17.43	
Foundation Drill, Truck Mounted	$15.89	
Front End Loader 3 CY or less	$13.32	
Front End Loader, Over 3CY	$13.17	
Loader/Backhoe	$14.29	
Mechanic	$16.96	
Milling Machine	$13.53	
Motor Grader, Fine Grade	$15.69	
Motor Grader, Rough	$14.23	
Off Road Hauler	$14.60	
Pavement Marking Machine	$11.18	
Piledriver	$14.95	
Roller, Asphalt	$11.95	
Roller, Other	$11.57	
Scraper	$13.47	
Spreader Box	$13.58	
Servicer	$13.97	
Steel Worker:		

Reinforcing Steel	$15.15	
Structural Steel Welder	$12.85	
Structural Steel	$14.39	
Truck Driver:		
Low Boy Float	$16.03	
Single Axle	$11.46	
Single or Tandem Axle Dump	$11.48	
Tandem Axle Tractor w/Semi Trailer	$12.27	
Welders – Receive rate prescribed for craft performing operation to which welding is incidental.		

Heavy Construction Projects Including Water and Sewer Lines (Does Not Include Flood Control)

County Name: Harris County
Wages based on DOL General Decision: TX180042 01/05/2018 TX42

CLASSIFICATION	RATE	FRINGES
Sprinkler Fitter (Fire Sprinklers)	$29.03	$17.52
Carpenter	$14.04	
Cement Mason / Concrete Finisher	$12.50	$1.17
Electrician	$17.00	$0.04
Formbuilder / Formsetter	$13.84	$1.17
Ironworker, reinforcing	$11.28	
Laborers:		
Common	$8.94	
Landscape	$7.35	
Mason Tender Cement	$9.94	
Pipelayer	$10.14	
Pipefitter	$17.00	$0.04
Power Equipment Operator:		
Backhoe	$13.47	
Bulldozer	$12.58	
Crane	$15.33	$0.57
Excavator	$16.37	
Front End Loader	$12.16	
Grader	$12.20	$1.48
Tractor	$15.00	
Truck Driver	$12.02	$1.02
Welders – Receive rate prescribed for craft performing operation to which welding is incidental.		

Building Construction Projects- (Does not include single family homes or apartments up to and including 4 stories)

County Name: Harris County

Wages based on DOL General Decision: TX180303 01/12/2018 TX303

CLASSIFICATION	RATE	FRINGES
Asbestos Worker/Heat & Frost Insulator (Duct, Pipe and Mechanical System Insulation)	$23.26	$12.92
Boilermaker	$28.00	$22.35
Carpenter (Excludes Acoustical Ceiling Installation, Drywall Hanging, Form Work and Metal Stud Installation)	$23.05	$8.78
Electrician:		
Excludes Low Voltage Wiring and Installation of Alarms	$32.25	$9.14
Alarm Installation Only	$17.97	$3.37
Low Voltage Wiring Only	$18.00	$1.68
Elevator Mechanic	$41.28	$32.645+a+b
Power Equipment Operator:		
Cranes	$34.85	$9.85
Ironworker:		
Structural	$23.27	$7.12
Ornamental	$23.27	$7.12
Reinforcing	$12.14	
Glazier	$23.27	$7.12
Plasterer	$19.92	$1.00
Plumber	$34.90	$10.54
Pipefitter (Including HVAC Pipe Installation)	$34.10	$11.71
Sprinkler Fitter (Fire Sprinklers)	$29.03	$15.84
Sheet Metal Worker:		
Exludes HVAC Duct and Unit Installation	$27.72	$13.70
HVAC Duct Installation Only	$27.72	$13.70
HVAC Unit Installation Only	$20.05	$2.24
Acoustical Ceiling Mechanic	$17.27	$3.98
Bricklayer	$18.87	
Caulker	$15.36	
Cement Mason/Concrete Finisher	$13.93	
Drywall Finisher/Taper	$16.27	$3.66
Drywall Hanger and Metal Stud Installer	$17.44	$3.93
Floor Layer (Carpet)	$20.00	
Form Worker	$12.77	
Insulator – Batt. Installation Only	$14.87	$0.73
Laborer:		
Common or General	$11.76	
Mason Tender - Brick	$13.47	
Mason Tender – Cement/Concrete	$10.48	
Pipelayer	$12.94	

Roof Tearoff	$11.28	
Landscape and Irrigation	$9.52	
Lather	$19.73	
Operator:		
Backhoe/Excavator/Trackhoe	$13.94	
Bobcat/Skid Steer/Skid Loader	$13.93	
Bulldozer	$22.75	
Drill	$16.22	$0.34
Forklift	$16.00	
Grader/Blade	$13.37	
Loader	$13.55	$0.94
Mechanic	$17.52	$3.33
Paver (Asphalt, Aggregate, and Concrete)	$16.03	
Roller	$16.00	
Painter (Brush, Roller and Spray, Exludes Drywall Finishing/Taping	$17.24	$4.41
Roofer	$15.40	
Tile Finisher	$12.00	
Tile Setter	$16.17	
Truck Driver:		
1/Single Axle Truck	$14.18	
Dump Truck	$12.39	$1.18
Flatbed Truck	$19.65	$8.57
Semi-Trailer Truck	$12.50	
Water Truck	$12.00	$4.11
Waterproofer	$14.39	
Welders – Receive rate prescribed for craft performing operation to which welding is incidental.		
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.		

Building Construction Projects- (Does not include single family homes or apartments up to and including 4 stories)

County Name: Montgomery County
Wages based on DOL General Decision: TX190262 01/04/2019 TX62

CLASSIFICATION	RATE	FRINGES
Asbestos Worker/Heat & Frost Insulator (Duct, Pipe and Mechanical System Insulation)	$24.15	$13.29
Boilermaker	$28.00	$22.35
Carpenter:		
Excludes Acoustical Ceiling Installation, Drywall Hanging, Form Work and Metal Stud Installation	$18.81	$2.10
Batt. Installation Only	$14.87	$0.73
Electrician:		
Excludes Low Voltage Wiring and Installation of Alarms	$32.25	$9.14
Alarm Installation Only	$17.97	$3.37
Low Voltage Wiring Only	$18.00	$1.68
Elevator Mechanic	$41.28	$32.645+a+b
Power Equipment Operator:		
Cranes	$34.85	$9.85
Ironworker:		
Structural	$27.15	$5.66
Ornamental	$23.77	$7.12
Reinforcing	$12.10	
Glazier	$19.12	$4.41
Plasterer	$19.92	$1.00
Plumber	$35.60	$11.04
Pipefitter:		
Including HVAC Pipe Installation	$33.30	$12.26
Excludes HVAC Pipe Installation	$26.73	$11.13
Sprinkler Fitter (Fire Sprinklers)	$22.17	$9.70
Sheet Metal Worker:		
Exludes HVAC Duct and Unit Installation	$27.72	$13.70
HVAC Duct Installation Only	$20.17	$4.77
HVAC Unit Installation Only	$19.67	$2.24
Acoustical Ceiling Mechanic	$16.41	$3.98
Bricklayer	$19.86	
Caulker	$15.36	
Cement Mason/Concrete Finisher	$13.37	
Drywall Finisher/Taper	$16.30	$3.71
Drywall Hanger and Metal Stud Installer	$17.45	$3.96
Floor Layer (Carpet)	$20.00	
Form Worker	$13.13	
Insulator – Batt. Installation Only	$14.87	$0.73
Laborer:		

Common or General	$10.20	
Mason Tender - Brick	$13.37	
Mason Tender – Cement/Concrete	$10.50	
Pipelayer	$12.94	
Roof Tearoff	$11.28	
Landscape and Irrigation	$9.49	
Lather	$19.73	
Operator:		
Backhoe/Excavator/Trackhoe	$16.17	
Bobcat/Skid Steer/Skid Loader	$13.93	
Bulldozer	$20.77	
Drill	$16.22	$0.34
Forklift	$15.64	
Grader/Blade	$13.37	
Loader	$13.55	$0.94
Mechanic	$17.52	$3.33
Paver (Asphalt, Aggregate, and Concrete)	$16.03	
Roller	$16.00	
Painter (Brush, Roller and Spray, Exludes Drywall Finishing/Taping	$16.77	$4.51
Roofer	$15.40	
Tile Finisher	$12.00	
Tile Setter	$16.17	
Truck Driver:		
1/Single Axle Truck	$14.95	$5.23
Dump Truck	$12.39	$1.18
Flatbed Truck	$19.65	$8.57
Semi-Trailer Truck	$12.50	
Water Truck	$12.00	$4.11
Waterproofer	$14.39	
Welders – Receive rate prescribed for craft performing operation to which welding is incidental.		
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		

END OF SECTION

SECTION 01 11 13

WORK COVERED BY CONTRACT DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Definitions.
2. Work Covered by Contract Documents.
3. Cash Allowances.
4. Owner-Furnished Products.
5. Document Management Software.
6. Work Sequence.
7. Work Guidelines.
8. Coordination of Work.
9. Contractors Use of Premises.
10. Contract Clarification.
11. Alternate Construction Methods.
12. Utility Lines.
13. Warranty.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Proposing Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS (NOT USED)

1.4 DEFINITIONS

A. Mobilization Area: For Work at facilities, an area, defined on the Contract Drawings, for Contractor staging and storage of construction equipment, tools, products, and spare parts.

1.5 WORK COVERED BY CONTRACT DOCUMENTS

A. The proposed building will be built as a turn-key construction project by the Contractor who is awarded the contract. This includes construction of the foundation base and foundation, and design and construction of the building structure including all openings (windows, pedestrian doors, roll-up doors, louvered openings), electrical system, lighting and installation of ductless HVAC unit. Crushed concrete base pavement to be installed in areas as shown on drawings, with Alternate Items to substitute with asphalt or concrete.

B. The proposed building is to be constructed with the following:

1. Provide grading of proposed site, including installation of concrete drainage swale east of proposed building site as shown on Drawings. Depth and slope of swale sides to be determined based upon existing grades and depth of entrance to proposed inlet to proposed storm sewer (shown on Drawings).
2. Building 100-feet long, 40-feet deep, 16 feet tall at eaves with roof pitch of 2:12. Also, will have 20-wide by 40-deep lean-to on north side of structure with 2:12 pitch, connecting to building at 14-feet height. Then entire structure, including lean-to is to be constructed on a reinforced concrete foundation (constructed by Contractor). Building with lean-to to be designed and assembled turn-key by Contractor in accordance with drawings and specifications. The structure is to be Category 3 hurricane rated. Building and foundation to be designed by a Texas Licensed Professional Engineer, and submit the design to SJRA for review. The building is to be at an elevation so it is approximately 4-inches above the highest natural grade surrounding the foundation. However, the surrounding pavement (whichever type is chosen) should be graded to allow for level access to roll-up doors and pedestrians doors, and to prevent any water draining towards or standing by the building.
3. Three (3) steel roll-up bay doors, two (2) being 14’ x 14’, and one (1) being 12’ x 10’ as shown on plans and per specifications. An alternate item will be included to motorize these doors. Base item will be chain operated.
4. Three (3) pedestrian access doors, all three (3) being double 6’ x 7’ doors (left side door (from exterior) being normal operating door) with locations as shown on drawings. Doors and frames to be fiberglass per specifications.
5. Five (5) 3’ x 6’ size aluminum frame windows as shown on drawings and per specifications.
6. Gutters and downspouts (located not to impede with openings).
7. One gable vent on north side of building above lean-to.
8. Four (4) ventilation (positive displacement (blow into room)) blowers/fans installed in east wall centered in the four bays of the un-air-conditioned space. Blower/fans to have rectangular frame with 48-inch diameter fan blades. Mount blower/fan unit 1’ above finished floor. Air displacement to

be minimum 15,000 CFM at top speed for each unit. Include hinged louver with screen on exterior. All exterior components to be constructed of corrosive resistant material.

9. Installation of ductless HVAC system for 20' x 40' SCADA area (as noted on Drawings) including installation of cooling/heating unit and outside condenser unit. Elevated condenser unit on platform so it is 18" above ground level.
10. Turn-key design and installation of electrical system, including 480V panel, low-voltage transformer, low-voltage load center, conduit, wiring, switches, receptacles and lights (includes switches, conduit and wiring to proposed fans/blowers, heaters, ductless HVAC system, and door openers (if included in contract)). Drawings have been provided showing approximate locations of devices; however, current NEC code requirements must be met. Also, drawings indicated SJRA recommended circuit layout, but Contractor is responsible for ultimate design. The Contractor must provide site and building layout and one-line drawings for proposed installation design and signed/sealed by a Licensed Electrical Engineer in the State of Texas. 20 interior lights (type and size per General Electrical specification) to be installed spaced equally in building in locations as shown on Drawings and coordinated with SJRA Woodlands division staff (hung at elevation at or above top of 14' roll-up door height). Other exterior lights to be installed at locations shown on drawings 10 feet above ground level. An electrical junction box is located approximately 40 feet from the proposed building site. SJRA will provide the HPSS panel, LPSS panel and transformer for the Contractor to install (refer to appropriate drawings). Contractor to install all conduit, wire and boxes for site electrical per Drawings. SJRA will pull cabling from existing junction box through Contractor installed conduit, and will terminate main wiring at Contractor installed HPSS panel.
11. Provide and install fiber optic cable in conduit as shown on drawings with any required pull boxes. Cable to be terminated at point shown on drawings.
12. Paving (parking area) per drawings and specifications (see Base and Alternate Items below for explanation). Slope parking area to approximately

follow natural downhill slope from east to west, but do not exceed a slope of 5%.

13. Removable Pipe Bollards per detail.
14. Pole mounted light fixture.
15. Installation of parking area as shown on Drawings. Base Item to be Crushed Concrete Base, and Alternate Items given for substitution with either Asphalt Paving or Concrete Paving.
16. Installation of driveway from proposed parking area to wastewater plant driveway (north side) (Alternate Item).
17. Installation of driveway to connect proposed parking area to existing concrete driveway to Admin Building (south side) (Alternate Item).
18. Relocate existing 70 foot by 10 foot awning in the wastewater plant to location shown on Drawings.

1.6 CASH ALLOWANCES (NOT USED)

1.7 OWNER-FURNISHED PRODUCTS

A. Contractor's Responsibilities:

1. Arrange and pay for product delivery to site.
2. Receive and unload products at site; jointly with Owner's Representative, inspect for completeness or damage.
3. Handle, store, install, and finish products.
4. Repair or replace damaged items.

1.8 DOCUMENT MANAGEMENT SOFTWARE

A. Contractor and the Owner's Representative shall be given the applicable number of Document Management System user names and passwords.

B. Contractor shall use the Owner's internet based document management system to transmit its documents to the Owner's Representative, including but not limited to Requests for Information (RFIs), shop drawing submittals, applications for payment, and letters of correspondence. Refer to Specification Section 01 33 00 – Submittals. The document management software should be able to automatically notify all team members of a submittal upload regardless of the originator, i.e. contractor, Principal Architect/Engineer, Owner's Representative, or Owner. Notification of new uploads should go to all team members regardless if they are the Principal Architect/Engineer or not, i.e. sub-consultants for construction management & inspection, but are not tasked as the Principal Architect/Engineer.

C. A minimum of one (1) and a maximum of three (3) accounts on the document management system will be provided by the Owner. Additional accounts may be requested by the Contractor.

D. Each account will allow one (1) user to access the document management system. Training on the document management system will be provided by the Owner as requested by the Contractor at a mutually agreed upon date and location.

1.9 WORK SEQUENCE

A. Construct Work in phases during the construction period. Coordinate construction schedule and operations with the Owner's Representative. Subcontractors shall coordinate its activities and operations with the Contractor.

B. Construction of this project may require using multiple crews working concurrently in order to complete the project within the specified Contract Time. At no time will multiple crews be allowed to work in consecutive traffic control phases during construction.

C. Due to overall project complexity and numerous active utility interface requirements, submit a sequence of construction of water lines for review by the Owner's Representative. Proposed sequence of construction shall address proposed method and timing of all major construction activities to be undertaken.

D. Data for all facilities and utilities shown were taken from available plans, record drawings, and/or utility maps made available from several sources. Actual field locations of facilities and utilities may vary from that shown on the Drawings. Contractor shall make a complete and independent verification of utility locations prior to submittal of subsequent shop drawings. Unless otherwise approved by the Owner's Representative, work shall not continue at locations where there is a conflict with existing utilities.

E. Construction disturbing traffic shall be conducted during off-peak hours, 9:00 a.m. to 4:00 p.m. weekdays and/or weekends 7:00 p.m. Friday to 4:00 a.m. Monday, dependent upon provisions of Texas Department of Transportation. Exception to these times, if necessary, shall be sought during the permit application process. Continue work in areas using same construction schedule during consecutive days and/or weekends until work is completed.

1.10 WORK GUIDELINES

A. Maintain local driveway access to public schools, residential and commercial properties adjacent to work areas at all times. Provide temporary driveway access in accordance with Specification Sections 01 55 26 – Traffic Control and 01 14 19 – Use of Premises. Coordinate work and schedule with impacted business owners, schools, and residents in conjunction with the Owner's Representative, well in advance of commencing the Work in the area(s) of the impacted entities.

B. Contractor shall adhere to each privately owned and operated utility company's construction guidelines when constructing the proposed Work adjacent-to or across each such entities wet or dry utility. Contractor to coordinate with such utilities for guidelines.

C. Contractor shall coordinate its Work with the respective pipeline companies' at all proposed utility crossings. See appropriate Contract Drawings for additional and /or related information.

D. Obtain right-of-entry agreement(s), insurance, crossing permit(s), and other documentation as required or deemed necessary by each utility or pipeline company or other such entity at no additional cost to the Owner.

E. Contractor shall coordinate its Work schedule with those utility companies who require a representative of their company to be present (onsite) during the construction adjacent-to or across their wet or dry utility.

F. Site restoration at all crossings shall be performed immediately upon completion of the Work. Restoration shall be performed in accordance with all applicable Specification Sections and utility company requirements.

G. Hand dig within one (1) foot of underground service lines (public or private).

H. Contractor shall bear the sole responsibility for damage to existing utilities resulting from its construction activities. The Contractor shall be responsible for the repair of damaged utilities, at no additional cost to the Owner.

1.11 COORDINATION OF WORK

A. Coordinate activity schedule and extend full cooperation to other Contractors who have responsibilities either concurrent with, proceeding, or following this project's duration along the work site. Ensure availability of access to selected portions of this project area to others and provide appropriate information for planning purposes to other Contractors. No compensation or time extension will be allowed as a result of conflicting construction activities.

B. Comply with coordination requirements outlined in Specification Section 01 14 19 – Use of Premises.

C. Coordinate work with the following construction activities by others:

D. Dial 811 to contact either Texas 811 or Lone Star 811 One-Call all three (3) One-Call centers in the state of Texas a minimum of seventy-two (72) hours prior to construction within twenty-five (25) feet of a private pipeline.

Contact numbers for such centers are as follows:

1. TESS (Texas) One Call (800) 344-8377.
2. Texas One-Call (800) 245-4545.
3. Texas (Lone Star) One Call (800) 669-8344.

E. All work shall be performed to the lines, grades, elevations, and locations shown on the Drawings.

F. Prevent overstress or damage of any structure and any part or member of it during construction. This applies to new and existing facilities, utilities, and structures affected by construction operations. Contractor shall monitor and record the effect of its construction operations on new and existing facilities, utilities and structures and provide engineered temporary supports and connections as required to assure the safety and stability of the same to prevent overstress of any part.

G. Contractor Work performed within all rights-of-way shall be performed in accordance with the respective entities' standards. Contractor to coordinate with such entities to obtain required standards.

1.12 CONTRACTOR USE OF PREMISES

A. Comply with all requirements outlined in Specification Section 01 14 19 – Use of Premises.

1.13 CONTRACT CLARIFICATION

A. Should clarification of the Contract Documents be requested, request clarification before proceeding with Work by submitting a Request for Information (RFI). Such requests shall be preceded by a diligent investigation of the Contract Documents. Include evidence of such investigation(s) in all requests for clarification.

1.14 ALTERNATE CONSTRUCTION METHODS

A. Alternate construction means and methods will be permitted in accordance with applicable Contract Document details and specification at no additional cost to the Owner. Alternate construction means and methods shall provide a substantial benefit to the project and/or the Owner. Contractor accepts full responsibility for all additional costs of geotechnical investigations and other incidental items, including any re-design that may be necessary to permit the alternate construction means and methods.

B. If alignment revisions are requested, Contractor shall immediately inform the Owner Representative of any proposed changes and any potential impacts the revised alignment may have on that portion of the transmission line segment and all adjacent line segments, existing or proposed.

1.15 UTILITY LINES

A. All utilities represented on the Drawings are shown as an approximate location and are based on the best information available during project design. Contractor shall field-verify the exact location of all utilities prior to commencing construction. The Contractor shall be responsible for any and all damage to these utilities, caused or resulting from their failure to locate, protect and/or maintain these utilities during construction.

1.16 WARRANTY

A. Comply with the warranty requirements stipulated in Contract Document General Conditions and the warranty requirements of the various specification sections of this project manual.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 14 19

USE OF PREMISES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for:
    a. Contractor Responsibilities
    b. Temporary Utilities
    c. Limits of Construction
    d. Storage Sheds and Buildings
    e. Working Times
    f. Site Access Times
    g. Notification to Adjacent Occupants
    h. Safety Requirements
    i. First Aid Equipment
    j. Fire Protection
    k. Security Measures
    l. Protection of Utilities, Pipelines, and Property
    m. Surface Restoration
    n. Traffic Control and Use of Public Rights of Way
    o. Contractor's Roads and Parking
    p. Coordination with Facility Owner's Operations
    q. Project Photographs
    r. Special Considerations Related to Adjacent Properties and Facilities

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Proposing Requirements, Contract Forms, and General Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in

associated items for this project.

1.3 SUBMITTALS

A. See Specification Section 01 33 00 – Submittals for the requirements for the mechanics and administration of the submittal process.

B. Contractors Safety Program.

1.4 CONTRACTOR RESPONSIBITIES

A. Comply with applicable requirements specified in other sections of Project Specifications.

B. Comply with procedures for access to the site and Contractor's use of rights-of-way.

C. Maintain and operate temporary construction facilities and temporary systems to assure continuous service of Owner's and other adjacent existing facilities.

D. Modify and extend temporary systems as Work progress requires.

E. Completely remove materials and equipment when no longer required.

F. Restore existing facilities used for temporary services to original or better condition, or as specified.

G. Prior to installation of material, equipment and/or other work, verify with subcontractors, material or equipment manufacturers, and installers that the substrate or surface to which those materials will attach is acceptable for installation of those materials or equipment. (Substrate is defined as any building or construction surfaces to which materials or equipment are attached to, or required prior to installation i.e., floors, walls, ceilings, soils, utilities, site grading, and backfill etc.).

H. Correct unacceptable substrate until acceptable for installation of equipment or materials.

1.5 TEMPORARY UTILITES

A. Obtaining Temporary Service:

1. Make arrangements with utility service companies for temporary services, unless provided by Owner.

2. Abide by rules and regulations of utility service companies and/or authorities/agencies/entities having jurisdiction.

3. Be responsible for utility service costs and permits until Work is substantially complete. Included services are fuel, power, light, heat, and any other utility services necessary for execution, completion, testing, and initial operation of Work.

4. Be responsible for providing approved metering devices, as necessary, for

any temporary utilities.

B. Water:

1. Contractor to provide water required for performance of Work, specified tests of piping, equipment, devices, or other equipment, and for other uses as necessary.
2. Provide and maintain adequate supply of potable water for consumption by Contractor personnel and Owner's Representatives.
3. Provide necessary approved metering devices and backflow preventers.

C. Electricity and Lighting:

1. Provide electrical service required for Work, including testing of Work. Provide power for lighting, operation of equipment, and other use as necessary.
2. For projects on existing sites, electric power service to be provided includes temporary power service or generator(s) to maintain Owner's operations during scheduled shutdown(s). Coordinate all temporary shutdowns with Owner and Owner's Representative(s).
3. Minimum lighting level shall be ten (10) foot-candles for open areas; twenty (20) foot-candles for stairs and shops. Provide minimum of one (1) 300 watt lamp for each 200 square feet of work area.

D. Heat and Ventilation:

1. Provide temporary heat as necessary for protection or completion of Work.
2. Provide temporary heat and ventilation to assure safe working conditions. Maintain enclosed areas at minimum of 50°F.

E. Telephone:

1. Provide emergency telephone service (including call waiting and call forwarding) at Project Site for use by Contractor personnel, Owner, Owner's Representative, and others performing work or furnishing services at the site.

F. Sanitary Facilities:

1. Provide and maintain sanitary facilities for persons on job site. Comply with regulations of State and local departments of health.
2. Enforce use of sanitary facilities by construction personnel at job site. Enclose sanitary facilities. Pit-type toilets will not be permitted. No discharge will be allowed from these facilities. Collect and store sewage and waste so as not to cause nuisance or health problem. Haul sewage and waste off-site and properly dispose of in accordance with all applicable regulations.

3. Locate toilets near Work site, within 500 feet of working activities for line work projects and secluded from view as best as possible. Keep toilets clean and supplied throughout course of Work. Locate toilets a minimum of 100 feet from all water wells.

1.6 LIMITS OF CONSTRUCTION

A. Construction operations and storage areas are limited to Owner's property, permanent easements, temporary construction easements (TCE), and/or the Limits of Construction or Construction Limits as indicated on the Contract Drawings.

B. Unauthorized use of areas, or trespassing on land outside of defined limits, is not permitted.

C. Make arrangements, at no cost to the Owner, for Contractor's temporary use of any private properties which may be needed by Contractor for performance of Work. Contractor and Contractor's surety shall indemnify and hold harmless the Owner and Owner's Representatives against claims or demands arising from use of properties outside the Limits of Construction. Submit notarized copy of any separately negotiated agreement(s) between private property owner(s) and Contractor prior to use of area.

D. Where Limits of Construction are shown on Contract Drawings to extend to a property or Right-of-Way line, keep equipment, materials, and stockpiles a minimum of 5 feet from boundary, or existing fence lines.

E. Where utility alignment is within an esplanade and Limits of Construction are shown to extend to edge of the esplanade, keep equipment, materials, and stockpiles a minimum of 5 feet from back of curb.

F. There are unique terms and conditions associated with the various public and private easements, rights-of-entry, encroachment and crossing documents (collectively, the easement documents) which may be site specific. Contractor shall familiarize itself with all easement Documents. Easement documents are available from the Owner on a case by case basis upon request.

G. The Contractor, at its sole expense, shall be responsible for complying with all terms and conditions of all easement documents and the easement rights described therein for this project.

H. Contractor shall safely, properly, and adequately assume and perform all of the duties, indemnities, responsibilities, and liabilities of the Owner under the easement documents.

I. Contractor, at its cost, shall provide all insurance required by the easement documents. All land included within the tracts covered by the easement documents and easements described herein shall be restored to its original condition prior to Substantial Completion of the construction (including, without

limitation, repair or replacement of pavement, concrete, signs, fencing, trees, sidewalks, landscaping, shrubbery, and grass) unless otherwise specified in the Contract Documents.

1.7 STORAGE SHEDS AND BUILDINGS

A. Provide adequately ventilated, watertight storage facilities with floor above ground level for protection of materials and equipment susceptible to weather damage.

B. Store materials in neat and orderly manner. Store materials and equipment to permit easy access for identification, inspection, and inventory.

C. Storage of materials not susceptible to weather damage may be on blocks off ground.

D. Storage of all fuels and chemicals shall be in designated areas by Contractor.

E. Refer to Specification Section 01 65 50 – Product Delivery, Storage, and Handling for additional requirements.

F. Fill and grade site for temporary structures to provide positive drainage away from Work area, but not to impact adjacent property owners.

G. Avoid obstructing drainage ditches or inlets. When obstruction is unavoidable due to requirements of Work, provide grading and temporary drainage structures to maintain unimpeded drainage flow. Failure of the Contractor to maintain proper site drainage shall prohibit it from making a claim against the Owner for monetary or time damages due to drainage impacts.

1.8 WORKING TIMES

A. Construction shall be conducted during working hours as indicated in Specification Section 00 72 00 – General Conditions of the Contract, unless otherwise amended by a supplemental specification or agreement to the General Conditions of the Contract, and approved by Owner.

1.9 SITE ACCESS TIMES

A. Contractor to coordinate all site access, including deliveries, outside of working hours with Owner's Representative. Neither Owner nor Owner's Representatives shall sign for any Contractor deliveries. Refer to Specification Section 01 65 50 – Product Delivery, Storage, and Handling.

B. Contractor shall coordinate with Owner to not interfere with Owner's facility operations.

1.10 NOTIFICATION OF ADJACENT OCCUPANTS (NOT USED)

1.11 SAFETY REQUIREMENTS

A. Beware of overhead power lines existing in area and in close proximity to project. When 10 feet of clearance between energized overhead power line and construction-related activity cannot be maintained, submit a request to the appropriate utility provider to de-energize or move conflicting overhead power line(s).

B. Submit Contractor's Safety Program in accordance with Specification Section 01 33 00 – Submittals. Include Site Safety and Site Security in accordance with Specification Section 00 72 00 – General Conditions of the Contract. Include documented response to trench safety requirements as specified in Specification Section 00 31 32.10 – Trench Safety Geotechnical Information.

C. Conduct operations in strict accordance with the Contractor's Safety Program, in accordance with applicable Federal, State, and local safety codes and statutes, and with good construction practice. Establish and maintain procedures for safety of all work, personnel, and equipment involved in Project.

D. Observe and comply with Texas Occupational Safety Act (Art. 5182a, V.C.S.) and with all safety and health standards promulgated by Secretary of Labor under Section 107 of Contract Work Hours and Standards Act, published in 29 CFR Part 1926 and adopted by Secretary of Labor as occupational safety and health standards under Williams-Steiger Occupational Safety and Health Act of 1970, and to other legislation enacted for safety and health of Contractor employees. Safety and health standards apply to subcontractors and their employees as well as to Contractor and its employees.

E. Observance of and compliance with regulations is solely and without qualification responsibility of Contractor without reliance or superintendence of or direction by the Owner or Owner's Representative. Immediately advise Owner's Representative of investigation or inspection by Federal Safety and Health Inspectors of Contractor or subcontractor's work or place of work on job site under this Contract, and after investigation or inspection, advise Owner's Representative of results. Submit one copy of accident reports to Owner's Representative within 10 days of occurrence.

F. Protect areas occupied by workmen using best available devices for detection of lethal and combustible gases. Test devices frequently to assure functional capability. Constantly observe infiltration of liquids into Work area for visual or odor evidences of contamination, and immediately take appropriate steps to seal off entry of contaminated liquids into Work area.

G. Implement safety measures, including but not limited to safety personnel, first-aid equipment, ventilating equipment, and other safety equipment, as specified or detailed on the Contract Drawings.

H. Maintain required coordination with Police and Fire Departments during entire

period covered by Contract.

I. In safety plan, include project safety analysis. Itemize major tasks and potential safety hazards. Plan to eliminate hazards or protect workers and public from each hazard.

1.12 FIRST AID EQUIPMENT

A. Provide first aid kit throughout construction period. List telephone numbers for hospitals, and ambulance services in each first aid kit.

B. Have at least one person thoroughly trained in first aid and cardiopulmonary resuscitation (CPR) procedures present on site whenever Work is in progress. Contractor to conform to protocols and requirements for training and protection against “blood borne pathogens.”

1.13 FIRE PROTECTION

A. Conform to specified fire protection and prevention requirements established by Federal, State, or local governmental agencies and as provided in Contractor’s Safety Program.

1.14 SECURITY MEASURES

A. Protect all Work materials, equipment, and property from loss, theft, damage, and vandalism. Perform duty to protect property of the Owner used in connection with performance of Work.

B. If existing fencing or barriers are breached or removed for purposes of construction, provide and maintain temporary security fencing equal to existing.

1.15 PROTECTION OF UTILITIES, PIPELINES, AND PROPERTY

A. Utilize Utility Coordinating Committee One Call System (telephone number, (713) 223-4567), which must be called 48 hours in advance to locate utilities. Toll free telephone number is 1-800-669-8344, Texas (Lone Star) One Call System.

B. Prevent damage to existing utilities during construction. Utilities shown on Drawings are at approximate locations. Pre-locate, by whatever means may be required (metal detection equipment, probes, excavation, survey), underground utilities before excavating in accordance with the Critical Locations investigation described in Specification Section 31 21 33 – Trenching, Backfilling and Compacting for Utilities. Perform investigative work and repairs required after investigation. Contractor is responsible for damages caused by failure to locate and preserve these underground utilities. Give owners of utilities a minimum of five (5) days’ notice before commencing Work in area, for locating utilities during construction and for making adjustments or relocation of utilities when they conflict with proposed Work. Include cost for temporary relocation of utilities necessary to accommodate construction in unit costs for

utility construction unless otherwise noted on Drawings. Bypassing of sanitary waste to storm drainage facilities is not allowed. Utility service laterals are not shown on Drawings. Contractor shall anticipate that service lines exist and repair them when damaged due to construction activity. No separate payment will be made for repair work. Include payment in unit prices for work in appropriate sections.

C. Contractor shall adhere to each privately owned and operated utility company's construction guidelines when working adjacent-to or across each such entities wet or dry utility.

D. Prior to abandonment of any utility indicated on the Drawings, make arrangements with Owner's Representative and utility owner to terminate service, remove meters, valves, appurtenances, transformers, and/or poles, as required.

E. Utility Outages and Shutdowns: Provide a notification to the Owner's Representative and private utility companies (when applicable) a minimum of 48 hours, excluding weekends and holidays, in advance of required utility shutdown. Shutdown planning and coordination activities shall commence a minimum of 2-weeks prior to scheduled shutdown. Coordinate all work as required.

F. Protect and prevent damage to existing crossing, parallel, and adjacent pipelines during construction in accordance with Specification Section 01 11 13 – Work Covered by Contract Documents.

G. When excavating near product pipelines and prior to start of excavation, request that representative of pipeline company come to the construction site(s) to meet representatives of Contractor and Owner's Representative to discuss actual procedures that will be used. Request that pipeline company's representative probe and locate pipelines in at least three locations: one at each side of proposed excavation and one at centerline of proposed Work. Representative of the pipeline company and Owner's Representative must be present to observe activities of Contractor at all times when excavation is being conducted within 15 feet of existing pipelines.

H. Protection of the Work, and Public and Private Property

1. Take precautions, provide programs, and take actions necessary to protect the Work, and public and private property from damage.
2. Do not alter condition of properties adjacent to and along Limits of Construction.
3. Do not use ways, means, methods, techniques, sequences, or procedures that result in damage to adjacent properties or improvements.
4. Restore properties damaged by Contractor outside of designated Limits of

Construction at no cost to Owner.

5. Take action to prevent damage, injury, or loss, including, but not limited to, the following:
   a. Store materials, supplies, and equipment in orderly, safe manner that will not interfere with progress of Work or work of others.
   b. Provide suitable storage for materials subject to damage by exposure to weather, theft, breakage, or otherwise.
   c. Place upon Work or any part thereof only safe loads.
   d. Frequently clean up refuse, rubbish, scrap materials, and debris created by construction operations, keeping Project site safe and orderly.
   e. Provide safe barricades and guard rails to protect pedestrian and vehicular traffic around openings, scaffolding, temporary stairs and ramps, excavations, elevated walkways, and other hazardous areas.
6. Assume full responsibility for preservation of public and private property on or adjacent to the Limits of Construction. When direct or indirect damage is done by or on account of any act, omission, neglect, or misconduct in execution of Work by Contractor, restore to condition equal to or better than that existing before damage was done.
7. Perform daily clean up in affected construction areas in order to restore site to existing or better conditions. Areas should be free of debris, scrap material, dirt, mud, and other items identified by Owner's Representative. Do not leave buildings, roads, streets, or other construction areas unclean. If deemed necessary by the Owner's Representative, Contractor shall employ street sweeping/cleaning equipment to maintain area streets.

I. Barricades and Warning Signals:

1. Where Work is performed on or adjacent to any roadway, right-of-way, or public place, furnish and erect barricades, fences, lights, warning signs, and danger signals, and take other precautionary measures, for protection of persons or property and of the Work.
2. Paint barricades to be visible at night. From sunset to sunrise, furnish and maintain at least one light at each barricade.
3. Erect sufficient barricades to keep vehicles and pedestrians from entering the area under construction.
4. Maintain barricades, signs, lights and provide watchmen until Project is accepted by the Owner or the site has been completely restored to its preconstruction condition.
5. Whenever Work creates encroachment on public roadways, station flagmen

to manage traffic flow in accordance with approved traffic control plan. Refer to Specification Section 01 55 26 – Traffic Control.

J. Protection of Existing Structures:

1. Underground Structures:

   a. Underground structures are defined to include, but not be limited to, sewer, water, gas, and other piping, manholes, boxes, chambers, electrical signal and communication conduits, tunnels, and other existing subsurface installations located within or adjacent to limits of Work.

   b. Known underground structures including water, sewer, electric, and telecommunication services are shown on Contract Drawings. This information is not guaranteed to be correct or complete.

   c. Explore ahead of trenching and excavation work and sufficiently uncover obstructing underground structures to determine their location, to prevent damage to them, and to prevent interruption of utility services. Restore underground structures to original conditions at no additional cost if damaged during construction.

   d. Locate and protect private lawn sprinkler systems which may exist within site. Repair or replace damaged systems to condition existing at start of Work, or better.

   e. Necessary changes in location of Work may be made by the Owner to avoid unanticipated underground structures.

   f. If permanent relocation of underground structures or other subsurface installations is required and not otherwise provided in Contract, the Owner will direct Contractor in writing to perform Work, which is paid for under provisions for changes as described in Specification Section 00 72 00 - General Conditions of the Contract.

2. Surface Structures: Surface structures are defined as existing buildings, structures and other constructed installations above ground surface. Included with structures are their foundations and any extensions below the surface. Surface structures include, but are not limited to buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks, guard cables, fencing, and other facilities visible above ground surface.

3. Existing Condition Survey: Contractor shall survey and adequately document the condition and elevation of existing structures adjacent to the proposed alignment.

4. Protection of Underground and Surface Structures:

   a. Support in place and protect from direct or indirect damage underground

and surface structures located within or adjacent to limits of Work.

b. Prevent overstress or damage to any structure and any part or member of structures during construction. This applies to new and existing facilities, utilities, and structures affected by construction operations. Contractor shall monitor and record the effect of its construction operations on new and existing facilities, utilities, and structures, and shall provide engineered temporary supports and connections as required to assure the safety and stability of the structures and prevent overstress of any part. Employ a registered Professional Engineer licensed in the State of Texas to design temporary supports to assure safety and integrity of structures and facilities.

c. Install temporary supports carefully and as required by party owning or controlling structure. Before installing structure supports, satisfy Owner's Representative that methods and procedures have been approved by owner of structure.

d. Avoid moving or changing property of public utilities or private corporations without prior written consent of responsible official of that service or public utility. Representatives of these utilities reserve the right to enter within limits of this Project for purpose of maintaining their properties, or of making changes or repairs to their property that may be considered necessary by performance of this Contract.

e. Notify owners and/or operators of utilities and pipelines adjacent to the Work of the nature of construction operations and dates when operations will be performed. When construction operations are required in immediate vicinity of existing structures, pipelines, or utilities, give minimum of 5 working days advance notice. Probe and flag location of underground utilities prior to commencement of excavation. Keep flags in place until construction operation reaches and uncovers utility.

f. Assume risks attending presence or proximity of underground and surface structures within or adjacent to Work including but not limited to damage and expense for direct or indirect damage caused by Contractor's Work to structure. Immediately repair damage.

K. Protection of Installed Products:

1. Provide protection of installed products to prevent damage from subsequent operations. Remove protection facilities when no longer needed, prior to final completion of Work.

2. Control traffic to prevent damage to equipment, materials, and surfaces.

3. Provide coverings to protect equipment and materials from damage. Cover projections, wall corners, jambs, sills, and exposed sides of openings in

areas used for traffic and passage of materials in subsequent work.

1.16 SURFACE RESTORATION

A. Restore site to the condition which existed before construction in accordance with Specification Section 01 74 23 – Restoration of Site, unless otherwise noted in Contract Documents.

1.17 TRAFFIC CONTROL AND USE OF PUBLIC RIGHTS OF WAY

A. Comply with traffic regulation in accordance with Specification Section 01 55 26 - Traffic Control, and approved traffic control plan(s).

B. Provide barricades and signs in accordance with Section VI of the State of Texas Manual on Uniform Traffic Control Devices.

C. Obtain necessary permits and Owner's approval when the nature of Work requires closing an entire street. Obtaining permits required for street closure are the Contractor's responsibility. Avoid unnecessary inconvenience to abutting property owners. Avoid closing more than two (2) consecutive intersections at one time, except by permission of Owner.

D. Notify Owner's Representative at least 48 hours prior to closing a street or street crossing. It is the Contractor's responsibility to obtain all required permits for street closures in advance.

E. Maintain 10-foot-wide minimum access lane for emergency vehicles, including access to fire hydrants, at all times.

F. Remove surplus materials and debris and open each 500 lineal foot length of roadway for public use when work within that length is complete.

G. Contractor shall provide and install signs indicating entrances to businesses whose normal entry is impaired or detoured as a result of construction. Proposed signs shall be submitted to the Owner's Representative for approval prior to manufacture and installation.

H. Final acceptance of any portion of Work is not based on return of roadway to public use.

I. Avoid obstructing driveways or entrances to private property.

J. Provide temporary access or complete excavation and backfill in one continuous operation to minimize duration of obstruction when excavation is required across drives or entrances.

K. Contractor shall bear the sole responsibility for damage to existing traffic cables resulting from its construction activities. The Contractor shall be responsible for the repair of damaged traffic cables including the re-cabling of the entire intersection if required, at no additional cost to the Owner.

L. Construct and maintain temporary detours, ramps, and/or roads to provide for normal public traffic flow when use of public roads or streets is closed by necessities of Work. Contractor shall obtain all required roadway closure or detour permits in advance of commencing the proposed temporary detour, ramps, and/or roadway Work.

M. Provide mats or other means to prevent overloading or damage to existing roadways from tracked equipment, large tandem axle trucks or equipment that will damage existing roadway surface. Contractor shall repair or replace damaged roadway not scheduled for removal and/or replacement at no additional cost to the Owner. Repairs or replacement shall be in conformance with the roadway owner's requirements.

N. Provide daily sweeping of hard-surface roadways to remove soils tracked onto public roadways.

1.18 CONTRACTORS ROADS AND PARKING

A. Prevent interference with traffic on existing roads.

B. Construct and maintain temporary access roads and parking areas.

C. Designate temporary parking areas to accommodate Contractor's and Owner's Representative personnel. When site space is not adequate, provide additional off-site parking. Locate as approved by Owner's Representative.

D. Minimize use by construction traffic of existing streets and driveways.

E. Do not allow heavy vehicles or construction equipment in existing parking areas.

F. Do not inhibit the ability of the Owner's personnel to access, operate, and maintain existing facilities during construction.

1.19 COORDINATION WITH FACILITY OWNER'S OPERATIONS

A. Definition: A "shutdown" is when a portion of the normal operation of Owner's facility, whether equipment, systems, piping, or conduit, has to be temporarily suspended or taken out of service to perform the Work.

B. Work that may interrupt normal operations shall be accomplished at times convenient to, and approved by Owner.

C. Except for necessary shutdowns, perform the Work such that Owner's facilities remain in continuous satisfactory operation during the Project. Schedule and conduct the Work such that the Work does not:

1. Impede Owner's production or processes,
2. Create potential hazards to public health or wellbeing,
3. Create potential hazards to operating equipment and personnel,
4. Reduce the quality of Owner's facilities' product(s) or effluent, or

5. Cause odors or other nuisances.

D. Coordinate shutdowns with Owner. When possible, combine activites into a single shutdown to minimize impacts on Owner's operations and processes.

E. After acceptance of shutdown planning submittal and prior to starting the shutdown, provide written notification to Owner of date and time each shutdown is to start. Provide written notification submitted to the Owner's Representative at least 72 hours in advance of each shutdown.

F. Furnish at the Site, in close proximity to the shutdown and tie-in work areas, tools, equipment, spare parts and materials, both temporary and permanent, necessary to successfully complete the shutdown. Complete to the extent possible, prefabrication of piping and other assemblies prior to the associated shutdown. Demonstrate to Owner's satisfaction that Contractor has complied with these requirements before commencing the shutdown.

G. If Contractor's operations cause an unscheduled interruption of Owner's operations, immediately re-establish satisfactory operation for Owner.

H. Unscheduled shutdowns or interruptions of continued safe and satisfactory operation of Owner's facilities that result in fines or penalties by authorities having jurisdiction shall be paid solely by Contractor.

I. Shutdowns of Electrical Systems: Comply with Laws and Regulations, including the National Electric Code. Contractor shall lock out and tag circuit breakers and switches operated by Owner and shall verify that affected cables and wires are de-energized to ground potential before shutdown Work is started. Upon completion of shutdown Work, remove the locks and tags and notify Owner that facilities are available for use.

1.20 CONTRACTOR'S FIELD OFFICE (NOT USED)

1.21 PRINCIPAL ARCHITECT/ENGINEER'S FIELD OFFICE (NOT USED)

1.22 PROJECT PHOTOGRAPHS

A. Refer to Specification Section 01 32 36.01 – Project Photographs

1.23 SPECIAL CONSIDERATIONS RELATED TO ADJACENT PROPERTIES AND FACILITIES

A. Contractor shall be responsible for negotiations of any waivers or alternate arrangements required to enable transportation of materials to the site.

B. Maintain conditions of access road to site such that access is not hindered as the result of construction related deterioration.

1. Provide daily sweeping of hard-surface roadways to remove soils tracked onto roadway.

1.24 HISTORICAL AND ARCHAEOLOGICAL SITES

A. If, during the course of construction, evidence of deposits of historical or archeological interest are found, the Contractor shall cease operations affecting the find and shall notify Owner.

1. No further disturbance of the deposits shall ensue until the Contractor has been notified by Owner that Contractor may proceed.
2. Owner will issue a notice to proceed after appropriate authorities have surveyed the find and made a determination to Owner.
3. Compensation to the Contractor, if any, for lost time or changes in construction resulting from the find shall be determined in accordance with changed or extra work provisions of the Contract Documents.

B. Refer to Specification Section 00 72 00 – General Conditions of the Contract including paragraph 4.2.4.

1.25 WARRANTY (NOT USED)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MAINTENANCE (NOT USED)

3.2 OWNER TRAINING (NOT USED)

END OF SECTION

SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Authority
2. Unit Quantities Specified
3. Measurement
4. Payment Plus Conditions
5. Nonconformance Assessment
6. Nonpayment for Rejected Products

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Measurement:

1. Measurement by Volume:
   a. Stockpiles: Measured by cubic dimension using mean length, width, and height or thickness.
   b. Excavation and Embankment Materials: Measured by cubic dimension using average end area method.
2. Measurement by Area: Measured by square dimension using mean length and width or radius.
3. Linear Measurement: Measured by linear dimension, at item centerline or mean chord.
4. Other: Items measured by weight, volume, area, or linear means or combination, as appropriate, as completed item or unit of Work.
5. Measurement by Each: Measured by each instance or item provided.
6. Measurement by Lump Sum: Measure includes all associated work.

B. Payment:

1. Payment Includes: Full compensation for required supervision, labor, products, tools, equipment, plant, transportation, services, and incidentals; and erection, application or installation of an item of Work; and Contractor's overhead and profit.
2. Total compensation for required Unit Price Work shall be included in Unit Price provided in Proposal. Claims for payment as Unit Price Work, but not specifically covered in list of unit prices contained in Proposal, will not be accepted.
3. Interim payments for stored materials will be made only for materials to be incorporated under items covered in unit prices, unless disallowed in Supplementary Conditions.
4. Progress payments will be based on Owner's Representative's observations and evaluations of quantities incorporated in Work multiplied by unit price.
5. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities determined by Owner's Representative multiplied by unit price for Work which is incorporated in or made necessary by the Work.

1.3 SUBMITTALS (NOT USED)

1.4 AUTHORITY

A. Measurement methods delineated in Specification sections are intended to complement criteria of this section. In event of conflict, the order of governance is: General Conditions, Individual Specifications, 01 22 00 – Unit Prices.

B. Owner's Representative will take measurements and compute quantities accordingly.

C. Assist by providing necessary equipment, workers, and survey personnel.

1.5 UNIT QUANTITIES SPECIFIED

A. Quantity and measurement estimates stated in Agreement are for contract purposes only. Quantities and measurements supplied or placed in Work and verified by Owner's' Representative (GCs 11.6.2) shall determine payment as stated in Specifications Section 00 72 00 - General Conditions of the Contract.

B. When actual Work requires greater or lesser quantities than those quantities indicated in Proposal, provide required quantities at unit prices contracted as stated in Specifications Section 00 72 00 – General Conditions of the Contract.

1.6 NONCONFORMANCE ASSESSMENT

A. Remove and replace Work, or portions of Work, not conforming to Contract Documents.

B. When not practical to remove and replace Work, Owner's Representative will direct one of the following remedies:

1. Nonconforming Work will remain as is, but Unit Price will be adjusted lower at discretion of Owner's Representative.
2. Nonconforming Work will be modified as authorized by Owner's Representative, and Unit Price will be adjusted lower at discretion of Owner's Representative, when modified Work is deemed less suitable than specified.

C. Specification sections may modify above remedies or may identify a specific formula or percentage price reduction.

D. Authority of Owner's Representative to assess nonconforming work and identify payment adjustment is final.

1.7 NONPAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for the following:

1. Products wasted or disposed of in unacceptable manner.
2. Products determined as nonconforming before or after placement.
3. Products not completely unloaded from transporting vehicle.
4. Products placed beyond lines and levels of required Work.
5. Products remaining on hand after completion of Work, unless specified otherwise.
6. Loading, hauling, and disposing of rejected products.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 25 13

PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. The procedure for requesting the approval of substitution of a product that is not equivalent to a product which is specified by descriptive or performance criteria or defined by reference to one or more of the following:

   a. Name of manufacturer.

   b. Name of vendor.

   c. Trade name.

   d. Catalog number.

2. Substitutions are not "or-equals".

3. This Specification Section does not address substitutions for major equipment.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.

2. Division 01 – General Requirements.

C. Request for Substitution – General:

1. Base all bids on materials, equipment, and procedures specified.

2. Certain types of equipment and kinds of material are described in specifications by means of references to names of manufacturers and vendors, trade names, or catalog numbers.

   a. When this method of specifying is used, it is not intended to exclude from consideration other products bearing other manufacturer's or vendor's names, trade names, or catalog

numbers, provided said products are "or-equals," as determined by Owner's Representative.

3. Other types of equipment and kinds of material may be acceptable substitutions under the following conditions:
   a. Or-equals are unavailable due to strike, discontinued production of products meeting specified requirements, or other factors beyond control of Contractor; or,
   b. Contractor proposes a cost and/or time reduction incentive to the Owner.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS (NOT USED)

1.4 QUALITY ASSURANCE

A. In making request for substitution or in using an approved product, Contractor represents Contractor:
   1. Has investigated proposed product, and has determined that it is adequate or superior in all respects to that specified, and that it will perform function for which it is intended.
   2. Will provide same guarantee for substitute item as for product specified.
   3. Will coordinate installation of accepted substitution into Work, to include building modifications if necessary, making such changes as may be required for Work to be complete in all respects.
   4. Waives all claims for additional costs related to substitution which subsequently arise.

1.5 DEFINITIONS

A. Product: Manufactured material or equipment.

1.6 PROCEDURE FOR REQUESTING SUBSTITUTION

A. Substitution shall be considered only:
   1. After award of Contract.
   2. Under the conditions stated herein.

B. Written request through Contractor only.

C. Transmittal Mechanics:
   1. Follow the transmittal mechanics prescribed for Shop Drawings in Specification Section 01 33 00 – Submittals.

a. Product substitution will be treated in a manner similar to "deviations," as described in Specification Section 01 33 00 – Submittals.

b. List the letter describing the deviation and justifications on the transmittal form in the space provided under the column with the heading DESCRIPTION.

1) Include in the transmittal letter, either directly or as a clearly marked attachment, the items listed in the following paragraph below.

D. Transmittal Contents:

1. Product identification:

a. Manufacturer's name.

b. Telephone number and representative contact name.

c. Specification Section or Drawing reference of originally specified product, including discrete name or tag number assigned to original product in the Contract Documents.

2. Manufacturer's literature clearly marked to show compliance of proposed product with Contract Documents.

3. Itemized comparison of original and proposed product addressing product characteristics including but not necessarily limited to:

a. Size.

b. Composition or materials of construction.

c. Weight.

d. Electrical or mechanical requirements.

4. Product experience:

a. Location of past projects utilizing product.

b. Name and telephone number of persons associated with referenced projects knowledgeable concerning proposed product.

c. Available field data and reports associated with proposed product.

5. Data relating to changes in construction schedule.

6. Data relating to changes in cost.

7. Samples:

a. At request of Owner’s Representative.

b. Full size if requested by Owner’s Representative.

c. Held until substantial completion.

d. Owner's Representative not responsible for loss or damage to samples.

1.7 APPROVAL OR REJECTION

A. Written approval or rejection of substitution given by the Owner's Representative, Principal Architect/Engineer, and the Owner.

B. Owner's Representative reserves the right to require proposed product to comply with color and pattern of specified product if necessary to secure design intent.

C. In the event the substitution is approved, the resulting cost and/or time reduction will be documented by Change Order in accordance with the General Conditions.

D. Substitution will be rejected if:

1. Submittal is not through the Contractor with his stamp of approval.
2. Request is not made in accordance with this Specification Section.
3. In Owner's Representative opinion, acceptance will require substantial revision of the original design.
4. In the Owner's Representative opinion, substitution will not perform adequately the function consistent with the design intent.

E. Contractor shall reimburse Owner for the cost of the Owner's Representative evaluation whether or not substitution is approved.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 26 63

CHANGE ORDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

Procedures for processing Change Orders, including:

1. Quality Assurance.
2. Responsible Individual.
3. Documentation of Change in Contract Price and Contract Time.
4. Change Procedures.
5. Proposals and Contract Modifications.
6. Work Change Directive.
7. Change Order.
8. Execution of Change Documentation.
9. Correlation of Contractor Submittals.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Introductory Information, Proposing Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT (NOT USED)

1.3 SUBMITTALS (NOT USED)

1.4 QUALITY ASSURANCE

A. Reference Standards:

1. Equipment Rental Rates: equipmentwatch.com. Rental Rate is defined as full unadjusted base rental rate for appropriate item of construction equipment.

1.5 RESPONSIBLE INDIVIDUAL

A. Provide letter to the Owner's Representative indicating name, title, address and contact information of individual authorized to execute change documents and who is responsible for informing others in Contractor's employ and Subcontractors of changes to the Work. Information should be provided at the

Preconstruction Conference but, no later than 10 calendar days following the Preconstruction Conference.

1.6 DOCUMENTATION OF CHANGE IN CONTRACT PRICE AND CONTRACT TIME

A. Maintain detailed records of changes in Work. Provide full information required for identification and evaluation of proposed changes, and substantiate costs of changes in Work.

B. Document each proposal for change in cost or time with sufficient data to allow evaluation of proposal. Provide additional information upon request of the Owner or the Owner's Representative.

C. Proposals shall include the following minimum information:

1. Quantities of items in original Proposal with additions, reductions, deletions, and substitutions.
2. Quantities and cost of items in original schedule of values with additions, reductions, deletions, and substitutions.
3. Provide unit prices for items not included in original Proposal with supporting information when absent from original Proposal Work.
4. Justification for changes in Contract Time.
5. Additional data upon request.

D. For changes in Work performed on a time-and-materials basis, provide the following additional information:

1. Quantities and description of products and equipment.
2. Taxes, insurance and bonds.
3. Overhead and profit as noted in Document 00 72 00 - General Conditions, Article 11.5.
4. Dates, times, and by whom work was performed.
5. Time records and certified copies of applicable payrolls.
6. Invoices, receipts for products, rented equipment, and subcontracts, similarly documented.

E. For changes in Work performed on a time-and-materials basis, payment for rental equipment will be as follows:

1. Actual invoice cost for duration required to complete extra work without markup for overhead and profit. When extra work comprises only a portion of rental invoice where equipment would otherwise be on site, compute

hourly equipment rate by dividing the actual monthly invoice by 176. (One day equals 8 hours and 1 week equals 40 hours.)

2. Do not exceed estimated operating costs given on equipmentwatch.com website for items of equipment. Overhead and profit will be allowed on operating cost.

F. For changes in Work performed on a time-and-materials basis using Contractor-owned equipment, use equipmentwatch.com rates as follows:

1. Contractor-owned equipment will be paid at Rental Rate for duration of time required to complete extra work without markup for overhead and profit. Utilize lowest cost combination of hourly, daily, weekly, or monthly rates. Use 150 percent of Rental Rate for double shifts (one extra shift per day) and 200 percent of Rental Rate for more than two shifts per day. Standby rates shall be 50 percent of appropriate Rental Rate shown on equipmentwatch.com website. No other rate adjustments apply.

2. Do not exceed estimated operating costs given on equipmentwatch.com. Overhead and profit will be allowed on operating cost. Operating costs will not be allowed for equipment on standby.

1.7 CHANGE PROCEDURES

A. Changes to Contract Price or Contract Time can only be made by issuance of Change Order. Issuance of Work Change Directive will be formalized into a Change Order. Changes will be in accordance with requirements of the General Conditions.

B. The Owner's Representative will advise of minor changes in Work not involving an adjustment to Contract Price or Contract Time as authorized by the General Conditions by issuing supplemental instructions.

C. Request clarification of Drawings, Specifications, Contract Documents, or other information by using Request for Information. Response by the Owner's Representative to Requests for Information does not authorize Contractor to perform tasks outside scope of Work. Changes must be authorized as described in this section.

1.8 PROPOSALS AND CONTRACT MODIFICATIONS

A. The Owner or the Owner's Representative may issue a Request for Proposal (RFP), which includes detailed description of proposed change with supplementary or revised Drawings and Specifications. The Owner or the Owner's Representative may also request a proposal in response to a Request for Information. Prepare and submit proposal within 7 days or as specified in the request.

B. Submit request for Contractor changes to Owner's Representative describing proposed change and its full effect on Work, with a statement describing reason

for change and effect on Contract Price and Contract Time including full documentation.

C. The Owner may use the Principal Architect/Engineer to review Change Orders.

1.9 WORK CHANGE DIRECTIVE

A. The Owner may issue a signed Work Change Directive instructing Contractor to proceed with a change in Work. Work Change Directive will subsequently be incorporated in Change Order.

B. Document will describe changes in Work and designate method of determining change in Contract Price or Contract Time.

C. Proceed promptly to execute changes in Work in accordance with Work Change Directive.

1.10 CHANGE ORDER

A. Stipulated Price Change Order

1. Stipulated Price Change Order will be based on accepted proposal.

B. Unit Price Change Order

1. Where Unit Prices for affected items of Work are included in Proposal, unit price Change Order will be based on unit prices, subject to the General Conditions.
2. Where unit prices of Work are not pre-determined in Proposal, Work Change Directive or accepted proposal will specify unit prices to be used.

C. Time-and-Material Change Order

1. Provide itemized account and supporting data after completion of change, within time limits indicated for claims in the General Conditions.
2. The Owner will determine change allowable in Contract Price and Contract Time as provided in the General Conditions.
3. Maintain detailed records of work done on time-and-material basis as specified in paragraph 1.4, Documentation of Change in Contract Price and Contract Time.
4. Provide full information required for evaluation of changes and substantiate costs for changes in Work.

1.11 EXECUTION OF CHANGE DOCUMENTATION

A. The Owner or the Owner's Representative will issue Change Orders, Work Change Directives, or accepted proposal for signatures of parties as described in the General Conditions.

1.12 CORRELATION OF CONTRACTOR SUBMITTALS

A. For Stipulated Price Contracts, promptly revise Schedule of Values and Application for Payment forms to record authorized Change Orders as separate line item.

B. For Unit Price Contracts, next monthly estimate of Work after acceptance of a Change Order will be revised to include new items not previously included and appropriate unit rates.

C. Promptly revise progress schedules to reflect change in Contract Time, and to adjust time for other items of work affected by change, and resubmit for review.

D. Promptly enter changes to on-site and record copies of Drawings, Specifications, or Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 29 73

SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Measurement and Payment
2. Definition
3. Preparation
4. Submittal

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Introductory Information, Proposing Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS

A. Submit Schedule of Values in accordance with requirements of Section 01 33 00 – Submittals. Submit at least 10 days prior to submitting first application for progress payment. Submit via SharePoint.

B. Revise Schedule of Values and resubmit for items affected by contract modifications, Change Orders, and Work Change Directives. After changes are reviewed without exception by Authority's Principal Architect/Engineer, make submittal at least 10 days prior to submitting next application for progress payment.

1.4 DEFINITIONS

A. Schedule of Values: Is a schedule, prepared and maintained by the Contractor, allocating portions of the Contract Amount to various portions of the Work, including a tabulation of all of the costs of the various Subcontracts and materials which in the aggregate make up the Cost of the Work. The Schedule of Values shall be subject to Owner's approval and, after such approval, be used as the basis for reviewing the Contractor's Application For Payment.

B. Break down costs to list major products or operations for each line item which has an installed value of more than $5000.

1.5 PREPARATION

A. For stipulated price contracts, subdivide Schedule of Values into logical portions of Work, such as major work items or work in contiguous geographic areas.

B. Schedule and Schedule of Values shall be developed together. At a minimum, the Schedule of Values shall be broken out by trade and split between materials and labor as approved by the Owner. Such Prices will include overhead and profit applicable to each item of work.

C. For lump sum equipment items where submittal of operation/maintenance data and testing are required, include separate item for equipment operation and maintenance data submittal valued at 5 percent of lump sum amount for each equipment item and separate item for testing and adjusting valued at 5 percent of lump sum amount for each equipment item.

D. Round off figures for each listed item to nearest $100 except for value of one item, when necessary, to make total of items in Schedule of Values equal Contract Price for stipulated price contracts or lump sum amount in Schedule of Unit Price Work.

E. Submit Schedule of Values in approved electronic spreadsheet, formatted to print on 11” x 17” paper, to the Owner’s Document Management System.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Specific requirements for the preparation, submittal, updating, status reporting and management of the construction Progress Schedule.

B. Provide Construction Schedules for Work included in Contract in accordance with requirements in this Section. Create Construction Schedule using Critical Path Method (CPM) computer software capable of mathematical analysis of Precedence Diagramming Method (PDM) plans. Provide printed activity listings and bar charts in formats described in this Section.

C. Combine activity listings and bar charts with narrative report to form Construction Schedule submittal for Owner and the Owner's Representatives.

D. Related Specification Sections include, but are not necessarily limited to:

1. Division 00 - Bidding Requirements, Contract Forms and Conditions of the Contract.

2. Division 01 - General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this item. Include the cost of construction scheduling in overhead cost for this project.

1.3 SCHEDULING STAFF

A. Employ or retain services of individual experienced in critical path scheduling for duration of Contract. Individual shall cooperate with Owner's Representative

and shall update schedule (Progress Schedule) monthly as required by the Contract's General Conditions, to indicate current status of Work.

1.4 QUALITY ASSURANCE

A. The person preparing and revising the construction Progress Schedule shall be experienced in the preparation of schedules of similar complexity.

B. Within five (5) days from award of the Contract, Contractor shall submit to Owner's Representative the name of the person responsible for the preparation, maintenance, updating and revision of all schedules.

1. Qualifications necessary:

a. At least five (5) years verifiable experience in the preparation and updating of complex construction schedules for projects of similar type, size and complexity.

b. Proficient in the use of Microsoft© Project® 2007.

1.5 DEFINITIONS

A. The following definitions shall apply to this Specification Section:

1. BASELINE SCHEDULE: The initial as-bid, detailed, cost and resource loaded Progress Schedule prepared by the Contractor to define its plan for constructing the Project as required by the Contract Documents, and accepted by the Owner or Owner's Representative as meeting the requirements of the Contract Documents for specified constraints, sequences, milestones and completion dates.

2. PROGRESS SCHEDULE: The initially accepted Baseline Schedule, or subsequently approved Revised Baseline Schedules, updated each month to reflect actual start and finish dates of schedule activities and all time impact events whether caused by Contractor or Owner or factors beyond the control of either party.

3. REVISED BASELINE SCHEDULE: The initially accepted Baseline Schedule revised to reflect only approved changes.

4. WORKING SCHEDULE: A schedule developed from the Progress Schedule, utilizing scheduling software features not allowed for Baseline and Progress Schedules at the Contractor's sole discretion, to indicate the Contractor's plan for executing the Work, and providing for schedule recovery when approved time extensions are not sufficient to provide for

timely completion due to Contractor inefficiencies beyond the control of the Owner or outside the risks accepted by the Owner.

1.6 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Scheduler qualifications.
3. Baseline Schedule: Submitted within 30 days after Effective Date of Agreement.
4. Monthly Progress Schedules.
5. Revised Baseline Schedules.
6. Working Schedules.
7. Look-Ahead Schedules.

1.7 GENERAL REQUIREMENTS

A. Contractor shall prepare and submit Baseline and Progress Schedules and updates and revisions to them as specified herein.

1. All scheduling to be performed in Microsoft© Project® 2007.
2. The Baseline and Progress Schedules shall be a calendar day-based and cost-loaded Critical Path Method (CPM) network diagram with supporting data.

B. Disallowed Scheduling Software Features:

1. The following specific features are not allowed to be applied in the Baseline and Progress Schedules:
   a. Resource leveling.
   b. Activity or event constraints, other than those specified by the Contract Documents.
   c. Leads and lags:
      1) Create specific activities with specific durations in-lieu-of leads and lags.
      2) Durations shall have positive values.
   d. Default progress data:
      1) Start and finish dates shall not be automatically updated.
      2) Update with actual start and finish dates documented from field reports.
      3) Work activities shall be updated by actual Work progression, not cash flow driven.

4) Updating of activity percent complete and remaining duration shall be independent functions, not one parameter calculated from the other.

5) Out-of-sequence progress shall be accounted for through retained logic, not a default option of progress override.

e. Multiple calendars.

2. Any float suppression techniques or other software features that corrupts the pure mathematical model calculating the critical path.

a. The following CPM schedule outputs will be rejected without further review:

1) Schedules indicating the start of the critical path at a date point or activity beyond the date of Notice to Proceed, or schedules indicating a discontinuous critical path from Notice to Proceed to Contract completion.

2) Schedules defining critical activities as those on a path or paths having some minimum value of float.

3) Schedules with multiple critical paths.

4) Schedules indicating a completion date beyond the contractual completion date.

3. Contractor, at Contractor's sole discretion, may employ the disallowed scheduling software features for Contractor's exclusive use in preparing a Working Schedule.

C. Float Time:

1. Neither the Owner nor the Contractor owns the float; the project owns the float.

2. As such, liability for delay of the project completion date rests with the party actually causing delay to the project completion date.

D. By preparing and submitting the Baseline Schedule, the Contractor represents that it can and intends to execute the Work and portions thereof within the

specified times and constraints and that its bid covers the costs associated with the execution of the Work in accordance with the Construction Schedule.

E. Contractor shall provide an electronic copy on CD media for the Baseline Schedule and Progress Schedule and all monthly updates of both to accompany hard copies of the schedules and tabular reports.

1. Electronic submittal shall be in a format compatible with Microsoft© Project® 2007.
2. Contractor shall provide with the schedules, a procedural outline of the system shut-downs and proposed tie-ins, and the Owner's O&M staff, which shall be subject to approval of the Owner.

1.8 SUBMITTAL PACKAGES

A. Baseline Schedule:

1. CPM time-scaled network diagram:
   a. Submit via Owner's Sharepoint® sytem.

B. Monthly updates that include the following:

1. Revised Baseline Schedule as appropriate.
   a. Update to reflect approved Change Orders occurring since the prior update.
   b. If no new approved Change Orders since prior update, provide a narrative report indicating such, and acknowledging the pertinence of the previously approved Baseline Schedule.
2. Updated Progress Schedule.
3. Explanation of changes in logic, duration of activities.
4. Upload electronic version (pdf) to SharePoint.

C. Look-Ahead Rolling Schedule:

1. A four-week rolling schedule shall be provided by the Contractor at each progress meeting.
   a. The schedule shall provide an accurate representation of the work performed the previous week and work planned for the current week and subsequent two (2) weeks.
2. The schedule shall be provided in a tabular format with bars representing work duration.
   a. The schedule shall refer to activity ID numbers on the Baseline and Progress Schedules.
   b. Activities that are on the critical path and activities that are behind schedule shall be noted by color, highlight, or underscore.
3. Derived from the Working Schedule, if applicable.

1.9 START-UP, DEMONSTRATION, TRAINING, AND FINAL COMPLETION (NOT USED)

1.10 SCHEDULING CONFERENCE (NOT USED)

1.11 BASELINE SCHEDULE

A. Schedule shall include, but not be limited to, activities that show the following that are applicable to the project:

1. Project characteristics, salient features, or interfaces, including those with outside entities that could affect time of completion.
2. Project start date, scheduled completion date and other milestones.
3. Work performed by Contractor, subcontractors and suppliers.
4. Submittal development, delivery, review and approval, including those from Contractor, subcontractors and suppliers.
5. Procurement, delivery, installation and testing of materials, plants and equipment.
6. Testing and settlement periods.
7. Utility notification and relocation.
8. Erection and removal of falsework and shoring.
9. Finish work and final cleanup.
10. Project float as the predecessor activity to the scheduled completion date.

B. Working durations shall be planned to incorporate the effects of normal weather impacts. See General Conditions Article 12.2 for the “Baseline Rain Day Determination”.

1.12 PROGRESS SCHEDULE

A. Develop Progress Schedule based on approved Baseline and Revised Baseline Schedules.

1. All restrictions on use of constraints, leads and lags, resource leveling, etc., shall also apply to Progress Schedules.

B. The Progress Schedule will be updated once per month for monitoring progress.

1. Contractor may submit one (1) additional update per month for its own convenience.

C. Indicate progress by making entries on the most recently accepted version of the network diagram and supporting data to show:

1. Activities completed.
2. Activities started.
3. Remaining duration for each activity started but not yet completed.

4. Percent complete based on value of work in place and value of equipment or material delivered and properly stored.
5. Status of activity due to be completed by the next scheduled progress meeting.

D. Computerized Progress Schedule and percent completion of Work shall be used to verify Contractor's payment requests.

1. Progress payments will not be processed by the Owner's Representative unless the updated Progress Schedule has been submitted concurrently with a pay request and found acceptable by the Owner's Representative.

1.13 REVISIONS TO PROGRESS SCHEDULE

A. Contractor shall submit data for a revised Progress Schedule within five (5) days of the occurrence of any of the following:

1. When contractor-caused delay in completion of any activity or group of activities indicates an overrun of the Contract Time or Control Dates by 30 working days or 10 percent of the remaining duration, whichever is less.
2. When delays in submittals, deliveries, or work stoppages are encountered making necessary the replanning or rescheduling of the Work.
3. When the schedule does not represent the actual progress of the Work.
4. When a change order significantly affects the contract completion date.

B. The revised Progress Schedule shall be the basis of a Working Schedule showing:

1. How Contractor intends to return to schedule.
2. How Contractor intends to avoid falling behind schedule on future activities.

C. Show changes on the network diagram and supporting data including:

1. New activities and their duration.
2. Modifications to existing activities.

D. Provide written narrative report as needed to define:

1. Problem areas, anticipated delays, and impact on the current schedule.
2. Corrective action recommended, and its effect.
3. Major changes in scope.
4. Revised projections of progress and completion.

E. Except as provided in the following subparagraphs 1 and 2, the cost of revisions to the Progress Schedule resulting from changes in the Work shall be included in the cost for the change in the Work, and shall be based on the complexity of

the revision or Change Order, man-hours expended in analyzing the change, and the total cost of the change.

1. The cost of revision to the Construction Schedule not resulting from authorized changes in the Work shall be the responsibility of the Contractor.
2. The cost of revision to the Construction Schedule for the Contractor's convenience shall be the responsibility of the Contractor.

F. The revised network diagram and supporting data for the Progress Schedule shall be submitted to the Owner's Representative upon completion of the revisions, but not later than the next progress meeting.

G. Revisions to the Progress Schedule for the Contractor's convenience:

1. Must be approved by the Owner's Representative before Contractor changes the sequence of Work.

1.14 TIME IMPACT ANALYSIS (TIA)

A. The accepted initial Baseline Schedule or subsequently accepted Revised Baseline Schedule shall be used for TIA.

B. Contractor shall submit a written TIA to the Owner's Representative with each request for adjustment of Contract Time, or when Contractor or Owner's Representative consider that an approved or anticipated change may impact the critical path or contract progress.

1. The TIA must be attached to any change order prior to approval of any change to time or cost.

C. The TIA shall illustrate the impacts of each change or delay on the current scheduled completion date or internal milestone, as appropriate.

1. The analysis shall use the Baseline or Revised Baseline Schedule (accepted Baseline Schedule) that has a data date closest to and prior to the event.
2. If the Owner's Representative determines that the accepted Baseline Schedule used does not appropriately represent the conditions prior to the event, the accepted Baseline Schedule shall be updated to the day before the event being analyzed.
3. The TIA shall include an impact schedule developed from incorporating the event into the accepted Baseline Schedule by adding or deleting activities, or by changing durations or logic of existing activities as appropriate to the nature of the change event.
4. If the impact schedule shows that incorporating the event modifies the critical path and scheduled completion date of the accepted Baseline

Schedule, the difference between scheduled completion dates of the two (2) schedules shall be equal to the adjustment of Contract Time.

D. Contractor shall submit a TIA in duplicate within 15 working days of receiving a written request for a TIA from the Owner's Representative.
   1. Contractor shall allow the Owner's Representative two (2) weeks after receipt to approve or reject the submitted TIA.
   2. All approved TIA schedule changes shall be shown on the next update schedule.

E. In the event of a TIA rejection:
   1. If a TIA submitted by the Contractor is rejected by the Owner's Representative, the Contractor shall meet with the Owner's Representative to discuss and resolve issues related to the TIA.
   2. If agreement is not reached, the Contractor will be allowed 15 days from the meeting with the Owner's Representative to give notice.
   3. Contractor shall only show actual as-built work, not unapproved changes related to the TIA, in subsequent update schedules.
   4. If agreement is reached at a later date, approved TIA schedule changes shall be shown on the next update schedule.
   5. Owner's Representative will withhold remaining payment on the schedule contract item if a TIA is requested by Owner's Representative and not submitted by Contractor within 15 working days.
   6. The schedule item payment will resume on the next estimate after the requested TIA is submitted.
      a. No other contract payment will be retained regarding TIA submittals.

1.15 NARRATIVE SCHEDULE REPORT (NOT USED)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 32 36.01

PROJECT PHOTOGRAPHS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Technical and submittal requirements for project photographs, including:

   a. Measurement and Payment

   b. Project photographs for facility and pipeline projects. Facility projects may have one or more distinct sites. Pipeline projects may have more than one segment but are usually linear in nature, such as waterline or wastewater line projects.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.

2. Division 01 - General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 DEFINITIONS:

1. Pre-construction Photographs: Photographs taken, in sufficient numbers and detail, prior to beginning field activities, to show original construction site conditions.

1.4 SUBMITTALS:

1. Refer to Section 01 33 00 – Submittals.

2. Format and Media. Digital photography shall be used for Preconstruction Photographs.

   a. Prints.

      1) Submit Preconstruction Photograph via the Owner's Sharepoint site.Preconstruction photographs must be taken prior the first construction activities in the field and submitted prior to the first Pay Application being made by the Contractor.

   b. Media

      1) Digital Photography. Use at least 6.0 megapixel density for photographs.

3. Submittal Quantities and Frequencies

   a. Preconstruction photographs:

1) For Pipeline Projects, Contractor shall provide photos to document the existing conditions of the site. For water line and wastewater line projects, Contractor shall take photos at approximately 200 foot intervals (plus or minus 25 feet) along the center line of the project. One photo shall be taken looking in the direction of increasing stationing, one photo looking to the right (90ºR) from the first photo, one photo looking to the left (90ºL), one photo looking in the direction of decreasing stationing (180º from the increasing stationing direction). Where the project is to be constructed in or near active traffic lanes offset the location of the photos such that the photographs are taken from the sidewalk or shoulder or median and not from the active traffic pavement. In addition to the centerline photographs, Contractor shall document with photographs all features such as mailboxes, signs, traffic and light poles, driveways, culverts, inlets, and landscaping along the pipeline route which could be damaged by the Contractor's operations. Preconstruction Photo prints submittals shall progress from the lowest station to the highest station along the centerline. Progress Photographs

4. Labeling:

a. Digital Images: Place a label on the CD, Labels shall contain the following information:

1) Name of Project and Project Number

2) Name of Contractor.

3) For each digital image create a file name which has as part of the name the date the photograph was taken and the location of the photograph by station, coordinates or other unique identifier

B. Quality Assurance:

1. Contractor shall be responsible for the quality of and timely execution and submittal of photographs.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 33 00

SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanics and administration of the submittal process for:
    a. Shop Drawings.
    b. Samples.
    c. Miscellaneous submittals.
    d. Operation and Maintenance Manuals.
2. General content requirements for Shop Drawings.
3. Content requirements for Operation and Maintenance Manuals.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 - General Requirements.
3. Sections in Divisions 02 through 48 identifying required submittals.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS (NOT USED)

1.4 DEFINITIONS

A. Shop Drawings:

1. See General Conditions.
2. Product data and samples are Shop Drawing information.

B. Operation and Maintenance (O&M) Manuals:

1. Contain the information required for proper installation and maintenance of building materials and finishes.
2. Contain the technical information required for proper installation, operation and maintenance of process, electrical and mechanical equipment and systems.

C. Miscellaneous Submittals:

1. Submittals other than Shop Drawings and O&M Manuals.

2. Representative types of miscellaneous submittal items include but are not limited to:
    a. Construction schedule.
    b. Facility Shutdown Plan(s)
    c. HVAC test and balance reports.
    d. Installed equipment and systems performance test reports.
    e. Manufacturer's installation certification letters.
    f. Instrumentation and control commissioning reports.
    g. Warranties.
    h. Service agreements.
    i. Construction photographs.
    j. Record Documents.
    k. Cost breakdown (Schedule of Values).
    l. Safety Plan(s).

1.5 SUBMITTAL SCHEDULE (NOT USED)

1.6 PREPARATION OF SUBMITTALS

A. General:
    1. All submittals and all pages of all copies of a submittal shall be completely legible.
    2. Submittals which, in the Owner’s Representative’s or Principal Architect/Engineer’s sole opinion, are illegible will be returned without review.

B. Shop Drawings:
    1. Scope of any submittal and shop drawing transmittal:
        a. Submit shop drawings utilizing Owner’s standard Submittal Transmittal Form.
        b. Limited to one (1) Specification Section.
        c. Do not submit under any Specification Section entitled (in part) "Basic Requirements" unless the product or material submitted is specified, in total, in a “Basic Requirements” Section.
    2. Numbering letter of transmittal:
        a. Include a series number, "xx", beginning with "01" and increasing sequentially with each additional transmittal.
        b. Assign consecutive series numbers to subsequent transmittals.
    3. Describing transmittal contents:

a. Provide listing of each component or item in submittal capable of receiving an independent review action.

b. Identify for each item:

1) Manufacturer and Manufacturer's Drawing or data number.

2) Contract Document tag number(s).

3) Unique page numbers for each page of each separate item.

4) Use divider sheets with labeled tabs to separate independent items within a single submittal.

c. When submitting "or-equal" items that are not the products of named manufacturers, include the words "or-equal" in the item description.

4. Contractor stamping:

a. General:

1) Contractor's review and approval stamp shall be applied either to the letter of transmittal or a separate sheet preceding each independent item in the submittal.

a) Contractor's signature and date shall be wet ink signature. Is an electronic signature acceptable as most submittals are uploaded to SharePoint as a .PDF electronic document?

b) Shop Drawing submittal stamp shall read "(Contractor's Name) has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval as stipulated under General Conditions Paragraph 6.20.4."

2) Submittals containing multiple independent items shall be prepared with an index sheet for each item listing the discrete page numbers for

each page of that item, which shall be stamped with the Contractor's review and approval stamp.

a) Individual pages or sheets of independent items shall be numbered in a manner that permits Contractor's review and approval stamp to be associated with the entire contents of a particular item.

b) Use divider sheets with labeled tabs to separate independent items within a single submittal.

b. Electronic stamps:

1) Contractor may electronically embed Contractor's review and approval stamp to either the Submittal Transmittal Form or a separate index sheet preceding each independent item in the submittal.

2) Contractor's signature and date on electronically applied stamps shall be wet ink signature. Is an electronic signature acceptable as most submittals are uploaded to SharePoint as a PDF electronic document?

5. Resubmittals:

a. Number with original root number and a suffix letter starting with "A" on a new Submittal Transmittal Form.

b. Do not increase the scope of any prior transmittal.

c. Account for all components of prior transmittal.

1) If items in prior transmittal received "A" or "B" Action code, list them and indicate "A" or "B" as appropriate (See also 1.6, this Section).

a) Do not include submittal information for items listed with prior "A" or "B" in resubmittal.

2) Indicate items to be resubmitted “at a later date” for any prior "C" or "D" Action item not included in resubmittal.

a) Obtain Principal Architect/Engineer’s approval to exclude items.

6. Electronic submittals utilizing web based document management system (SharePoint®):

a. Shop drawing submittals shall be produced (scanned) in Adobe Acrobat's Portable Document Format (PDF) Version 5.0 or higher.

b. Do not password protect and/or lock the PDF document.

c. Create one (1) PDF document (PDF file) for each submittal.

d. Drawings or other graphics must be converted to PDF format and made part of the singe (one [1]) PDF document.

1) Scanning to be used only where actual file conversion is not possible.

e. Limit PDF document size to 5MB.

f. Rotate pages that must be viewed in landscape to the appropriate position for easy reading.

g. Images only shall be scanned at a resolution of 300 dpi or greater.

   1) Perform Optical Character Recognition (OCR) capture on all images.

   2) Achieve OCR with the "original image with hidden text" option.

   3) Word searches of the PDF document must operate successfully to demonstrate OCR compliance.

h. Create bookmarks in the navigation frame, for each entry in the Table of Contents/Index.

   1) Normally three (3) levels deep (i.e., "Chapter," "Section," "Sub-section").

i. Thumbnails must be generated for each PDF file.

j. Set the opening view for PDF files as follows:

   1) Initial view: Bookmarks and Page.

   2) Magnification: Fit in Window.

   3) Page layout: Single page.

   4) Set the file to open to the cover page of the submittal with bookmarks to the left, and the first bookmark linked to the cover page.

k. All PDF documents shall be set with the option "Fast Web View" to open the first pages of the document for the viewer while the rest of the document continues to load.

l. File naming conventions:

   1) File names shall use a "nine dot three" convention (XXXXXX-YY-Z.PDF) where XXXXXX is the Specification Section number, YY is the

Shop Drawing Root series number and Z is an ID number used to designate the associated volume.

a) Example 1:

(1) Two (2) pumps submitted as separate Shop Drawings under the same Specification Section:

(a) Pump 1 = 43 21 21-01-1.pdf.

(b) Pump 2 = 43 21 21-02-1.pdf.

b) Example 2:

(1) Control system submitted as one (1) Shop Drawing but separated into two (2) shop drawing submittals:

(a) Volume 1 = 40 90 00-01-1.pdf.

(b) Volume 2 = 40 90 00-01-2.pdf.

7. Provide clear space (3 In Sq) for Principal Architect/Engineer stamping of each component defined in the PREPARATION OF SUBMITTALS Article – Contractor Stamping.
8. Contractor shall not use red color for marks on transmittals.
   a. Duplicate all marks on all copies transmitted, and ensure marks are photocopy reproducible.
   b. Outline Contractor marks on reproducible transparencies with a rectangular box.
9. Transmittal contents:
   a. Coordinate and identify Shop Drawing contents so that all items can be easily verified by the Owner's Representative and the Principal Architect/Engineer.
   b. Identify equipment or material use, tag number, Drawing detail reference, weight, and other Project specific information.
   c. Provide sufficient information together with technical cuts and technical data to allow an evaluation to be made to determine that the item submitted is in compliance with the Contract Documents.
   d. Submit items such as equipment brochures, cuts of fixtures, product data sheets or catalog sheets on 8-1/2 x 11 In pages.
      1) Clearly mark (indicate) exact item or model and all options proposed.
   e. When a Shop Drawing submittal is called for in any Specification Section, include as appropriate, scaled details, sizes, dimensions, performance characteristics, capacities, test data, anchoring details, installation instructions, storage and handling instructions, color charts, layout Drawings, rough-in diagrams, wiring diagrams, controls, weights and

other pertinent data in addition to information specifically stipulated in the Specification Section.

1) Arrange data and performance information in format similar to that provided in Contract Documents.

2) Provide, at minimum, the detail specified in the Contract Documents.

f. Provide warranty information.

g. If proposed equipment or materials deviate from the Contract Drawings or Specifications in any way, clearly note the deviation and justify the said deviation in detail in a separate letter immediately following transmittal sheet.

10. Samples:

a. Identification:

1) Identify sample as to transmittal number, manufacturer, item, use, type, project designation, tag number, standard Specification Section

or Drawing detail reference, color, range, texture, finish and other pertinent data.

2) If identifying information cannot be marked directly on sample without defacing or adversely altering samples, provide a durable tag with identifying information securely attached to the sample.

b. Include application specific brochures, and installation instructions.

c. Provide Contractor's stamp of approval on samples or transmittal form as indication of Contractor's checking and verification of dimensions and coordination with interrelated work.

d. Resubmit samples of rejected items.

C. Miscellaneous Submittals:

1. Prepare in the format and detail specified in Specification requiring the miscellaneous submittal.

D. Operation and Maintenance Manuals:

1. Owner's use of manufacturer's Operation and Maintenance materials:

a. Materials are provided for Owner's use, reproduction and distribution as training and reference materials within Owner's organization.

1) Applicable to hard copy or electronic media.

2) Applicable to materials containing copyright notice as well as those with no copyright notice.

b. Notify manufacturer of this intended use of materials provided under the Contract.

2. Number each Operation and Maintenance Manual transmittal with the original root number of the associated Shop Drawing.

a. Identify resubmittals with the original number plus a suffix letter starting with "A."

3. Submittal format:

a. Interim submittals: Submit two (2) paper copies until manual is approved.

b. Final submittals:

1) Within 30 days of receipt of approval, submit one (1) additional paper copy and two (2) electronic copies to the Owner’s Document

Management System (SharePoint) in Portable Document Format (PDF).

a) Compact discs to be secured in jewel cases.

2) Electronic copies will be reviewed for conformance with the approved paper copy and the electronic copy (PDF) requirements of this Specification.

3) Non-conforming CDs will be returned with comments.

a) Provide final CDs within 30 days of receipt of comments.

4. Paper copy submittals:

a. Submit Operation and Maintenance Manuals printed on 8-1/2 x 11 In size heavy first quality paper with standard three-hole punching and bound in

appropriately sized three-ring (or post) vinyl view binders with clear overlays front, spine and back.

1) Provide binders with titles inserted under clear overlay on front and on spine of each binder.
   a) As space allows, binder titles shall include, but not necessarily be limited to, Project Name, related Specification Number, Equipment Name(s) and Project Equipment Tag Numbers.
2) Provide a Cover Page for each manual with the following information:
   a) Manufacturer(s).
   b) Date.
   c) Project Owner and Project Name.
   d) Specification Section.
   e) Project Equipment Tag Numbers.
   f) Model Numbers.
   g) Principal Architect/Engineer.
   h) Contractor.
3) Provide a Table of Contents or Index for each manual.
4) Use plastic-coated dividers to tab each section of each manual per the manual's Table of Contents/Index for easy reference.
5) Provide plastic sheet lifters prior to first page and following last page.

b. Reduce Drawings or diagrams bound in manuals to an 8-1/2 x 11 In or 11 x 17 In size.
   1) Where reduction is not practical to ensure readability, fold larger Drawings separately and place in vinyl envelopes which are bound into the binder.
   2) Identify vinyl envelopes with Drawing numbers.

c. Mark each sheet to clearly identify specific products and component parts and data applicable to the installation for the Project.
   1) Delete or cross out information that does not specifically apply to the Project.

5. Electronic copy submittals:
   a. Electronic copies of the approved paper copy Operation and Maintenance Manuals are to be produced in Adobe Acrobat's Portable Document Format (PDF) Version 5.0 or higher.
   b. Do not password protect and/or lock the PDF document.

c. Create one (1) PDF document (PDF file) for each equipment O&M Manual.

d. Drawings or other graphics must be converted to PDF format and made part of the one (1) PDF document.

   1) Scanning to be used only where actual file conversion is not possible.

e. Rotate pages that must be viewed in landscape to the appropriate position for easy reading.

f. Images only shall be scanned at a resolution of 300 dpi or greater.

   1) Perform Optical Character Recognition (OCR) capture on all images.

   2) Achieve OCR with the "original image with hidden text" option.

   3) Word searches of the PDF document must operate successfully to demonstrate OCR compliance.

g. Create bookmarks in the navigation frame, for each entry in the Table of Contents/Index.

   1) Normally three (3) levels deep (i.e., "Chapter," "Section," "Sub-section").

h. Thumbnails must be generated for each PDF file.

i. Set the opening view for PDF files as follows:

   1) Initial view: Bookmarks and Page.

   2) Magnification: Fit in Window.

   3) Page layout: Single page.

   4) Set the file to open to the cover page of the manual with bookmarks to the left, and the first bookmark linked to the cover page.

j. All PDF documents shall be set with the option "Fast Web View" to open the first pages of the document for the viewer while the rest of the document continues to load.

k. File naming conventions:

   1) File names shall use a "ten dot three" convention (XXXXXX-YY-Z.PDF) where XXXXXX is the Specification Section number, YY is the

Shop Drawing Root number and Z is an ID number used to designate the associated volume.

a) Example 1:

(1) Two (2) pumps submitted as separate Shop Drawings under the same Specification Section:

(a) Pump 1 = 43 21 21-01-1.pdf.

(b) Pump 2 = 43 21 21-02-1.pdf.

b) Example 2:

(1) Control system submitted as one (1) Shop Drawing but separated into two (2) O&M volumes:

(a) Volume 1 = 40 90 00-01-1.pdf.

(b) Volume 2 = 40 90 00-01-2.pdf.

l. Labeling:

1) As a minimum, include the following labeling on all CD-ROM discs and jewel cases:

a) Project Name.

b) Equipment Name and Project Tag Number.

c) Project Specification Section.

d) Manufacturer Name.

e) Vendor Name.

m. Binding:

1) Include labeled CD(s) in labeled jewel case(s).

a) Bind jewel cases in standard three-ring binder Jewel Case Page(s), inserted at the front of the Final paper copy submittal.

b) Jewel Case Page(s) to have means for securing Jewel Case(s) to prevent loss (e.g., flap and strap).

6. Operation and Maintenance Manuals for Materials and Finishes:

a. Building Products, Applied Materials and Finishes:

1) Include product data, with catalog number, size, composition and color and texture designations.

2) Provide information for re-ordering custom manufactured products.

b. Instructions for Care and Maintenance:

1) Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods and recommended schedule for cleaning and maintenance.

c. Moisture Protection and Weather Exposed Products:

1) Include product data listing, applicable reference standards, chemical composition, and details of installation.

2) Provide recommendations for inspections, maintenance and repair.

d. Additional requirements as specified in individual product specifications.

7. Operation and Maintenance Manuals for Equipment and Systems:

a. Submission of Operation and Maintenance Manuals for equipment and systems is applicable but not necessarily limited to:

1) Major equipment.

2) Equipment powered by electrical, pneumatic or hydraulic systems.

3) Specialized equipment and systems including instrumentation and control systems and system components for HVAC process system control.

4) Valves and water control gates.

b. Equipment and Systems Operation and Maintenance Manuals shall include, but not necessarily be limited to, the following completed forms and detailed information, as applicable:

1) Fully completed type-written copies of the associated Equipment Record(s), Exhibits A1, A2 and A3, shall be included under the first

tab following the Table of Contents of each Operation and Maintenance Manual.

a) Each section of the Equipment Record must be completed in detail.

(1) Simply referencing the related manual for nameplate, maintenance, spare parts or lubricant information is not acceptable.

b) For equipment items involving components or subunits, a fully completed Equipment Record Form is required for each operating component or subunit.

c) Submittals that do not include the associated Equipment Record(s) will be rejected without further content review.

d) Electronic copies of the Exhibits may be obtained by contacting the Project Manager.

2) Equipment function, normal operating characteristics, limiting operations.

3) Assembly, disassembly, installation, alignment, adjustment, and checking instructions.

4) Operating instructions for start-up, normal operation, control, shutdown, and emergency conditions.

5) Lubrication and maintenance instructions.

6) Troubleshooting guide.

7) Parts lists:

a) Comprehensive parts and parts price lists.

b) A list of recommended spare parts.

c) List of spare parts provided as specified in the associated Specification Section.

8) Outline, cross-section, and assembly Drawings; engineering data; and electrical diagrams, including elementary diagrams, wiring diagrams,

connection diagrams, word description of wiring diagrams and interconnection diagrams.

9) Test data and performance curves.

10) As-constructed fabrication or layout Drawings and wiring diagrams.

11) Instrumentation or tag numbers assigned to the equipment by the Contract Documents are to be used to identify equipment and system components.

12) Additional information as specified in the associated equipment or system Specification Section.

1.7 TRANSMITTAL OF SUBMITTALS

A. Shop Drawings, Samples and Operation and Maintenance Manuals:

1. Transmit all submittals via Owner's Document Management System (SharePoint).
2. Transmit all paper submittals to the address provided below.

San Jacinto River Authority

2436 Sawdust Road

The Woodlands, Texas 77380

Attn: (Construction Manager – TBD)

3. Utilize SJRA Standard Submittal Transmittal Form (to be provided by Owner) to transmit all Shop Drawings, Samples and Operation and Maintenance Manuals.
4. All submittals must be from Contractor.
   a. Submittals will not be received from or returned to subcontractors.
   b. Operation and Maintenance Manual submittal stamp may be Contractor's standard approval stamp.
5. Provide submittal information defining specific equipment or materials utilized on the Project.
   a. Generalized product information, not clearly defining specific equipment or materials to be provided, will be rejected.

B. Miscellaneous Submittals:

1. Transmit under Contractor's standard Submittal Transmittal Form or letterhead.
2. Submit in triplicate or as specified in individual Specification Section.
3. Transmit to the address provided below.

San Jacinto River Authority

2436 Sawdust Road

The Woodlands, Texas 77380

Attn: (Construction Manager – TBD)

4. Provide copy of Submittal Transmittal without attachments to Owner's Representative.

C. Expedited Return Delivery:

1. Include prepaid express envelope or airbill in submittal transmittal package for any submittals Contractor expects or requires express return mail.
2. Inclusion of prepaid express envelope or airbill does not obligate Owner's Representative or Principal Architect/Engineer to conduct expedited review of submittal.

D. Fax Transmittals:

1. Permitted on a case-by-case basis to expedite review when approved by Principal Architect/Engineer.
2. Requires hard copy transmittal to immediately follow.
   a. Principal Architect/Engineer will proceed with review of fax transmittal.
   b. Principal Architect/Engineer 's approval or rejection comments will be recorded and returned on hard copy transmittal.
3. Provisions apply to both:
   a. Initial transmittal contents.
   b. Supplemental information required to make initial transmittal contents complete.

1.8 PRINCIPAL ARCHITECT/ENGINEER 'S REVIEW ACTION

A. Shop Drawings and Samples:

1. Items within transmittals will be reviewed for overall design intent and will receive one of the following actions:
   a. NO EXCEPTION.
   b. EXCEPTIONS AS NOTED.
   c. REVISE & RESUBMIT
   d. REJECTED - RESUBMIT.
   e. ACKNOWLEDGE RECEIPT.
   f. FOR INFORMATION PURPOSES ONLY.

g. SUPPLEMENTARY INFORMATION.

2. Submittals received will be initially reviewed to ascertain inclusion of Contractor's approval stamp.
   a. Submittals not stamped by the Contractor or stamped with a stamp containing language other than that specified herein will not be reviewed for technical content and will be returned without any action.
3. In relying on the representation on the Contractor's review and approval stamp, Owner and Principal Architect/Engineer reserve the right to review and process poorly organized and poorly described submittals as follows:
   a. Submittals transmitted with a description identifying a single item and found to contain multiple independent items:
      1) Review and approval will be limited to the single item described on the transmittal letter.
      2) Other items identified in the submittal will:
         a) Not be logged as received by the Principal Architect/Engineer.
         b) Be removed from the submittal package and returned without review and comment to the Contractor for coordination, description and stamping.
         c) Be submitted by the Contractor as a new series number, not as a re-submittal number.
   b. Principal Architect/Engineer, at Principal Architect/Engineer's discretion, may revise the transmittal letter item list and descriptions, and conduct review.
      1) Unless Contractor notifies Principal Architect/Engineer in writing that the Principal Architect/Engineer's revision of the Submittal Transmittal Form item list and descriptions was in error, Contractor's review and

approval stamp will be deemed to have applied to the entire contents of the submittal package.

4. Submittals returned with Action "A" or "B" are considered ready for fabrication and installation.
   a. If for any reason a submittal that has an "A" or "B" Action is resubmitted, it must be accompanied by a letter defining the changes that have been made and the reason for the resubmittal.
   b. Destroy or conspicuously mark "SUPERSEDED" all documents having previously received "A" or "B" Action that are superseded by a resubmittal.
5. Submittals with Action "A" or "B" combined with Action "C" (Revise and Resubmit) or "D" (Rejected) will be individually analyzed giving consideration as follows:
   a. The portion of the submittal given "C" or "D" will not be distributed (unless previously agreed to otherwise at the Preconstruction Conference).
      1) One (1) copy or the one (1) transparency of the "C" or "D" Drawings will be marked up and returned to the Contractor.
         a) Correct and resubmit items so marked.
   b. Items marked "A" or "B" will be fully distributed.
   c. If a portion of the items or system proposed are acceptable, however, the major part of the individual Drawings or documents are incomplete or require revision, the entire submittal may be given "C" or "D" Action.
      1) This is at the sole discretion of the Principal Architect/Engineer.
      2) In this case, some Drawings may contain relatively few or no comments or the statement, "Resubmit to maintain a complete package."
      3) Distribution to the Owner and field will not be made (unless previously agreed to otherwise).
6. Failure to include any specific information specified under the submittal paragraphs of the Specifications will result in the submittal being returned to the Contractor with "C" or "D" Action.
7. Calculations: Requirements for the submittal of calculations in the individual Specification Sections shall be satisfied through the submittal of a certification sealed by the Principal Architect/Engineer that the calculations have been performed. Certification will be received for information purposes only and will be returned stamped "D. ACKNOWLEDGE RECEIPT ".
8. Transmittals of submittals which the Principal Architect/Engineer considers as "Not Required" submittal information, which is supplemental to but not essential to prior submitted information, or items of information in a transmittal which have been reviewed and received "A" or "B" Action in a

prior submittal, will be returned with Action "E. Acknowledge Receipt" (Principal Architect/Engineer 's Review Not Required).

9. Samples may be retained for comparison purposes.
   a. Remove samples when directed.
   b. Include in bid all costs of furnishing and removing samples.
10. Approved samples submitted or constructed, constitute criteria for judging completed work.
    a. Finished work or items not equal to samples will be rejected.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

EXHIBIT A1
Equipment Record

Equipment Data and Spare Parts Summary

Project Name	Specification Section:
Equipment Name	Year Installed:
Project Equipment Tag No(s).	

Equipment Manufacturer		Project/ Order No.
Address		Phone
Fax	Web Site	E-mail
Local Vendor/Service Center		
Address		Phone
Fax	Web Site	E-mail

MECHANICAL NAMEPLATE DATA

Equip.		Serial No.		
Make		Model No.		
ID No.	Frame No.	HP	RPM	Cap.
Size	TDH	Imp. Sz.	CFM	PSI
Other:				

ELECTRICAL NAMEPLATE DATA

Equip.				Serial No.				
Make				Model No.				
ID No.	Frame No.	HP	V.	Amp.	HZ	PH	RPM	SF
Duty	Code	Ins. Cl.	Type	NEMA	C Amb.	Temp. Rise	Rating	
Other:								

SPARE PARTS PROVIDED PER CONTRACT

Part No.	Part Name	Quantity

RECOMMENDED SPARE PARTS

Part No.	Part Name	Quantity

EXHIBIT A2

Equipment Record

Recommended Maintenance Summary

Equipment Description	Project Equip. Tag No(s).

RECOMMENDED BREAK-IN MAINTENANCE (FIRST OIL CHANGES, ETC.)	INITIAL COMPLETION * FOLLOWING START-UP						
	D	W	M	Q	S	A	Hours

RECOMMENDED PREVENTIVE MAINTENANCE	PM TASK INTERVAL *						
	D	W	M	Q	S	A	Hours

* D = Daily W = Weekly M = Monthly Q = Quarterly S = Semiannual A = Annual Hours = Run Time Interval

EXHIBIT A3

Equipment Record

Lubrication Summary

Equipment Description	Project Equip. Tag No(s).

Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					
Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 35 05

ENVIRONMENTAL PROTECTION AND SPECIAL CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Addresses:

1. Minimizing the pollution of air, water, or land; control of noise, the disposal of solid waste materials, and protection of deposits of historical or archaeological interest.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Prices. No separate payment will be made for this item. Include the cost of same in associated items for this project.

1.3 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Prior to the start of any construction activities submit:
   a. A detailed proposal of all methods of control and preventive measures to be utilized for environmental protection.
   b. A drawing of the work area, haul routes, storage areas, access routes and current land conditions including trees and vegetation.
   c. Submit manufacturer's catalog sheets and other product data on dispensing equipment, pump, and aboveground fuel storage tanks, indicating capacity and dimensions of tank.
   d. Submit drawings to show location of tank protection area and driveway. Indicate nearest inlet or channelized flow area. Clearly dimension distances and measurements.
   e. Submit list of spill containment equipment, and quantities thereof, located at fueling area.

1.4 ENVIRONMENTAL CONTROLS

A. Provide and maintain methods, equipment, and temporary construction as necessary for controls over environmental conditions at construction site and adjacent areas.

B. Work to minimize impact to surrounding environment. Adopt construction procedures that do not cause unnecessary excavation and filling of terrain, indiscriminate destruction of vegetation, air or stream pollution, nor harassment or destruction of wildlife.

C. Recognize and adhere to environmental requirements of Project. Limit disturbed areas to boundaries established by Contract. Avoid pollution of "on-site" streams, sewers, wells, or other water sources.

D. Burning of rubbish, debris, or waste materials is not permitted.

1.5 POLLUTION CONTROL

A. Provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by discharge of noxious substances from construction operations.

B. Provide equipment and personnel to perform required emergency measures to contain spillage, and to remove contaminated soils or liquids. Excavate and dispose of contaminated earth off-site, and replace with suitable compacted fill and topsoil.

C. Provide systems for control of atmospheric pollutants.

1. Prevent toxic concentrations of chemicals.
2. Prevent harmful dispersal of pollutants into atmosphere.

D. Use equipment that conforms to current Federal, State, and local laws and regulations.

E. Install or otherwise implement positive controls to prevent hazardous materials migrating from Work area.

1.6 PEST AND RODENT CONTROL

A. Provide rodent and pest control as necessary to prevent infestation of construction or storage areas.

B. Employ methods and use materials which will not adversely affect conditions at site or on adjoining properties.

1.7 NOISE CONTROL

M. Provide vehicles, equipment, and construction activities that minimize noise to greatest degree practicable. Conform noise levels to latest OSHA standards.

Do not permit noise levels to interfere with Work or create nuisance in surrounding areas.

N. Conduct construction operations during daylight hours except as approved by Owner's Representative.

O. Select construction equipment to operate with minimum noise and vibration. When in opinion of Owner's Representative, objectionable noise or vibration is produced by equipment, rectify conditions without additional cost to Owner. Sound Power Level (PWL) of equipment shall not exceed 85 dbA (re: 10-12

watts) measured 5 feet from piece of equipment. Explicit equipment noise requirements are specified with equipment specifications.

1.8 DUST CONTROL

A. Control objectionable dust caused by operation of vehicles and equipment. Apply water or use other methods, subject to approval of Owner's Representative, to control amount of dust generated.

1.9 WATER RUNOFF AND EROSION CONTROL

A. Comply with Texas Pollutant Discharge Elimination System (TPDES) permit when required.

B. In addition to TPDES requirements:

1. Provide methods to control surface water, runoff, subsurface water, and water from excavations and structures to prevent damage to Work, site, or adjoining properties.
2. Control fill, grading and ditching to direct water away from excavations, pits, tunnels, and other construction areas; and to direct drainage to proper runoff courses so as to prevent erosion, sedimentation or damage.
3. Provide, operate, and maintain equipment and facilities of adequate size to control surface water.
4. Dispose of drainage water in manner to prevent flooding, erosion, or other damage to portion of site or to adjoining areas and in conformance with environmental requirements.
5. Retain existing drainage patterns external to construction site by constructing temporary earth berms, sedimentation basins, retaining areas, and temporary ground cover as needed to control conditions.
6. Plan and execute construction and earth work by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
   a. Minimize area of bare soil exposed at one time.
   b. Provide temporary control measures, as berms, dikes, and drains.
7. Construct fills and waste areas by selective placement to eliminate erosion of surface silts or clays.
8. Inspect earthwork periodically to detect evidence of start of erosion. Apply corrective measures as required to control erosion.

1.10 QUALITY ASSURANCE

A. Person conducting visual examination for pollutant shall be fully knowledgeable about the TPDES Construction General Permit, detecting sources of storm water contaminants, inspection of aboveground storage tank and appurtenances for

leakage, and the day-to-day operations that may cause unexpected pollutant releases.

PART 2 - PRODUCTS

2.1 ABOVEGROUND FUEL STORAGE TANK

A. Tank Assembly: Must be listed with UL 1709 and UL 2085.

B. Inner Steel Storage Tank: Follow UL 142, with minimum thickness of ⅛-inch welded construction.

C. Tank Encasement: Either concrete or steel to provide minimum of 110 percent containment of inner tank capacity. Provide 5-gallon overspill containment pan for tank refueling.

D. Dispenser Pump: For submersible pump, UL listed emergency shut-off valve to be installed at each dispenser. For suction pump, UL listed vacuum-activated shut-off valve, with shear section, is to be installed at each dispenser. Fuel may not be dispensed from tank by gravity flow or by pressurization of tank. Means must be provided to prevent release of fuel by siphon flow.

E. Representative Manufacturers: Convault, Fireguard, Ecovault, SuperVault, or equal.

2.2 CONCRETE

A. Provide concrete with minimum strength of 4,000 psi at 28 days.

2.3 AGGREGATES

A. Coarse aggregate shall consist of crushed stone, gravel, crushed blast furnace slag, or 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 following gradation requirements.

Sieve Size	**Percent Retained**
(Square Mesh)	(By Weight)
2-1/2"	0
2"	0 - 20
1-1/2"	15 - 50
3/4"	60 - 80
No. 4	95 - 100

PART 3 - EXECUTION

3.1 INSTALLATION

A. Employ and utilize environmental protection methods, obtain all necessary permits, and fully observe all local, state, and federal regulations.

B. No clearing and grubbing or rough cutting permitted until erosion and sediment control systems are in place, other than site Work specifically directed by Owner's Representative to allow soil testing and surveying.

C. Prohibit equipment and vehicles from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Immediately repair damage caused by construction traffic to erosion and sediment control systems.

D. Maintain existing erosion and sediment control systems located within project site until acceptance of Project or until directed by Owner's Representative to remove and discard existing system.

E. Regularly inspect and repair or replace damaged components of erosion and sediment control systems as specified in this Section. Unless otherwise directed, maintain erosion and sediment control systems until project area stabilization is accepted by the Owner. Remove erosion and sediment control systems promptly when directed by Owner's Representative. Discard removed materials off site.

F. Remove and dispose sediment deposits at designated spoil site for Project. If a project spoil site is not designated on Drawings, dispose of sediment off site at

location not in or adjacent to stream or flood plain. Assume responsibility for off-site disposal. Spread sediment evenly throughout site, compacted and stabilized. Prevent sediment from flushing into a stream or drainage way. If sediment has been contaminated, dispose of in accordance with existing federal, state, and local rules and regulations.

G. Assume responsibility 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.

H. Employ protective measures to avoid damage to existing trees to be retained on project site. Conduct construction operations under this Contract in conformance with erosion control practices described in Drawings and this or other Specifications.

I. Prepare spill response and containment procedures to be implemented in event of significant materials spill. Significant materials include but are not limited to: raw materials; fuels; materials such as solvent, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under Section 101(14) of CERCLA; chemical required to be reported pursuant to Section 313 of Title III of SARA; fertilizers; pesticides, and waste products such as slag, ashes and sludge that have potential to be released with storm water discharges. Spill containment procedures shall be kept on-site or in construction field office.

J. Spill containment equipment appropriate to size of operation is to be located in close proximity of fueling area. Such equipment includes, but not limited to,

suitable waste containers for significant materials, drip pans, booms, inlet covers, or absorbent.

K. Properly label significant materials or waste containers used for construction activities and stored on-site overnight.

L. Install, maintain, and inspect erosion, sediment control measures and practices as specified in Drawings and in this or other Specifications

M. Land Protection:

1. Except for any work or storage area and access routes specifically assigned for the use of the Contractor, the land areas outside the limits of construction shall be preserved in their present condition.
    a. Contractor shall confine his construction activities to areas defined for work within the Contract Documents.
2. Manage and control all borrow areas, work or storage areas, access routes and embankments to prevent sediment from entering nearby water or land adjacent to the work site.
3. Restore all disturbed areas including borrow and haul areas and establish permanent type of locally adaptable vegetative cover.
4. Unless earthwork is immediately paved or surfaced, protect all side slopes and backslopes immediately upon completion of final grading.
5. Plan and execute earthwork in a manner to minimize duration of exposure of unprotected soils.
6. Except for areas designated by the Contract Documents to be cleared and grubbed, the Contractor shall not deface, injure or destroy trees and

vegetation, nor remove, cut, or disturb them without approval of the Owner's Representative.

a. Any damage caused by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the Contractor's expense.

7. Utilize, as necessary, erosion control methods to protect side and backslopes, minimize and the discharge of sediment to the surface water leaving the construction site as soon as rough grading is complete.

   a. These controls shall be maintained until the site is ready for final grading and landscaping or until they are no longer warranted and concurrence is received from the Owner's Representative.

   b. Physically retard the rate and volume of run-on and runoff by:

      1) Implementing structural practices such as diversion swales, terraces, straw bales, silt fences, berms, storm drain inlet protection, rocked outlet protection, sediment traps and temporary basins.

      2) Implementing vegetative practices such as temporary seeding, permanent seeding, mulching, sod stabilization, vegetative buffers,

hydroseeding, anchored erosion control blankets, sodding, vegetated swales or a combination of these methods.

3) Providing Construction sites with graveled or rocked access entrance and exit drives and parking areas to reduce the tracking of sediment onto public or private roads.

8. Discharges from the construction site shall not contain pollutants at concentrations that produce objectionable films, colors, turbidity, deposits or noxious odors in the receiving stream or waterway.

N. Solid Waste Disposal:

1. Collect solid waste on a daily basis.
2. Provide disposal of degradable solid waste to an approved solid waste disposal site.
3. Provide disposal of nondegradable solid waste to an approved solid waste disposal site or in an alternate manner approved by Owner's Representative and regulatory agencies.
4. No building materials wastes or unused building materials shall be buried, dumped, or disposed of on the site.

O. Fuel and Chemical Handling:

1. Store and dispose of chemical wastes in a manner approved by regulatory agencies.
2. Take special measures to prevent chemicals, fuels, oils, greases, herbicides, and insecticides from entering drainage ways.
3. Do not allow water used in onsite material processing, concrete curing, cleanup, and other waste waters to enter a drainage way(s) or stream.
4. The Contractor shall provide containment around fueling and chemical storage areas to ensure that spills in these areas do not reach waters of the state.

P. Control of Dust:

1. The control of dust shall mean that no construction activity shall take place without applying all such reasonable measures as may be required to

prevent particulate matter from becoming airborne so that it remains visible beyond the limits of construction.

a. Reasonable measures may include paving, frequent road cleaning, planting vegetative groundcover, application of water or application of chemical dust suppressants.

b. The use of chemical agents such as calcium chloride must be approved by the State of Texas DOT.

2. Utilize methods and practices of construction to eliminate dust in full observance of agency regulations.

3. The Owner's Representative will determine the effectiveness of the dust control program and may request the Contractor to provide additional measures, at no additional cost to Owner.

Q. Burning:

1. Do not burn material on the site.

2. If the Contractor elects to dispose of waste materials by burning, make arrangements for an off-site burning area and conform to all agency regulations.

R. Control of Noise:

1. Control noise by fitting equipment with appropriate mufflers.

S. Completion of Work:

1. Upon completion of work, leave area in a clean, natural looking condition.

2. Ensure all signs of temporary construction and activities incidental to construction of required permanent work are removed.

T. Historical Protection:

1. If during the course of construction, evidence of deposits of historical or archaeological interests is found, cease work affecting find and notify Owner's Representative.

a. Do not disturb deposits until written notice from Owner's Representative is given to proceed.

2. The Contractor will be compensated for lost time or changes in construction to avoid the find based upon normal change order procedures.

3.2 TOPSOIL PLACEMENT FOR EROSION AND SEDIMENT CONTROL SYSTEMS

A. When topsoil is specified as a component of another Specification, conduct erosion control practices described in this Specification during topsoil placement operations.

B. When placing topsoil, maintain erosion and sediment control systems consisting of swales, grade stabilization structures, berms, dikes, waterways, and sediment basins.

C. Maintain grades which have been previously established on areas to receive topsoil.

D. After areas to receive topsoil have been brought to grade, and immediately prior to dumping and spreading topsoil, loosen subgrade by discing or by scarifying to a depth of at least 2 inches to permit bonding of topsoil to subsoil. Compact by passing bulldozer up and down slope, tracking over entire surface area of slope to create horizontal erosion control slots.

E. 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 following methods:

1. Mulches bound with chemical binders such as Carasol, Terratack, or equal.
2. Temporary vegetative cover.
3. Spray-on adhesives on mineral soils when not used by traffic.
4. Tillage to roughen surface and bring clods to 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 project site.

3.4 KEEPING STREETS CLEAN

A. Keep streets clean of construction debris and mud carried by construction vehicles and equipment. If necessary, install stabilized construction exits at construction, staging, storage, and disposal areas. Vehicle/equipment wash area (stabilized with coarse aggregate) may be installed adjacent to stabilized construction exit, as needed. Release wash water into a drainage swale or inlet

protected by erosion and sediment control measures. Construction exit specified in Section 01 57 13.02 - Stabilized Construction Access.

B. In addition to stabilized construction exits, shovel or sweep pavement to extent necessary to keep street clean. Water hosing or sweeping of debris and mud off of 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 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 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. Formulate and implement a plan for collection and disposal of waste materials on construction site. In plan, designate locations for trash and waste receptacles and establish a collection schedule. Specify and carry out methods for ultimate disposal of waste in accordance with applicable local, state, and federal health and safety regulations. Make special provisions for collection and disposal of liquid wastes and toxic or hazardous materials.

B. Keep receptacles and waste collection areas neat and orderly to extent possible. Waste shall not be allowed to overflow its container or accumulate from day-to-day. Locate trash collection points where they shall least likely be affected by concentrated storm water runoff.

3.7 WASHING AREAS

A. Avoid washing concrete delivery trucks or dump trucks and other construction equipment at locations where runoff shall flow directly into a watercourse or storm water conveyance system. Designate special areas for washing vehicles. Locate these areas where wash water shall spread out and evaporate or infiltrate directly into ground, or where runoff can be collected in 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 shall not cause runoff pollution.

B. Store toxic chemicals, materials, 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 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, retain water or slurry used to control dust contaminated with heavy metals or toxic pollutants on site, and prevent runoff directly into watercourses or storm water conveyance systems. Carry out methods of ultimate disposal of these materials in accordance with applicable local, state, and federal health and safety regulations.

3.10 SANITARY FACILITIES

A. Provide construction sites with adequate portable toilets for workers in accordance with 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.

3.12 CONSTRUCTION METHODS

A. Provide fuel tank protection area and driveway as shown on Drawings.

B. Do not locate fueling area in or near channelized flow area or close to storm sewer conveyance system. Provide sufficient space to allow installation of other erosion and sediment controls to protect those areas.

C. Clear and grub fueling area to remove unsuitable materials. Place geotextile fabric as permeable separator to prevent mixing of coarse aggregate with underlying soil. Overlap fabric minimum of 6 inches. Place coarse aggregate on top of geotextile fabric to minimum depth of 8 inches.

D. Grade protection area and driveway 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. Provide driveway to fuel tank area with minimum width of 15 feet for one-way traffic and 30 feet for two-way traffic.

E. Place aboveground storage tank on top of cast-in-place or pre-cast foundation. Base size and thickness of foundation on size and weight of tank to be used, with minimum thickness of 6 inches. Enclose concrete foundation by 5-inch by

5-inch concrete curb and extend minimum of 1 foot beyond tank and dispenser assemblies, so that leak and drip can be contained within concrete foundation.

F. Slope concrete foundation minimum of 1 percent toward 6-inch wide by 12-inch long by 4-inch deep sump pit. Install minimum of 2-inch pipe inside sump pit with valve on outside of curb to allow draining of concrete foundation.

G. Install portable concrete Jersey Barrier around concrete foundation. Provide minimum clearance of 2 feet from edge of foundation. In lieu of Jersey barrier, install 4-inch diameter steel pipe bollards around foundation. Bury bollards minimum of 3 feet deep, 3 feet above ground, and 4 feet on center, encased in 12-inch wide concrete foundation.

3.13 MAINTENANCE

A. Inspections shall be conducted by designated health and safety officer qualified to conduct health and safety inspections.

B. Inspect stabilized areas after every storm event and at least once a week. Provide periodic top dressing with additional coarse aggregate to maintain required depth. Repair and clean out damaged control measures used to trap sediment.

C. Inspect fuel tank foundation's bermed area after every storm event and at least once a week. Visually examine storm water contained in tank's bermed foundation area for oil sheen or other obvious indicators of storm water pollution. Properly dispose of storm water when pollutant is present. Record visual examination of storm water discharge in Report noting date and time of examination, name of examiner, observations of water quality, and volume of storm water discharged from bermed area. Keep Report with other storm water pollution control inspection reports on site, in readily accessible location.

3.14 TEMPORARY FUELING AREA CLOSURE

A. Dispose of temporary vehicle and equipment fueling area by removal of sediment and erosion controls properly off site. Owner's Representative will inspect top soils in fueling area and immediate vicinity for evidence of fuel leaks. If Owner's Representative determines that sufficient pollutants have been released, remove soil and properly dispose off site. Other remediation methods may be required.

END OF SECTION

SECTION 01 45 16.32

CONTRACTOR'S QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Measurement and Payment
2. Quality Assurance/Control of Installation
3. References
4. Manufacturer's Field Services and Reports

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS (NOT USED)

1.4 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality at no additional cost to the Owner.

B. Comply fully with manufacturers' installation instructions, including each step in sequence.

C. Request clarification Owner's Representative before proceeding when manufacturers' instructions conflict with Contract.

D. Comply with specified standards as minimum requirements for Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce specified level of workmanship.

1.5 REFERENCES

A. Obtain copies of standards and maintain at job site when required by individual Specification sections.

1.6 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual Specification sections or as required by Owner's Representative, provide material or product suppliers' or manufacturers' technical representative to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, operator training, test, adjust and balance of equipment as applicable and to initiate operation, as required. Conform to minimum time requirements for start-up operations and operator training when defined in Specification sections.

B. At Owner's Representative's request, submit qualifications of manufacturers' representative to Owner's Representative 15 days in advance of required representatives' services. Representative is subject to approval by Owner's Representative.

C. A manufacturers' representative is to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to a manufacturer's written instructions. Submit report within 14 days of observation to Owner's Representative for review.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 45 29
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Testing laboratory services
2. Requirements of this section apply to testing laboratories employed by the Contractor for approval of manufactured products, materials, including mix designs and quality control of materials
3. Requirements of this section also apply to testing laboratories employed by the Owner for approval of materials and the constructed Work on site.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Proposal Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project

1.3 QUALITY ASSURANCE

A. Reference Standards

1. ASTM C 1077 – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
2. ASTM D 3666 – Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials.
3. ASTM D 3740 – Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
4. ASTM E 329 – Standard Specification for Minimum Requirements for Agencies Engaged the Testing and/or Inspection of Materials Used in Construction.
5. ISO/IEC 17025 – General Requirements for the Competence of Calibration and Testing Laboratories.

1.4 RELATED REQUIREMENTS

A. To test products and materials and provide certifications as identified in Part 2

Products, in the individual Specification sections, the Contractor shall either

1. Select, employ and pay for services of an independent testing laboratory or laboratories, or
2. Cause its suppliers to perform required inspection and testing using an independent testing laboratory or a qualified in-house laboratory.

B. Owner's Representative may, at its option, observe or witness any and all testing of materials and products which are to be utilized in the construction of the Work as they are being tested by the Contractor's laboratories.

C. Owner will select, employ, and pay for services of an independent testing laboratory to perform inspection and testing identified in Part 3 of individual Specification sections.

D. Employ and pay for services of independent testing laboratory or laboratories to perform inspection and testing identified in Part 2 of individual Specification sections.

E. Employment of testing laboratory by Owner does not relieve the Contractor of obligation to perform the Work in accordance with requirements of Contract Documents.

F. Owner's Representative schedules and monitors Owner's testing laboratory. Provide minimum 24 hours notice of testing to Owner's Representative to avoid delay of the Work.

1.5 QUALIFICATION OF LABORATORY

A. Meet laboratory qualification requirements of ASTM E 329 and applicable requirements of ASTM C 1077, ASTM D 3666, and ASTM D 3740.

B. Meet ISO/IEC 17025 conditions for accreditation by the American Association for Laboratory Accreditation (A2LA) in specific fields of testing required in individual Specification sections.

C. If laboratory subcontracts are part of testing services, such work will be placed with laboratory complying with requirements of this Section.

1.6 LABORATORY

A. Owner's testing laboratory will provide and distribute copies of laboratory reports to the distribution list provided by Owner's Representative at the preconstruction conference. Distribution will include download to the Owner's electronic document management system (SharePoint) for the Project.

B. Keep one copy of each laboratory report at site field office for duration of project.

C. Contractor's testing laboratory will provide and distribute copies of laboratory test reports for materials to be incorporated into this Work to the distribution list provided by Owner's Representative at the preconstruction conference.

Distribution will include download to the Owners electronic document management system (Sharepoint) for the Project

D. Laboratories will email material supplier, Contractor, and Owner's Representative no later than close of business on working day following test completion and review, reports which indicate failing test results.

1.7 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, alter, or enlarge requirements of Contract.

B. Laboratory may not approve or accept any portion of the Work.

C. Laboratory may not assume duties of Contractor or the Owner

D. Laboratory has no authority to stop the Work.

1.8 SUBMITTALS (NOT USED)

1.9 CONTRACTOR RESPONSIBILITIES

A. Provide safe access to the Work and to manufacturer's facilities for Owner's Representative, and for testing laboratory personnel.

B. Provide testing laboratory with copy of construction schedule and copy of each update to construction schedule.

C. Notify Owner's Representative and testing laboratory during normal working hours of the day previous to expected time for operations requiring inspection and testing services. When Contractor fails to make timely prior notification, then do not proceed with operations requiring inspection and testing services.

D. Notify Owner's Representative 24 hours in advance when Specification requires presence of Owner's Representative for sampling or testing.

E. Request and monitor testing as required to provide timely results and avoid delay to the Work. Where specified, provide samples to laboratory in sufficient time to allow required test to be performed in accordance with specified test methods before intended use of material.

F. Cooperate with laboratory personnel in collecting samples on site. Provide incidental labor and facilities for safe access to the Work to be tested; to obtain and handle samples at site or at source of products to be tested; and to facilitate tests and inspections including storage and curing of test samples.

G. Arrange with laboratory through Owner's Representative. Payment for additional testing will be made in accordance with Specification Section 00 72 00 - General Conditions of the Contract:

1. Retesting required for failed tests
2. Retesting for nonconforming Work
3. Additional sampling and tests requested beyond specified requirements
4. Insufficient notification of cancellation of tests for Work scheduled but not

performed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CONDUCTING TESTING

A. Conform laboratory sampling and testing specified in individual Specification sections to latest issues of ASTM standards, TxDOT methods, or other recognized test standards as approved by Owner's Representative.

B. Requirements of this section also apply to those tests for approval of materials, for mix designs and for quality control of materials as performed by employed testing laboratories.

END OF SECTION

SECTION 01 56 39

TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for tree and plant protection.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unless a separate bid item has been established, no separate payment will be made for tree and plant protection specified herein. Include cost in price bid for related work items.

1.3 SUBMITTALS

A. Conform to requirements of Section 01 33 00 – Submittals.

B. Submit name and experience of qualified Arborist to Owner's Representative.

1.4 PROJECT CONDITIONS WHEN TREES AND PLANTS ARE IDENTIFIED TO REMAIN

A. Preserve and protect existing trees and plants from foliage, branch, trunk, or root damage that could result from construction operations when trees and plants are identified to remain.

B. Do not allow any vehicular traffic, construction equipment, parking of vehicles or stockpiling of excavated material or construction materials within protected tree

root zone areas. Refer to Section 1.6 DEFINITIONS, for Dripline/Root Zone Area definition.

C. Prevent the following types of damage:

1. Compaction of root zone area by equipment, vehicles, foot traffic or materials storage.
2. Suffocating roots by placing soil in excess of three inches (3") within root zone areas, including placement of any select fill or soil with high clay content.
3. Trunk and limb damage resulting from contact with equipment and vehicles.
4. Poisoning by pouring solvents, fuel, and other injurious materials on or near root zone areas or in areas where such materials will leak or wash into root zone areas.
5. Changing soil pH within root zones by depositing concrete, powdered lime or other materials used to stabilize or dehydrate soils.
6. Cutting roots measuring one inch (1") in diameter and larger within protected areas unless required for root pruning.
7. Scorching of foliage, twigs and limbs caused by direct contact with expulsion of hot exhaust from equipment or vehicles.
8. Branch damage due to improper pruning or trimming.
9. Damage from permanently altering drainage patterns near root zones.
10. Trunk and branch damage resulting from nailing or bolting.

1.5 DAMAGE ASSESSMENT

A. When trees other than those designated for removal are destroyed or badly damaged as result of construction operations, remove and replace with same size, species, and variety up to and including 8 inches in trunk diameter. Any tree larger than 8 inches in diameter shall be replaced with 8-inch diameter tree of same species and variety and total contract amount shall be reduced by amount determined from following International Shade Tree Conference formula: 0.7854 x D2 x $38.00 where D is diameter in inches of tree or shrub trunk measured 12 inches above grade.

1.6 DEFINITIONS

A. Dripline/Root Zone Area - The ground area delineated by the branch spread of a single plant or group of plants. This area is considered the most critical area

of roots and should be protected, excluding the area within the street located between curbs.

B. Zero Curb Cut - The process in which required street work is conducted without cutting or otherwise disturbing soil located immediately behind the existing curb.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Protection Fencing - Orange, plastic mesh fencing, four feet (4') in height with six feet (6') high steel T-bar posts. Set posts eighteen inches (18") into ground. Stretch fencing material taut prior to securing.

B. Fertilizer - A low salt, slow release fertilizer containing twenty-seven percent (27%) nitrogen, nine percent (9%) phosphorus and nine percent (9%) potassium (potash) or similar.

C. Plastic Vapor Barrier - Polyethylene sheeting at least 6-mil thickness and three feet width to prevent leaching of stabilized material into native soil.

D. Tree Replacements - Shall be as approved by Owner's Representative as necessary.

PART 3 - EXECUTION

3.1 PROTECTION AND MAINTENANCE OF EXISTING TREES AND SHRUBS

A. Except for trees shown on Drawings or determined by Owner's Representative to be removed or relocated, trees within Project area are to remain in place, protected from damage and maintained by Contractor.

B. If required by the Project specifications, employ a qualified Arborist. The Arborist must be approved by Owner's Representative and shall have a minimum of 5 (five) years of experience in the field of tree protection.

C. Perform the following services as required by construction activities for trees that remain:

1. Trimming

a. Trees shall be pruned in accordance ANSI A300 (Part 1) - 2001 Pruning Revision of ANSI A300-1995 Tree, Shrub and Other Woody Plant Maintenance - Standard Practices. Pruning shall be done by a

professional arborist who has received training in proper pruning techniques.

b. Pruning shall not alter the natural shape or character of the tree or leave holes in the canopy. Trees and shrubs should be pruned for balance as well as to maintain proper form and branching habit.

c. Cut limbs at branch collar. No stubs should remain on trees. Branch cuts should not gouge outer layer of tree structure or trunk.

2. Root Pruning

a. When excavating with equipment within the root zone area is unavoidable and roots cannot be preserved, root prune prior to excavation to minimize damage to the portion of the root system that will remain.

b. Prune roots using a conventional trenching machine. Trench along the proposed edge of excavation limits to a depth of three feet (3'). Do not allow ripping of roots with a backhoe or other equipment.

c. Following trenching with the machine, re-cut roots measuring one inch (1") in diameter and larger using appropriate sharpened, pruning shears or pruning saws to make a clean, smooth-cut surface. Cut roots flush with edge of soil to limit root exposure.

d. Backfill trench in a manner that will not allow settling using clean, native soil.

3. Fertilizing and Watering

a. Trees should be fertilized in accordance with the American National Standard for tree fertilization ANSI A300 (Part 2) - 1998 Tree, Shrub and Other Woody Plant Maintenance - Standard Practices (Fertilization).

b. Deep root fertilize all trees that have received disturbance or damage to their root zone area.

c. Fertilize entire root zone area within the dripline of the tree and continue ten feet (10') beyond the dripline.

d. Mixture shall be injected into the top ten inches (10") of soil, under pressure of one hundred and fifty pounds per square inch (150 psi) to two

hundred pounds per square inch (200 psi). Mix and apply per product label instructions.

e. Inject one-half gallon (1/2) of solution at a depth of ten inches (10") on spacing of three feet (3') between injection points.

f. Fertilizer shall be mixed in a tank with mechanical agitation.

g. Fertilizer to be added to tank and mixed on site.

h. During periods of inadequate rainfall, water trees once weekly to saturate soil to a depth of six inches (6") to eight inches (8") within root zones. Allow soils to dry between watering. Do not allow soils to remain wet.

4. Water areas currently being served by private sprinkler systems to maintain health of existing landscapes if the affected systems are temporarily taken out of service due to construction activities.

5. Contractor's option with Owner's Representative's permission, shrubs to remain may be temporarily transplanted and returned to original positions under supervision of professional horticulturist.

3.2 PROTECTION

A. Construction Methods

1. General

a. Contractor shall attend a pre-construction meeting conducted by the Owner's Representative to review tree preservation requirements and sequence of services for the construction process.

b. Protect tree limbs, trunks and foliage from direct exposure to hot exhaust from equipment and vehicles by providing adequate exhaust pipe deflectors.

c. Cover exposed roots within 24 hours to reduce damage caused by desiccation. Roots may be covered with soil or mulch to help protect them from drying.

d. Protect root zone areas from damage that may result from soil compaction or from noxious materials in solution caused by run-off or

spillage during mixing and placement of construction materials, or drainage from stored materials.

e. Minimize cut to two inches (2") below grade when installing silt fence within tree root zones or anchor base of fabric on grade using gravel or staples. Do not cut roots 1" in diameter or larger.

f. Site preparation work and/or construction work shall not begin in any area where tree preservation measures have not been completed and approved by the Owner's Representative.

2. Preparation

a. Contractor shall not allow any vehicular traffic, parking of vehicles or stockpiling of excavated material or construction material within the root zone area of trees to be preserved.

b. When access within protected root zone areas by equipment traffic or frequent foot traffic cannot be avoided, contact Owner's Representative for review prior to entrance. Place a three-quarter inch (3/4") thick layer of plywood on natural grade within root zones to minimize soil compaction. Overlap edges of plywood by six inches (6") to twelve inches (12") to ensure adequate coverage. This is not acceptable bridging for driving over exposed tree roots. Exposed roots should not be driven over.

c. Contractor shall notify Owner's Representative if existing tree locations differ from locations represented on construction drawings. The tree location and dripline/root zone area as observed in the field shall supersede that outlined on construction plans.

3. Tree Protection Fencing

a. Each tree located adjacent to proposed soil excavation shall be protected with a tree protection fence or as designated on the plans. Fence locations shall be approved by Owner's Representative.

b. Contractor shall not remove or relocate tree protection fencing and shall not operate within the limits shown without approval of the Owner's Representative.

c. Fences shall be placed in continuous alignment to protect a tree or group of trees.

d. Posts shall be installed on eight-foot (8') centers at eighteen inches (18") below grade. The fencing shall be continuous between posts, shall be

pulled taut prior to securing to posts, and shall be firmly attached to the posts with a minimum of three (3) wire ties.

e. Place fencing in a manner that will not obstruct traffic site lines at curbs, intersections or driveways.

f. Fencing shall be removed only after all work within the immediate area is complete.

g. Contractor shall immediately repair fences if damage occurs at no additional charge to client.

4. Excavation within Root Zone Areas

   a. For excavation within root zone areas, where required for personal safety, provide excavation protection by using vertical-wall-shoring techniques at excavations to minimize excavation width. Do not bench cut or step cut edge where such techniques will encroach on root zone areas.

   b. If roots are encountered and must be severed, roots measuring one inch (1") in diameter and larger shall be cut using a sharpened pruning instrument to leave a smooth, clean-cut surface.

5. Zero Curb Cut and Vapor Barrier Installation

   a. Where existing curb is to be removed within tree root zone areas, do not disturb soil immediately back of curb. Do not allow forms and stakes to disturb roots.

   b. A vapor barrier shall be installed to provide a non-leaching barrier between any stabilized material and/or concrete and tree roots and soils.

   c. Vapor barrier shall be installed vertically to a depth of five inches (5") below limits of stabilized material. Vapor barrier to be extended ten inches (10") above natural grade and ten feet (10') beyond the dripline limits of the tree. Trim vertical vapor barrier to approximately one inch (1") above grade after installation of final grade.

6. Boring/Tunneling

   a. In areas indicated, bore under root systems of trees at a minimum depth of four feet (4') from the top of pipe to the soil surface at natural grade.

   b. Bore pits and receiving pits shall be located outside of protected root zone areas.

   c. Equipment and material shall be positioned outside of protected root zone areas. When access within protected root zone area by equipment traffic or frequent foot traffic cannot be avoided, place a three-quarter inch (3/4")

thick layer of plywood on natural grade within root zones to minimize soil compaction, refer to Section 3. 2, A, 2.

7. Trunk Barricading
   a. Install trunk barricading to protect trees in close proximity of moving or mechanical equipment and construction work when work is required within the tree protection fencing as shown on the plans.
   b. Place trunk barricading around entire tree trunks to protect tree trunks located within five feet (5') of construction activities.
   c. Install 2x4's or 2x6's (5-foot to 6-foot lengths) spaced 3 inches (3") apart around the circumference of the tree trunk.
   d. Tie in place with 9 to 12 gauge steel wire.

B. Sequence of Tree Protection and Services
   1. Fertilize trees affected by construction between the months of October and May.
   2. Prune/trim trees for clearance and safety.
   3. Root Prune trees.
   4. Place tree protection fence and trunk barricades to protect trees. Place fencing prior to any construction activities.
   5. Remove tree protection upon completion of project.

C. Existing Stressed and Declining Trees
   1. Prior to beginning the construction phase, trees located within the right-of-way should be reviewed and trees that appear to be stressed or declining in health should be documented. Immediately notify the Owner's Representative of any dead and dying trees.

D. Accidental Spills of Toxic Materials
   1. Concrete, lime or other chemicals placed or accidentally spilled within root zone protection areas shall be completely removed. Contaminated soil shall be completely removed at the time of the spill and removed by hand shovel. Fresh soil shall be added as necessary to bring the soil level to that of natural grade.

3.3 MAINTENANCE OF NEWLY PLANTED TREES AND REPLANTED TREES

A. Show proof of capacity to water during dry periods.

B. Guarantee trees planted for this Project shall remain alive and healthy at least until end of 1-year warranty period.
   1. Within 4 weeks notice from Owner's Representative, replace dead trees or trees that in opinion of Owner's Representative have become unhealthy,

unsightly or have lost their natural shape as result of additional growth, improper pruning, maintenance or weather conditions.

2. When tree must be replaced, guarantee period begins on date of tree replacement, subject to Owner's Representative's inspection, for no less than 1 year.
3. Straighten leaning trees and bear entire cost.
4. Dispose of trees rejected by Owner's Representative and bear entire cost.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 57 23.02

CONTROL OF GROUND WATER AND SURFACE WATER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

Control of ground water and surface water.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Proposing Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for this Work is included in the total Stipulated Price.

1.3 REFERENCES

A. ASTM D698 – Standard Test Methods for Laboratory Compaction of Soils Using Standard Effort (12,400 ft-lbf/ft3 (600kN-m/m3).

B. Federal Regulations29 CFR Part 1926, Standards-Excavation, Occupational Safety and Health Administration (OSHA).

1.4 DEFINITIONS

A. Ground water control includes both dewatering and depressurization of water-bearing soil layers.

1. Dewatering includes lowering water table and intercepting seepage that would otherwise emerge from slopes or bottoms of excavations, or into tunnels and shafts, and disposing of removed water. Intent of dewatering is to increase stability of tunnel excavations and excavated slopes, prevent dislocation of material from slopes or bottoms of excavations, reduce lateral loads on sheeting and bracing, improve excavating and hauling characteristics of excavated material, prevent failure or heaving of bottom of

excavations, and to provide suitable conditions for placement of backfill materials and construction of structures and other installations.

2. Depressurization includes reduction in piezometric pressure within strata not controlled by dewatering alone, as required to prevent failure or heaving of excavation bottom or instability of tunnel excavations.

B. Excavation drainage includes keeping excavations free of surface and seepage water.

C. Surface drainage includes use of temporary drainage ditches and dikes and installation of temporary culverts and sump pumps with discharge lines as required to protect work from any source of surface water.

D. Equipment and instrumentation for monitoring and control of ground water control system includes piezometers, monitoring wells and flow meters for observing and recording flow rates.

E. Surface water includes water from rainfall, runoff, the SJRA canal, and all other sources not considered ground water.

1.5 PERFORMANCE REQUIREMENTS

A. Provide drainage of seepage water and surface water, as well as water from any other source entering excavation. Excavation drainage may include placement of drainage materials, crushed stone and filter fabric, together with ditches and sump pumping.

B. Provide ditches, berms, pumps, and other methods necessary to divert and drain surface water from excavation and other work areas.

C. Locate ground water control and drainage systems so as not to interfere with utilities, construction operations, adjacent properties, or adjacent water wells.

1.6 SUBMITTALS

A. Conform to requirements of Specification Section 01 33 00 – Submittals.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Comply with requirements of agencies having jurisdiction.

B. Comply with Texas Commission on Environmental Quality regulations and Texas Water Well Drillers Association for development, drilling, and abandonment of wells used in dewatering system.

C. Obtain necessary permits from agencies with control over use of groundwater and matters affecting well installation, water discharge, and use of existing storm drains and natural water sources. Because review and permitting

process may be lengthy, take early action to pursue and submit for required approvals.

D. Filter water discharged from dewatering systems prior to entering drainage ways.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. Use optional equipment and materials as necessary to achieve desired results for dewatering. Selected equipment and materials are subject to review of Owner's Representative through submittals required in Paragraph 1.6, Submittals.

B. Equipment must be in good repair and operating order.

C. Keep sufficient standby equipment and materials available to ensure continuous operation, where required.

PART 3 - EXECUTION

3.1 GROUND WATER CONTROL (NOT USED)

3.2 SURFACE WATER CONTROL

A. Intercept surface water and divert it away from excavations through use of dikes, ditches, curb walls, pipes, sumps or other approved means. Requirement includes temporary works required to protect adjoining properties from surface drainage caused by construction operations.

B. Divert surface water and seepage water into sumps and pump it into drainage channels or storm drains, when approved by agencies having jurisdiction. Provide settling basins when required by agencies.

END OF SECTION

SECTION 01 65 50

PRODUCT DELIVERY, STORAGE, AND HANDLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for product delivery, storage and handling.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Proposing Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 - General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. No payment will be made to Contractor for equipment or materials not properly stored and insured or without approved Shop Drawings.

1. Previous payments for items will be deducted from subsequent progress estimate(s) if proper storage procedures are not observed.

B. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this payment.

1.3 SUBMITTALS

A. Provide Owner project Log Book.

1.4 TRANSPORTATION

A. Make arrangements for transportation, delivery, and handling of equipment and materials required for timely completion of Work.

B. Transport and handle products in accordance with instructions.

C. Consign and address shipping documents to proper party giving name of Project, street number, and city. Shipments shall be delivered to Contractor.

1.5 DELIVERY

A. Scheduling: Schedule delivery of products or equipment as required to allow timely inspection and installation, and to avoid prolonged storage, overburdening of limited storage space, conflicts with other contractors on site. Confirm availability of equipment and personnel for handling products prior to delivery.

B. Packaging: Deliver products or equipment in manufacturer's original unopened and unbroken cartons or other containers designed and constructed to protect the contents from physical or environmental damage.

C. Identification: Clearly and fully mark and identify as to manufacturer, item, and installation location.

D. Protection and Handling: Provide manufacturer's instructions for storage and handling.

PART 2 - PRODUCTS

A. Products: Means material, equipment, or systems forming Work. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of Work. Products may also include existing materials or components designated for reuse.

B. For material and equipment specifically indicated or specified to be reused in the work:

1. Use special care in removal, handling, storage and reinstallation, to assure proper function in completed work.

2. Arrange for transportation, storage and handling of products which require offsite storage, restoration or renovation. Pay all costs for such work.

C. When contract documents require that installation of work comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in installation, including two copies to Owner's Representative. Maintain one set of complete instructions at job site during installation until completion.

D. Provide equipment and components from fewest number of manufacturers as practical, in order to simplify spare parts inventory and allow for maximum interchangeability of components. For multiple components of same size, type, or application, use same make and model of component throughout Project.

PART 3 - EXECUTION

3.1 PROTECTION, STORAGE AND HANDLING

A. Protection:

1. Protect materials in accordance with manufacturer's recommendations and requirements of these Specifications.

   a. Store products or equipment in location to avoid loss or physical damage to items while in storage.

2. Protect equipment from exposure to elements and keep thoroughly dry.

3. When space heaters are provided in equipment, connect and operate heaters during storage until equipment is placed in service.

B. Storage:

1. Store materials in accordance with manufacturer's recommendations and requirements of these Specifications.

2. Make necessary provisions for safe storage of materials and equipment. Place loose soil materials, and materials to be incorporated into Work to

prevent damage to any part of Work or existing facilities and to maintain free access at all times to all parts of Work and to utility service company installations in vicinity of Work. Keep materials and equipment neatly and compactly stored in locations that will cause minimum inconvenience to other contractors, public travel, adjoining owners, tenants, and occupants. Arrange storage to provide easy access for inspection.

3. Restrict storage to areas available on construction site for storage of material and equipment as shown on Drawings or approved by Owner's Representative.
4. Provide off-site storage and protection when on-site storage is not adequate. Provide addresses of and access to off-site storage locations for inspection by Owner's Representative.
5. Do not use lawns, grass plots, or other private property for storage purposes without written permission of owner or other person in possession or control of premises.
6. Store in manufacturers' unopened containers.
7. Neatly, safely, and compactly stack materials delivered and stored along line of Work to avoid inconvenience and damage to property owners and general public, and maintain at least 3 feet from fire hydrant. Keep public, private driveways, and street crossings open.
8. Repair or replace damaged lawns, sidewalks, streets, or other improvements to satisfaction of Owner's Representative. Total length which materials may be distributed along route of construction at one time is 1,000 linear feet, unless otherwise approved in writing by Owner's Representative.

C. Handling:

1. Handle materials in accordance with manufacturer's recommendations and requirements of these Specifications.
2. Coordinate off-loading of materials and equipment delivered to job site. If necessary to move stored materials and equipment during construction, relocate materials and equipment at no additional cost to Owner. Do not allow the off-loading of materials in those parking areas used for crew's personal vehicles.
3. Provide equipment and personnel necessary to handle products by methods to prevent damage to products or packaging.
4. Provide additional protection during handling as necessary to prevent breaking, scraping, marring, or otherwise damaging products or surrounding areas.
5. Handle products by methods to prevent over bending or over stressing.
6. Lift heavy components only at designated lifting points.

7. Do not drop, roll, or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.

3.2 STORAGE FACILITIES (NOT USED)

3.3 FIELD QUALITY CONTROL

A. Inspect Deliveries:

1. Inspect all products or equipment delivered to the site prior to unloading.

a. Reject all products or equipment that are damaged, used, or in any other way unsatisfactory for use on Project.

B. Monitor Storage Area: Monitor storage area to ensure suitable temperature and moisture conditions are maintained as required by manufacturer or as appropriate for particular items.

END OF SECTION

SECTION 01 71 32.16

CONSTRUCTION SURVEYING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for construction surveying.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Proposing Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 QUALITY CONTROL

A. Conform to State of Texas laws for surveys requiring licensed surveyors.

B. Employ land surveyor acceptable to the Owner, if required.

1.3 MEASUREMENT AND PAYMENT

A. No Separate payment will be made for field surveying. Include cost in unit price for Work requiring field surveying.

1.4 SUBMITTALS

A. Conform to requirements of Specification Section 01 33 00 – Submittals.

B. Submit to Owner's Representative name, address, and telephone number of Surveyor before starting survey work.

C. Submit documentation verifying accuracy of survey work on request.

D. Submit certificate signed by surveyor, that elevations and locations of Work are in conformance with Contract.

1.5 PROJECT RECORD DOCUMENTS

A. Maintain complete and accurate log of control and survey Work as it progresses.

B. Prepare certified survey setting forth dimensions, locations, angles, and elevations of construction and site Work upon completion of foundation walls and major site improvements.

C. Submit Record Documents under provisions of Specification Section 01 78 39 – Project Record Documents.

1.6 EXAMINATION

A. Verify locations of survey control points prior to starting Work.

B. Notify Owner's Representative immediately of any discrepancies discovered.

1.7 SURVEY REFERENCE POINTS

A. Control datum for survey established by provided survey as indicated on Contract Drawings. Inform Owner's Representative in advance of time at which horizontal and vertical control points will be established so verification deemed necessary by Owner's Representative may be done with minimum inconvenience to Owner's Representative and minimum delay to Contractor.

B. Locate and protect survey control points prior to starting site work; preserve permanent reference points during construction.

C. Notify Owner's Representative 48 hours in advance of need for relocation of reference points due to changes in grades or other reasons.

D. Report promptly to Owner's Representative loss or destruction of reference point.

E. Contractor to replace permanent reference points disturbed by operations, at no additional cost to the Owner.

1.8 SURVEY REQUIREMENTS

A. Utilize recognized engineering survey practices.

B. Establish minimum of two permanent bench marks on site, referenced to established control points. Record locations with horizontal and vertical data on Project Record Documents.

C. Establish elevations, lines, and levels to provide quantities required for measurement and payment and to provide appropriate controls for Work. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading; fill and topsoil placement; utility locations, slopes, and invert elevations
2. Grid or axis for structures
3. Building foundation, column locations, ground floor elevations

D. Periodically verify layouts by same means.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 74 13

CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes intermediate and final cleaning of Work, not including special cleaning of closed systems specified elsewhere.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.

2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS (NOT USED)

1.4 STORAGE AND HANDLING

A. Store cleaning products and cleaning wastes in containers specifically designed for those materials.

1.5 SCHEDULING

A. Schedule cleaning operations so that dust and other contaminants disturbed by cleaning process will not fall on newly painted surfaces.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents:

1. Compatible with surface being cleaned.

2. New and uncontaminated.

3. For Manufactured Surfaces: Material recommended by manufacturer.

PART 3 - EXECUTION

3.1 CLEANING - GENERAL

A. Prevent accumulation of wastes that create hazardous conditions.

B. Conduct cleaning and disposal operations to comply with laws and safety orders of governing authorities.

C. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains or sewers.

D. Dispose of degradable debris at an approved solid waste disposal site.

E. Dispose of nondegradable debris at an approved solid waste disposal site or in an alternate manner approved by regulatory agencies.

F. Handle materials in a controlled manner with as few handlings as possible.

G. Do not drop or throw materials from heights greater than 4 FT or less than 4 FT if conditions warrant greater care.

H. On completion of work, leave area in a clean, natural looking condition.

1. Remove all signs of temporary construction and activities incidental to construction of required permanent Work.

I. Do not burn on-site.

3.2 INTERIOR CLEANING

A. Cleaning During Construction:

1. Keep work areas clean so as not to hinder health, safety or convenience of personnel in existing facility operations.
2. At maximum weekly intervals, dispose of waste materials, debris, and rubbish.
3. Vacuum clean interior areas when ready to receive finish painting.
   a. Continue vacuum cleaning on an as-needed basis, until Substantial Completion.

B. Final Cleaning:

1. Complete immediately prior to Demonstration Period.
2. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed surfaces.
3. Wipe all lighting fixture reflectors, lenses, lamps and trims clean.
4. Wash and shine glazing and mirrors.
5. Polish glossy surfaces to a clear shine.
6. Ventilating systems:
   a. Clean permanent filters and replace disposable filters if units were operated during construction.

b. Clean ducts, blowers and coils if units were operated without filters during construction.

7. Replace all burned out lamps.
8. Broom clean process area floors.
9. Mop office and control room floors.

3.3 EXTERIOR (SITE) CLEANING

A. Cleaning During Construction:

1. Construction debris:

a. Confine in strategically located container(s):

1) Cover to prevent blowing by wind.

2) Store debris away from construction or operational activities.

3) Haul from site minimum once a week.

b. Remove from work area to container daily.

c. Site clean-up prior to storm events. Thoroughly clean site of all loose or unsecured items which may become airborne or transported by flowing water during storm events.

2. Vegetation: Keep weeds and other vegetation trimmed to 3 IN maximum height.

a. The use of chemical weed control substances should be avoided unless prior Owner approval is received.

3. Soils, sand, and gravel deposited on paved areas and walks:

a. Remove as required to prevent muddy or dusty conditions.

b. Do not flush into storm sewer system.

B. Final Cleaning:

1. Remove trash and debris containers from site.

a. Repair areas disturbed by location of trash and debris containers to Owner’s satisfaction including but not limited to re-seeding, sod

placement, pavement repair, asphalt repair, sidewalk repair, and rut removal and/or fill placement.

2. Clean paved roadways.

3.4 FIELD QUALITY CONTROL

A. Immediately prior to Demonstration Period, conduct an inspection with Owner's Representative to verify condition of all work areas.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for construction waste management and disposal.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Proposing Requirements, Contract Forms, and Conditions of the Contract.

2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. No separate payment will be made for waste material disposal under this Section. Include payment in unit price for related sections.

1.3 SUBMITTALS

A. Conform to requirements of Specification Section 01 33 00 – Submittals.

B. Obtain and submit disposal permits for proposed disposal sites if required by local ordinances. Submit a copy of all disposal permits to the Owner's Representative.

C. Submit copy of written permission from property owner(s) outside limits of Project, with description of property, prior to disposal of excess material. Submit written and signed release from property owner upon completion of

disposal work. Copies of the permission and release documents are to be submitted to the Owner's Representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SALVAGEABLE MATERIAL

A. Excavated Material: When indicated on Drawings, load, haul, and deposit excavated material at location or locations shown on Drawings outside limits of Project.

B. Other Salvageable Materials: Conform to requirements of individual Specification Sections.

C. Coordinate with the Owner's Representative the loading of salvageable material.

3.2 EXCESS MATERIAL

A. Remove and legally dispose of vegetation, rubble, broken concrete, debris, asphaltic concrete pavement, excess soil, and other materials not designated for salvage from job site.

B. Excess soil may be deposited on private property outside the Project limits when written permission is obtained from property owner. See Paragraph 1.3C above.

C. Verify flood plain status of any proposed disposal site. Do not dispose of excavated materials in area designated as within 100-year Flood Hazard Area unless the proper permit has been obtained. Remove excess material placed in "100-year Flood Hazard Area" at no additional cost to the Owner.

D. Remove waste materials from site daily, in order to maintain site in neat and orderly condition, unless otherwise authorized by the Owner.

END OF SECTION

SECTION 01 77 19

CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for closeout of a construction project.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Introductory Information, Proposing Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS (NOT USED)

1.4 SUBSTANTIAL COMPLETION

A. Comply with Specification Section 00 72 00 – General Conditions of the Contract regarding Substantial Completion when Contractor considers the

Work, or portion thereof designated by Owner's Representative, to be substantially complete.

B. Insure the following items have been completed when included in the Work, prior to presenting a list of items to be inspected by Owner's Representative for issuance of a Certificate of Substantial Completion:

1. Cutting, plugging, and abandoning of water, wastewater, and storm sewer lines, as required by specifications for each item;
2. Construction of, and repairs to, pavement, driveways, sidewalks, culverts, headwalls and curbs and gutters;
3. Sodding and hydromulch seeding, unless waived by the Owner in writing;
4. General clean up including signage, lighting, pavement markings, transfer of services, successful testing and landscape;
5. Installation of all bid items included in Specification Section 00 41 00.02 – Proposal Form and approved Contract Document changes.
6. Any additional requirements in Specification Section 01 11 20 – Use of Premises.

C. Assist Owner's Representative with inspection of Contractor's list of items and complete or correct the items, including items added by Owner's Representative, within a time period of 30 days or as mutually agreed.

D. Should Owner's Representative's inspection show failure of Contractor to comply with substantial completion requirements, including those items in

Paragraph 1.2B of this specification, Contractor shall complete or correct the items, before requesting another inspection by Owner's Representative.

1.5 CLOSEOUT PROCEDURES

A. Comply with Specification Section 00 72 00 – General Conditions of the Contract regarding Final Inspection and Final Payment when Work is complete and ready for Owner's Representative's final inspection.

B. Provide Project Record Documents in accordance with Specification Section 01 78 39 – Project Record Documents.

C. Complete or correct items on punch list, with no new items added. Address new items during warranty period.

D. Owner will occupy portions of Work as specified in other Sections.

1.6 FINAL CLEANING

A. Execute final cleaning prior to Final Inspection.

B. For facilities, 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 sanitary condition.

D. Clean or replace filters of operating equipment.

E. Clean debris from roofs, gutters, down spouts, and drainage systems.

F. Clean site; sweep paved areas, rake landscaped surfaces clean.

G. Remove waste and surplus materials, rubbish, and temporary construction facilities from site following final test of utilities and completion of Work.

1.7 ADJUSTING

A. Adjust operating equipment to ensure smooth and unhindered operation in accordance with manufacturer's written instructions. Value of this testing and adjusting is five (5) percent of Lump Sum Amount in Schedule of Values for item being tested.

1.8 OPERATION AND MAINTENANCE DATA

A. Submit operations and maintenance data as noted in Specification Section 01 33 00 – Submittals.

B. Five (5) percent of Lump Sum Amount of each piece of equipment as indicated in Schedule of Unit Price Work or Schedule of Values shall be paid after

required O&M data submissions are received and approved by Owner's Representative.

1.9 WARRANTY

A. Provide one original and two copies of each warranty from subcontractors, suppliers, and manufacturers.

B. Provide Table of Contents and assemble warranties in three-ring/D binder with durable plastic cover.

C. Submit warranties prior to final progress payment.

D. Warranties shall commence in accordance with requirements in Specification Section 00 72 00 – General Conditions of the Contract.

1.10 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance, and extra materials in quantities specified in individual Specification sections.

B. Deliver to location as directed by Owner's Representative; obtain receipt prior to final Payment Application.

1.11 TEXAS DEPARTMENT OF LICENSING AND REGULATION (TDLR) INSPECTION

A. Contact TDLR's Houston Regional Office, 5425 Polk Street, Houston, Texas, 77023, telephone 713-924-6303, fax 713-921-3106, to schedule an inspection for ADA compliance prior to final completion.

B. Provide results of TDLR's inspection to Owner's Representative prior to final inspection.

1.12 FINAL PHOTOS

A. Provide per Specification Section 01 32 36.01 – Project Photographs.

1.13 PROJECT RECORD DOCUMENTS

A. Provide per Specification Section 01 78 39 – Project Record Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Maintenance and Submittal.
2. Recording.
3. Submittals.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Proposing Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Maintain one record copy of documents at site in accordance with Specification Section 00 72 00 – General Conditions of the Contract.

B. Store Record Documents and samples in field office when field office is required by Contract, or in secure location. Provide files, racks, and secure storage for Record Documents and samples.

C. Label each document “PROJECT RECORD” in neat, large, printed letters.

D. Maintain Record Documents in clean dry and legible condition. Do not use Record Documents for construction purposes.

E. Keep Record Documents and Samples available for inspection by Owner’s Representative.

F. Bring Record Drawings to progress review meetings for viewing by Owner’s Representative.

1.4 RECORDING

A. Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

B. Contract Drawings: Legibly mark each item to record actual construction, or “as built” conditions, including:

1. Measured depths of elements of foundation in relation to finish first floor datum.

2. Measured horizontal locations and elevations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Elevations of underground utilities referenced to bench mark utilized for Project.
4. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
5. Field changes of dimension and detail.
6. Modifications made by Change Order.
7. Details not on original Contract Drawings.
8. References to related shop drawings and modifications.

C. Maintain on site at all times an instrument for accurately measuring elevations. Survey every joint of water main at time of construction and record on drawings water main invert elevation, including elevation top of manway and centerline horizontal location relative to baseline.

D. Record information with red felt-tip marking pen on set of blue line opaque drawings.

E. Legibly mark Record Drawings to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
2. Changes made by Change Order or Field Order.
3. Other matters not originally specified.

F. Legibly annotate shop drawings to record changes made after review.

1.5 SUBMITTALS

A. At Contract closeout, deliver Project Record Documents to Owner's Representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02 41 13.13
REMOVING EXISTING PAVEMENTS AND STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Removing concrete pavement, asphaltic concrete pavement, brick pavement, and base courses.
2. Removing concrete curbs, concrete curbs and gutters, sidewalks, and driveways.
3. Removing pipe culverts, sewers, and sewer leads.
4. Removing existing inlets and manholes.
5. Removing and disposing of pre-stressed concrete beams and drill shafts.
6. Removing miscellaneous structures of concrete or masonry.
7. Removing existing bridge.
8. Regulatory Requirements

B. Related Specifications Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements Contract Forms and Conditions of the Contract
2. Division 01 – General Requirements
3. Section 32 12 16 – Asphaltic Concrete Vehicular Pavement

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Including all types and thicknesses of concrete pavement, asphaltic concrete pavement, brick pavement, asphalt overlays, base courses for roads, parking areas, curbs, curbs and gutters, sidewalks and driveways, culverts, headwalls, ditch liners, storm and sanitary sewers and sewer leads, manholes, inlets, pipe replacement, timber structures, steel structures, handling of hazardous materials and other miscellaneous structures of concrete and masonry.

1. Include the cost of associated items for this project in the following items:
   a. For removal of concrete pavement, include in price for construction of project.

1.3 SUBMITTALS (NOT USED)

1.4 WORK INCLUDED

A. Furnish labor, materials, equipment and incidentals necessary for every type of required demolition.

B. Furnish equipment of every type required to demolish and transport construction debris away from the Site.

1.5 STANDARDS

A. Work shall be performed in accordance with the codes and ordinances of the agency having jurisdiction over the Place of Record.

B. Coordinate removal work with utility companies.

C. Occupational Safety and Health Association (OSHA), 29CFR Parts 1010 and 1926, “Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite”, 40 CPR Part 61 - “National Emission Standard for Hazardous Air Pollutants”

1.6 DELIVERY AND STORAGE

A. Stockpile construction debris at the Site only as long as necessary to haul to a disposal site. Stack materials neatly and handle in an orderly manner until removed from the Site.

1.7 JOB CONDITIONS

A. Contractor shall visit the Site and determine the extent of demolition required and the Site conditions that might affect his proposal. Include costs of covering all aspects of the demolition as part of the proposal.

B. The Drawings shall be carefully reviewed to determine the extent of necessary demolition and to identify elements of the existing construction which are to remain in place. Report any discrepancies to Owner and Engineer before disturbing existing conditions. Property lines and limits of demolition shall be accurately located prior to beginning site demolition. Start of demolition activities shall represent confirmation by Contractor that existing conditions are as presented in the Contract Documents. Demolition outside the limits indicated on the Drawings, or outside the property lines shall not be performed.

C. For electrical demolition, verify field measurements and circuiting arrangements are as shown on the Drawings. Verify that existing wiring and equipment serve only abandoned facilities.

D. Material removed during demolition, and any equipment not otherwise designated to remain the property of the Owner, shall become the property of the Contractor and shall be promptly removed from the Site.

E. Equipment and material designated as remaining the property of the Owner shall be removed from the structure and transported to a designated location on the Site and stored for the Owner’s use. Store on wood runners raised above the surrounding grade and cover with weather resistant covering that is tied securely in place.

F. Take necessary precautions in removing Owner designated property to prevent damage during the demolition process. Equipment shall be removed in one piece. Loose components may be removed separately. Controls and electrical equipment may be removed from the equipment and handled separately. Large units, such as motor driven pumps, may be dismantled and motors handled separately. Do not use a cutting torch to separate the Owner's equipment or material. Salvaged piping shall be taken apart at flanges or fittings and removed in sections.

G. The Owner's designated property shall include:

1.8 HAZARDOUS MATERIALS (NOT USED)

1.9 WARRANTY (NOT USED)

PART 2 - PRODUCTS

A. New materials and equipment for patching and extending work shall meet the requirements of the individual Sections in these Contract Documents. For materials not addressed in these documents, materials used shall meet or exceed the dimensions and quality of the existing work.

PART 3 - EXECUTION

3.1 PREPARATION

A. Obtain advance approval from Owner's Representative for dimensions and limits of removal work.

B. Contractor shall be responsible for obtaining location of underground utilities at the Site and stake and flag locations. Known existing underground utilites as shown in Construction Drawings are based on best available information at the time of preparation of these construction documents. Arrange for all applicable utility companies to accurately locate underground piping and set color-coded flags along the project limits. Investigate utility company's records to ascertain depths and sizes of piping and other ancillary features.

1. In the event that exact location of utility cannot be obtained, dig test holes as necessary to establish location of utility. Contractor shall not use mechanical digging machines within 6 feet of any active buried utility. For a distance of 4 feet on either side of buried utility, all digging shall be by hand excavation. If the utility is not active, or is to be abandoned or removed, any form of excavation may be used.

3.2 PROTECTION

A. Protect following from damage or displacement:

1. Adjacent public and private property.

2. Trees, plants, and other landscape features designated to remain.
3. Utilities designated to remain.
4. Pavement and utility structures designated to remain.
5. Bench marks, monuments, and existing structures designated to remain.

3.3 REMOVALS

A. Remove pavements and structures by methods that will not damage underground utilities. Do not use drop hammer near existing underground utilities.

B. Minimize amount of earth loaded during removal operations.

C. Where existing pavement is to remain, make straight saw cuts in existing pavement to provide clean breaks prior to removal. Do not break concrete pavement or base with drop hammer unless concrete or base has been saw cut to minimum depth of 2 inches.

D. Unless otherwise shown and detailed on the plans, when street and driveway saw cut location is greater than one-half of a pavement lane width, remove pavement for full lane width or to nearest longitudinal joint as directed by Owner's Representative.

E. Remove sidewalks and curbs to nearest existing dummy, expansion, or construction joint.

3.4 BACKFILL

A. Backfill cavities resulting from demolition. Fill cavities occurring within the limits of buildings, structures, or pavements in accordance with the requirements Section 31 23 16.16 – Structural Excavation for Minor Structures. Backfill and compact cavities outside the construction limits to the same density as the surrounding earth. No testing is required for backfill outside the limits of new construction.

3.5 DISPOSAL

A. Disposal shall be in accordance with requirements of Section 01 74 19 – Construction Waste Management and Disposal.

B. Remove from site, debris resulting from work under this section in accordance with requirements of Specification Section 01 74 19 – Construction Waste Management and Disposal.

3.6 OWNER TRAINING (NOT USED)

END OF SECTION

SECTION 03 09 00

CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete and grout.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 - General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. Referenced Standards shall mean the standard, specification, manual, code, or Legal Requirements in effect at the time of opening of Bids/Proposals (or on the Effective Date of the Agreement if there were no Bids/Proposals) and as amended, modified, codified or reenacted, in whole or in part, and in effect from time to time.
2. American Concrete Institute (ACI):
    a. 116R, Cement and Concrete Terminology.
    b. 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
    c. 212.3R, Chemical Admixtures for Concrete.
    d. 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
    e. 304.2R, Placing Concrete by Pumping Methods.
    f. 305R, Hot Weather Concreting.
    g. 306R, Cold Weather Concreting.
    h. 318, Building Code Requirements for Structural Concrete.
    i. 347R, Recommended Practice for Concrete Formwork.
3. ASTM International (ASTM):

a. A82, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

b. A185, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

c. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

d. A775, Standard Specification for Epoxy-Coated Steel Reinforcing Bars.

e. C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field.

f. C33, Standard Specification for Concrete Aggregates.

g. C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

h. C94, Standard Specification for Ready-Mixed Concrete.

i. C138, Standard Method of Test for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.

j. C143, Standard Test Method for Slump of Hydraulic Cement Concrete.

k. C150, Standard Specification for Portland Cement.

l. C157, Standard Test Method for Length Change of Hardened Hydraulic-Cement, Mortar, and Concrete.

m. C172, Standard Practice for Sampling Freshly Mixed Concrete.

n. C173, Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

o. C231, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

p. C260, Standard Specification for Air-Entraining Admixtures for Concrete.

q. C289, Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).

r. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

s. C494, Standard Specification for Chemical Admixtures for Concrete.

t. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

u. C1315, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.

v. D882, Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

w. D994, Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).

x. D1056, Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.

y. D1709, Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.

z. D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

aa. E96, Standard Test Methods for Water Vapor Transmission of Materials.

bb. E329, Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.

cc. E1745, Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

4. Corps of Engineers (COE):

   a. CRD-C572, Specifications for Polyvinylchloride Waterstops.

   b. CRD-C621, Standard Specification for Packaged, Dry, Hydraulic-Cement Grout (Nonshrink).

B. Quality Control:

1. Concrete testing agency:

   a. Contractor to employ and pay for services of a testing laboratory to:

      1) Perform materials evaluation.

      2) Design concrete mixes.

   b. Concrete testing agency to meet requirements of ASTM E329.

2. Do not begin concrete production until proposed concrete mix design has been approved by Owner's Representative.

   a. Approval of concrete mix design by Owner's Representative does not relieve Contractor of his responsibility to provide concrete that meets the requirements of this Specification.

3. Adjust concrete mix designs when material characteristics, job conditions, weather, strength test results or other circumstances warrant.

   a. Do not use revised concrete mixes until submitted to and approved by Owner's Representative.

4. Perform structural calculations as required to prove that all portions of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its own weight plus the loads placed thereon.

C. Qualifications:

1. Ready mixed concrete batch plant certified by National Ready Mixed Concrete Association (NRMCA).
2. Formwork, shoring and reshoring for slabs and beams except where cast on ground to be designed by a professional engineer currently registered in the state where the Project is located.

1.4 DEFINITIONS

A. Per ACI 116R except as modified herein:

1. Concrete fill: Non-structural concrete.
2. Concrete Testing Agency: Testing agency employed to perform materials evaluation, design of concrete mixes or testing of concrete placed during construction.
3. Exposed concrete: Exposed to view after construction is complete.
4. Indicated: Indicated by Contract Documents.
5. Lean concrete: Concrete with low cement content.
6. Nonexposed concrete: Not exposed to view after construction is complete.
7. Required: Required by Contract Documents.
8. Specified strength: Specified compressive strength at 28 days.
9. Submitted: Submitted to Owner's Representative.

1.5 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Concrete mix designs proposed for use.
   a. Concrete mix design submittal to include the following information:
      1) Sieve analysis and source of fine and coarse aggregates.
      2) Test for aggregate organic impurities.
      3) Test for deleterious aggregate per ASTM C289.
      4) Proportioning of all materials.
      5) Type of cement with mill certificate for cement.
      6) Type of fly ash with certificate of conformance to specification requirements.
      7) Slump.
      8) Air content.

9) Brand, type, ASTM designation, and quantity of each admixture proposed for use.

10) 28-day cylinder compressive test results of trial mixes per ACI 318 and as indicated herein.

11) Shrinkage test results.

12) Standard deviation value for concrete production facility.

3. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's installation instructions.
   c. Manufacturers and types:
      1) Joint fillers.
      2) Curing agents.
      3) Chemical sealer.
      4) Bonding and patching mortar.
      5) Construction joint bonding adhesive.
      6) Non-shrink grout with cure/seal compound.
      7) Waterstops.
4. Reinforcing steel:
   a. Show grade, sizes, number, configuration, spacing, location and all fabrication and placement details.
   b. In sufficient detail to permit installation of reinforcing without having to make reference to Contract Drawings.
   c. Obtain approval of Shop Drawings by Owner’s Representative before fabrication.
   d. Mill certificates.
5. Strength test results of in place concrete including slump, air content and concrete temperature.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Storage of Material:
   1. Cement and fly ash:
      a. Store in moistureproof, weathertight enclosures.
      b. Do not use if caked or lumpy.
   2. Aggregate:

a. Store to prevent segregation and contamination with other sizes or foreign materials.

b. Obtain samples for testing from aggregates at point of batching.

c. Do not use frozen or partially frozen aggregates.

d. Do not use bottom 6 IN of stockpiles in contact with ground.

e. Allow sand to drain until moisture content is uniform prior to use.

3. Admixtures:

a. Protect from contamination, evaporation, freezing, or damage.

b. Maintain within temperature range recommended by manufacturer.

c. Completely mix solutions and suspensions prior to use.

4. Reinforcing steel: Support and store all rebars above ground.

B. Delivery:

1. Concrete:

a. Prepare a delivery ticket for each load for ready-mixed concrete.

b. Truck operator shall hand ticket to Owner's Representative at the time of delivery.

c. Ticket to show:

1) Mix identification mark.

2) Quantity delivered.

3) Amount of each material in batch.

4) Outdoor temp in the shade.

5) Time at which cement was added.

6) Numerical sequence of the delivery.

7) Amount of water added.

2. Reinforcing steel:

a. Ship to jobsite with attached plastic or metal tags with permanent mark numbers.

b. Mark numbers to match Shop Drawing mark number.

1.7 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following products and manufacturers are acceptable:

1. Nonshrink, nonmetallic grout:
   a. Sika "SikaGrout 212."
   b. Euclid Chemial "NS Grout."
   c. BASF Admixtures, Inc. "Masterflow 713."
2. Epoxy grout:
   a. BASF Admixtures, Inc. "Brutem MPG."
   b. Euclid Chemical Company, "E3-G."
   c. Fosroc, "Conbextra EPHF".
3. Expansion joint fillers:
   a. Permaglaze Co.
   b. Rubatex Corp.
   c. Williams Products, Inc.
4. Waterstops, PVC:
   a. Greenstreak Plastic Products, Inc.
   b. W.R.Meadows, Inc.
   c. Burke Company.
5. Form coating:
   a. Richmond "Rich Cote."
   b. Industrial Lubricants "Nox-Crete Form Coating."
   c. Euclid Chemical "Eucoslip VOX."
6. Prefabricated forms:
   a. Simplex "Industrial Steel Frame Forms."
   b. Symons "Steel Ply."
   c. Universal "Uniform."
7. Chemical sealer:
   a. L&M Construction Chemicals, Inc.
   b. Euclid Chemical Company.
   c. Dayton Superior.

8. Bonding agent:
    a. Euclid Chemical Co.
    b. BASF Admixtures, Inc.
    c. L&M Construction Chemicals Inc.

B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 MATERIALS

A. Portland Cement: Conform to ASTM C150 Type I/II.

B. Fly Ash:
1. ASTM C618, Class F or Class C.
2. Nonstaining.
    a. Hardened concrete containing fly ash to be uniform light gray color.
3. Maximum loss on ignition: 4 percent.
4. Compatible with other concrete ingredients.
5. Obtain proposed fly ash from a source approved by the State Highway Department in the state where the Project is located for use in concrete for bridges.

C. Admixtures:
1. Air entraining admixtures: ASTM C260.
2. Water reducing, retarding, and accelerating admixtures:
    a. ASTM C494 Type A through E.
    b. Conform to provisions of ACI 212.3R.
    c. Do not use retarding or accelerating admixtures unless specifically approved in writing by Owner's Representative and at no cost to Owner.
    d. Follow manufacturer's instructions.
    e. Use chloride free admixtures only.
3. Maximum total water soluble chloride ion content contributed from all ingredients of concrete including water, aggregates, cementitious materials and admixtures by weight percent of cement:
    a. 0.10 all concrete.
4. Do not use calcium chloride.
5. Pozzolanic admixtures: ASTM C618.
6. Provide admixtures of same type, manufacturer and quantity as used in establishing required concrete proportions in the mix design.

D. Water: Potable, clean, free of oils, acids and organic matter.

E. Aggregates:
   1. Normal weight concrete: ASTM C33, except as modified below.
   2. Fine aggregate:
      a. Clean natural sand.
      b. No manufactured or artificial sand.
   3. Coarse aggregate:
      a. Crushed rock, natural gravel, or other inert granular material.
      b. Maximum amount of clay or shale particles: 1 percent.
   4. Gradation of coarse aggregate:
      a. Lean concrete and concrete topping: Size #7.
      b. All other concrete: Size #57 or #67.

F. Concrete Grout:
   1. Nonshrink nonmetallic grout:
      a. Nonmetallic, noncorrosive, nonstaining, premixed with only water to be added.
      b. Grout to produce a positive but controlled expansion.
      c. Mass expansion not to be created by gas liberation.
      d. Minimum compressive strength of nonshrink grout at 28 days: 6500 psi.
      e. In accordance with COE CRD-C621.
   2. Epoxy grout:
      a. 3-component epoxy resin system.
         1) Two liquid epoxy components.
         2) One inert aggregate filler component.
      b. Each component packaged separately for mixing at jobsite.

G. Reinforcing Steel:
   1. Reinforcing bars: ASTM A615, Grade 60.
   2. Welded wire reinforcement: ASTM A185.
      a. Minimum yield strength: 60,000 psi.
   3. Column spirals: ASTM A82.

H. Forms:
   1. Prefabricated or job built.
   2. Wood forms:
      a. New 5/8 or ¾ IN 5-ply structural plywood of concrete form grade.

b. Built-in-place or prefabricated type panel.

c. 4 x 8 FT sheets for built-in-place type except where smaller pieces will cover entire area.

d. When approved, plywood may be reused.

3. Metal forms:

a. Metal forms excluding aluminum may be used.

b. Forms to be tight to prevent leakage, free of rust and straight without dents to provide members of uniform thickness.

4. Chamfer strips: Clear white pine, surface against concrete planed.

5. Form ties:

a. Removable end, permanently embedded body type with cones on outer ends not requiring auxiliary spreaders.

b. Cone diameter: 3/4 IN minimum to 1 IN maximum.

c. Embedded portion 1-1/2 IN minimum back from concrete face.

d. If not provided with threaded ends, constructed for breaking off ends without damage to concrete.

e. Provide ties with built-in waterstops at all walls that will be in contact with process liquid during plant operation.

6. Form release: Nonstaining and shall not prevent bonding of future finishes to concrete surface.

I. Waterstops:

1. Plastic: COE CRD-C572.

2. Serrated with center bulb.

3. Thickness: 3/8 IN.

4. Length (general use): 6 IN unless indicated otherwise.

5. Expansion joints:

a. Length: 9 IN.

b. Center bulb: 1 IN OD x 1/2 IN ID.

6. Provide hog rings or grommets spaced at maximum 12 IN OC along the length of the water stop.

7. Provide factory made waterstop fabrications at all changes of direction, intersections and transitions leaving only straight butt splices for the field.

J. Chairs, Runners, Bolsters, Spacers, and Hangers:

1. Stainless steel, epoxy coated, plastic, brick, or plastic coated metal.

a. Plastic coated: Rebar support tips in contact with the forms only.

K. Chemical Floor Sealer:
   1. Colorless low VOC water-based solution containing acrylic copolymers.
      a. ASTM C1315, Class B, minimum 30 percent solids.
   2. L&M Construction Chemicals Inc. Dress & Seal WB 30.

L. Vapor Retarder:
   1. ASTM E1745, Class A, minimum 15 mil thickness.
   2. Water vapor permeance: 0.03 maximum per ASTM E96.
   3. Puncture resistance: ASTM D1709, Method B, 2200 grams.
   4. Minimum tensile strength: 45 LBS/IN, ASTM D882.
   5. Vapor retarder tape: As recommended by vapor retarder manufacturer.

M. Membrane Curing Compound:
   1. ASTM C309, Type I-D.
   2. Resin based, dissipates upon exposure to UV light.
   3. Curing compound shall not prevent bonding of any future coverings, coatings or finishes.
   4. Curing compounds used in water treatment plant construction to be nontoxic and taste and odor free.

N. Bonding Agent:
   1. High solids acrylic latex base liquid for interior or exterior application as a bonding agent to improve adhesion and mechanical properties of concrete patching mortars.
   2. Euclid Chemical Co. "Flex-Con."
   3. BASF Admixtures, Inc. "Acryl-Set."
   4. L&M Construction Chemicals "Everbond."
   5. Thoro System Products "Acryl 60."

O. Expansion Joint Filler:
   1. In contact with water or sewage:
      a. Closed cell neoprene.
      b. ASTM D1056, Class SC (oil resistant and medium swell) of 2 to 5 psi compression deflection (Grade SCE41).
   2. Exterior driveways, curbs and sidewalks:
      a. Asphalt expansion joint filler.
      b. ASTM D994.
   3. Other use:

a. Fiber expansion joint filler.

b. ASTM D1751.

2.3 CONCRETE MIXES

A. General:

1. All concrete to be ready mixed concrete conforming to ASTM C94.
2. Provide concrete of specified quality capable of being placed without segregation and, when cured, of developing all properties required.
3. All concrete to be normal weight concrete.

B. Strength:

1. Provide specified strength and type of concrete for each use in structure(s) as follows:

TYPE	WEIGHT	SPECIFIED STRENGTH*
Concrete fill	Normal weight	3000 psi
Lean concrete	Normal weight	3000 psi
Concrete topping	Normal weight	4000 psi
All other general use concrete	Normal weight	4000 psi

* Minimum 28-day compressive strength.

C. Air Entrainment:

1. Provide air entrainment in all concrete resulting in a total air content percent by volume as follows:

MAX AGGREGATE SIZE	TOTAL AIR CONTENT PERCENT
1 IN or 3/4 IN	5 to 7
1/2 IN	5 1/2 to 8

2. Air content to be measured in accordance with ASTM C231, ASTM C173, or ASTM C138.

D. Slump - 4 IN maximum, 1 IN minimum:

1. Measured at point of discharge of the concrete into the concrete construction member.
2. Concrete of lower than minimum slump may be used provided it can be properly placed and consolidated.
3. Pumped concrete:

a. Provide additional water at batch plant to allow for slump loss due to pumping.

b. Provide only enough additional water so that slump of concrete at discharge end of pump hose does not exceed maximum slump specified above.

4. Determine slump per ASTM C143.

E. Selection of Proportions:

1. General:

a. Proportion ingredients to:

1) Produce proper workability, durability, strength, and other required properties.

2) Prevent segregation and collection of excessive free water on surface.

2. Minimum cement contents and maximum water cement ratios for concrete to be as follows:

SPECIFIED STRENGTH	MINIMUM CEMENT, LB/CY MAXIMUM AGGREGATE SIZE 1/2 IN	3/4 IN	1 IN	MAXIMUM WATER CEMENT RATIO BY WEIGHT
3000	---	517	517	0.45
4000	611	611	611	0.45
5000	---	686	665	0.40

3. Substitution of fly ash: Maximum of 25 percent by weight of cement at rate of 1 LB fly ash for 1 LB of cement.

4. Sand cement grout:

a. Three parts sand.

b. One part Portland cement.

c. Entrained air: Six percent plus or minus one percent.

d. Sufficient water for required workability.

e. Minimum 28-day compressive strength: 3,000 psi.

5. Pan stair fill:

a. Coarse aggregate: 100 percent passing a 1/2 IN sieve.

b. Proportions:

1) 1 sack cement.

2) 150 LBS coarse aggregate.

3) 150 LBS fine aggregate (sand).

c. Adjust mix to obtain satisfactory finishing.

6. Normal weight concrete:

a. Proportion mixture to provide desired characteristics using one of methods described below:

1) Method 1 (Trial Mix): Per ACI 318, Chapter 5, except as modified herein.

a) Air content within range specified above.

b) Record and report temperature of trial mixes.

c) Proportion trial mixes per ACI 211.1.

2) Method 2 (Field Experience): Per ACI 318, Chapter 5, except as modified herein:

a) Field test records must be acceptable to Owner's Representative to use this method.

b) Test records shall represent materials, proportions and conditions similar to those specified.

7. Required average strength to exceed the specified 28-day compressive strength by the amount determined or calculated in accordance with the requirements of Paragraph 5.3 of ACI 318 using the standard deviation of the proposed concrete production facility as described in Paragraph 5.3.1 of ACI 318.

F. Allowable Shrinkage: 0.048 percent per ASTM C157.

PART 3 - EXECUTION

3.1 FORMING AND PLACING CONCRETE

A. Formwork:

1. Contractor is responsible for design and erection of formwork.
2. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position.

a. Allowable tolerances: As recommended in ACI 347R.

3. Provide slabs and beams of minimum indicated depth when sloping foundation base slabs or elevated floor slabs to drains.

a. For slabs on grade, slope top of subgrade to provide floor slabs of minimum uniform indicated depth.

b. Do not place floor drains through beams.

4. Openings: Provide openings in formwork to accommodate work of other trades.
   a. Accurately place and securely support items built into forms.
5. Chamfer strips: Place 3/4 IN chamfer strips in forms to produce 3/4 IN wide beveled edges on permanently exposed corners of members.
6. Clean and adjust forms prior to concrete placement.
7. Tighten forms to prevent mortar leakage.
8. Coat form surfaces with form release agents prior to placing reinforcing bars in forms.

B. Reinforcement:
1. Position, support and secure reinforcement against displacement.
2. Locate and support with chairs, runners, bolsters, spacers and hangers, as required.
3. Set wire ties so ends do not touch forms and are directed into concrete, not toward exposed concrete surfaces.
4. Lap splice lengths: ACI 318 Class B top bar tension splices unless indicated otherwise on the Drawings.
5. Extend reinforcement to within 2 IN of concrete perimeter edges.
   a. If perimeter edge is earth formed, extend reinforcement to within 3 IN of the edge.
6. Minimum concrete protective covering for reinforcement: As shown on Drawings.
7. Do not weld reinforcing bars.
8. Welded wire reinforcement:
   a. Install welded wire reinforcement in maximum practical sizes.
   b. Splice sides and ends with a splice lap length measured between outermost cross wires of each fabric sheet not less than:
      1) One spacing of cross wires plus 2 IN.
      2) 1.5 x development length.
      3) 6 IN.
   c. Development length: ACI 318 basic development length for the specified fabric yield strength.
9. Provide at locations indicated.
10. Locate construction joints in floor slabs and foundation base slabs so that concrete placements are approximately square and do not exceed 2500 SF.
11. Locate construction joints in beams and girders:

a. At the middle of the span, unless a beam intersects a girder at that point.

b. If the middle of the span is at an intersection of a beam and girder, offset the joint in the girder a distance equal to twice the beam width.

c. Provide satisfactory means for transferring shear and other forces through the construction joint.

12. Locate construction joints in suspended slabs:

a. At or near the center of span in flat slab or T-beam construction.

b. Do not locate a joint between a slab and a concrete beam or girder unless so indicated on Drawings.

13. In pan-formed joists:

a. At or near span center when perpendicular to the joists.

b. Centered in the slab, midway between joists, when parallel to the joists.

14. Install construction joints perpendicular to main reinforcement with all reinforcement continued across construction joints.

15. At least 48 HRS shall elapse between placing of adjoining concrete construction.

16. Thoroughly clean and remove all laitance and loose and foreign particles from construction joints.

17. Before new concrete is placed, coat all construction joints with an approved bonding adhesive used and applied in accordance with manufacturer's instructions.

C. Embedments:

1. Set and build in anchorage devices and other embedded items required for other work that is attached to, or supported by concrete.

2. Use setting diagrams, templates and instructions for locating and setting.

3. Secure waterstops in correct position using hog rings or grommets spaced along the length of the waterstop and wire tie to adjacent reinforcing steel.

D. Placing Concrete:

1. Place concrete in compliance with ACI 304R and ACI 304.2R.

2. Place in a continuous operation within planned joints or sections.

3. Begin placement when work of other trades affecting concrete is completed.

4. Place concrete by methods which prevent aggregate segregation.

5. Do not allow concrete to free fall more than 4 FT.

6. Where free fall of concrete will exceed 4 FT, place concrete by means of tremie pipe or chute.

E. Consolidation: Consolidate all concrete using mechanical vibrators supplemented with hand rodding and tamping, so that concrete is worked around reinforcement and embedded items into all parts of forms.

F. Protection:

1. Protect concrete from physical damage or reduced strength due to weather extremes.
2. In cold weather comply with ACI 306R except as modified herein.
   a. Do not place concrete on frozen ground or in contact with forms or reinforcing bars coated with frost, ice or snow.
   b. Minimum concrete temperature at the time of mixing:

OUTDOOR TEMPERATURE AT PLACEMENT (IN SHADE)	CONCRETE TEMPERATURE AT MIXING
Below 30 DegF	70 DegF
Between 30-45 DegF	60 DegF
Above 45 DegF	50 DegF

   c. Do not place heated concrete that is warmer than 80 DegF.
   d. If freezing temperatures are expected during curing, maintain the concrete temperature at or above 50 DegF for 7 days or 70 DegF for 3 days.
   e. Do not allow concrete to cool suddenly.
3. In hot weather comply with ACI 305R except as modified herein.
   a. At air temperature of 95 DegF and above, keep concrete as cool as possible during placement and curing.
   b. Do not allow concrete temperature to exceed 95 DegF at placement.
   c. Prevent plastic shrinkage cracking due to rapid evaporation of moisture.
   d. Do not place concrete when the actual or anticipated evaporation rate equals or exceeds 0.2 LBS/SF/HR as determined from ACI 305R, Figure 2.1.5.

G. Curing:

1. Begin curing concrete as soon as free water has disappeared from exposed surfaces.
2. Cure concrete by use of moisture retaining cover, burlap kept continuously wet or by membrane curing compound.
3. Provide protection as required to prevent damage to concrete and to prevent moisture loss from concrete during curing period.

4. Provide curing for minimum of 7 days.
5. Form materials left in place may be considered as curing materials for surfaces in contact with the form materials except in periods of hot weather.
6. In hot weather follow curing procedures outlined in ACI 305R.
7. In cold weather follow curing procedures outlined in ACI 306R.
8. If forms are removed before 7 days have elapsed, finish curing of formed surfaces by one of above methods for the remainder of the curing period.
9. Curing vertical surfaces with a curing compound:
    a. Cover vertical surfaces with a minimum of two coats of the curing compound.
    b. Allow the preceding coat to completely dry prior to applying the next coat.
    c. Apply the first coat of curing compound immediately after form removal.
    d. Vertical surface at the time of receiving the first coat shall be damp with no free water on the surface.
    e. A vertical surface is defined as any surface steeper than 1 vertical to 4 horizontal.

H. Form Removal:
1. Remove forms after concrete has hardened sufficiently to resist damage from removal operations or lack of support.
2. Where no reshoring is planned, leave forms and shoring used to support concrete until it has reached its specified 28-day compressive strength.

3.2 CONCRETE FINISHES

A. Tolerances:
1. Class A: 1/8 IN in 10 FT.
2. Class B: 1/4 IN in 10 FT.

B. Surfaces Exposed to View:
1. Provide a smooth finish for exposed concrete surfaces and surfaces that are:
    a. To be covered with a coating or covering material applied directly to concrete.
    b. Scheduled for grout cleaned finish.
2. Remove fins and projections, and patch voids, air pockets, and honeycomb areas with cement grout.
3. Fill tie holes with nonshrink nonmetallic grout.

C. Surfaces Not Exposed to View:
1. Patch voids, air pockets and honeycomb areas with cement grout.

2. Fill tie holes with nonshrink nonmetallic grout.

D. Grout Cleaned Finish:

1. Mix one part Portland cement and 1-1/2 parts fine sand with sufficient bonding agent/water mixture to produce a grout with the consistency of thick paint.
   a. White Portland cement shall be substituted for gray Portland cement to produce a color that matches color of surrounding concrete as determined by trial patch for areas not to be painted.
2. Wet surface of concrete to prevent absorption of water by grout and uniformly apply grout with brushes or spray gun.
3. Immediately scrub the surface with a cork float or stone to coat and fill air bubbles and holes.
4. While grout is still plastic, remove all excess grout by working surface with rubber float, sack or other approved means.
5. After the surface whitens from drying, rub vigorously with clean burlap.
6. Keep final finish damp for a minimum of 36 HRS after final rubbing.

E. Slab Float Finish:

1. After concrete has been placed, consolidated, struck off, and leveled, do no further work until ready for floating.
2. Begin floating when water sheen has disappeared and surface has stiffened sufficiently to permit operation.
3. During or after first floating, check planeness of entire surface with a 10 FT straightedge applied at not less than two different angles.
4. Cut down all high spots and fill all low spots during this procedure to produce a surface within Class B tolerance throughout.
5. Refloat slab immediately to a uniform sandy texture.

F. Troweled Finish:

1. Float finish surface.
2. Next power trowel, and finally hand trowel.
3. Produce a smooth surface which is relatively free of defects with first hand troweling.
4. Perform additional trowelings by hand after surface has hardened sufficiently.
5. Final trowel when a ringing sound is produced as trowel is moved over surface.
6. Thoroughly consolidate surface by hand troweling.

7. Leave finished surface essentially free of trowel marks, uniform in texture and appearance and plane to a Class A tolerance.
8. On surfaces intended to support floor coverings remove any defects of sufficient magnitude that would show through floor covering by grinding.

G. Broom Finish: Immediately after concrete has received a float finish as specified, give it a transverse scored texture by drawing a broom across surface.

H. Apply chemical floor hardener to permanently exposed interior concrete floor slab surfaces where indicated.

1. Apply in accordance with manufacturer's instructions.

3.3 GROUT

A. Preparation:

1. Nonshrinking nonmetallic grout:
   a. Clean concrete surface to receive grout.
   b. Saturate concrete with water for 24 HRS prior to grouting.
2. Rock anchors:
   a. Clean rock anchors of all loose material.
   b. Orient hook or bends in anchor bars to clear anchor bolts, reinforcements, and other embedments to be installed later.
3. Epoxy grout: Apply only to clean, dry, roughened, sound surface.

B. Application:

1. Nonshrinking nonmetallic grout:
   a. Mix in a mechanical mixer.
   b. Use no more water than necessary to produce flowable grout.
   c. Place in accordance with manufacturer's instructions.
   d. Completely fill all spaces and cavities below the bottom of baseplates.
   e. Provide forms where baseplates and bedplates do not confine grout.
   f. Where exposed to view, finish grout edges smooth.
   g. Except where a slope is indicated on Drawings, finish edges flush at the baseplate, bedplate, member, or piece of equipment.
   h. Protect against rapid moisture loss by covering with wet rags or polyethylene sheets.
   i. Wet cure grout for seven (7) days, minimum.
2. Rock anchors:
   a. See Item 1 above.

b. If rodded:

1) Fill each hole so that it overflows when anchor bar is inserted.

2) Force anchor bars into place.

c. If pressure placed, set anchor bar before grouting.

d. Take special care to avoid any movement of anchors that have been placed.

3. Epoxy grout:

a. Mix and place in accordance with manufacturer's instructions.

b. Completely fill all cavities and spaces around dowels and anchors without voids.

c. Obtain manufacturer's field technical assistance as required to ensure proper placement.

3.4 FIELD QUALITY CONTROL

A. Owner will employ and pay for services of a concrete testing laboratory to perform testing of concrete placed during construction.

1. Contractor to cooperate with Owner in obtaining and testing samples.

B. Tests During Construction:

1. Strength test - procedure:

a. Three cylinders, 6 IN DIA x 12 IN high, will be taken from each sample per ASTM C172 and ASTM C31.

b. Cylinders will be tested per ASTM C39:

1) One at 7 days.

2) Two at 28 days.

2. Strength test - frequency:

a. Not less than one test each day concrete placed.

b. Not less than one test for each 50 CY or major fraction thereof placed in one day.

c. Not less than one test for each type of concrete poured.

d. Not less than one test for each concrete structure exceeding 2 CY volume.

3. Slump test:

a. Per ASTM C143.

b. Determined for each strength test sample.

c. Additional slump tests may be taken.

4. Air content:

a. Per ASTM C231, ASTM C173, and ASTM C138.

b. Determined for each strength test sample.

5. Temperature: Determined for each strength test sample.

C. Evaluation of Tests:

1. Strength test results:

a. Average of 28-day strength of two cylinders from each sample.

1) If one cylinder manifests evidence of improper sampling, molding, handling, curing or testing, strength of remaining cylinder will be test result.

2) If both cylinders show any of above defects, test will be discarded.

D. Acceptance of Concrete:

1. Strength level of each type of concrete shall be considered satisfactory if both of the following requirements are met:

a. Average of all sets of three consecutive strength tests equals or exceeds the required specified 28-day compressive strength.

b. No individual strength test falls below the required specified 28-day compressive strength by more than 500 psi.

2. If tests fail to indicate satisfactory strength level, perform additional tests and/or corrective measures as directed by Owner's Representative.

a. Perform additional tests and/or corrective measures at no additional cost to Owner.

3.5 SCHEDULES

A. Form Types:

1. Surfaces exposed to view:

a. Prefabricated or job-built wood forms.

b. Laid out in a regular and uniform pattern with long dimensions vertical and joints aligned.

c. Produce finished surfaces free from offsets, ridges, waves, and concave or convex areas.

d. Construct forms sufficiently tight to prevent leakage of mortar.

2. Surfaces normally submerged or not normally exposed to view: Wood or steel forms sufficiently tight to prevent leakage of mortar.

3. Other types of forms may be used:

a. For surfaces not restricted to plywood or lined forms.

b. As backing for form lining.

B. Grout:

1. Nonshrinking nonmetallic grout: General use.
2. Epoxy grout:
   a. Grouting of dowels and anchor bolts into existing concrete.
   b. Other uses indicated on Drawings.
3. Sand cement grout: Keyways of precast members.

C. Concrete:
1. Precast concrete: Where indicated on Drawings.
2. Lean concrete: Where indicated on Drawings.
3. Concrete fill: Where indicated on Drawings.
4. Normal weight concrete: All concrete.
5. Concrete pan fill: Stair and landings where indicated on Drawings.
6. General use concrete: All other locations.

D. Concrete Finishes:
1. Grout cleaned finish: Where indicated on Drawings.
2. Slab finishes:
   a. Use following finishes as applicable, unless otherwise indicated:
      1) Floated finish: Surfaces intended to receive roofing, concrete topping, lean concrete, concrete fill and waterproofing.
      2) Troweled finish: Interior floor slabs, exposed roof slabs and base slabs of structures, equipment bases, and column bases.
      3) Broom finish: Sidewalks, docks, concrete stairs, and ramps.

3.6 OWNER TRAINING (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sealant work.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 09 91 00 – Painting and Protective Coatings.

C. Work included consists of but is not necessarily limited to:

1. Sealing all joints which will permit penetration of dust, air or moisture, unless sealing work is specifically required under other Specification Sections.

a. Work may include the following:

1) Flashing reglets and retainers.

2) Exterior wall joints.

3) Masonry control joints, exterior and interior and between masonry and other materials.

4) Flooring joints.

5) Isolation joints.

6) Joints between paving or sidewalks and building.

7) Concrete construction, control and expansion joints, exterior and interior.

8) Sawed joints in interior concrete slabs.

9) Joints between precast roof units, between precast roof units and walls, and all exterior and interior joints between precast wall panels.

10) Joints at penetrations of walls, floors and decks by piping and other services and equipment.

11) Exterior and interior perimeters of exterior and interior door and window frames, louvers, grilles, etc.

12) Thresholds at exterior doors.

13) Sealing of plumbing fixtures to floor or wall.

14) Sealing around piping, duct or conduit penetrations through roof, floors, interior and exterior walls.

a) See Specification Section 07 84 00 – Firestopping for firestopping these penetrations.

15) Sealing perimeter and penetrations of sound insulated walls.

16) Other joints where calking, sealant, expanding foam sealant or compressible sealant is indicated.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Payment will be included in associated items.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. American Concrete Institute (ACI):

a. 302.1R – Guide for Concrete Floor and Slab Construction.

2. ASTM International (ASTM):

a. C834 – Standard Specification for Latex Sealants.

b. C920 – Standard Specification for Elastomeric Joint Sealants.

c. C1521 – Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

3. National Sanitation Foundation International (NSF).

4. Underwriters Laboratories, Inc. (UL).

B. Qualifications: Sealant applicator shall have minimum five (5) years experience using products specified on projects with similar scope.

C. Mock-Ups:

1. Before calking work is started, a mock-up of each type of joint shall be calked where directed by the Owner's Representative.

a. The approved mock-ups shall show the workmanship, bond, and color of calking materials as specified or selected for the work and shall be the minimum standard of quality on the entire project.

b. Each sample shall cure for a minimum of seven (7) days at which time the sealant manufacturer's authorized factory representative shall perform adhesion tests on each sample joint.

1) Perform adhesion tests per ASTM C1521.

2) If mock-up is not acceptable or if adhesion test fails, provide additional mock-up and adhesion testing as required until acceptable to Owner's Representative.

1.4 DEFINITIONS

A. "Caulk(ing)," "calk(ing)," and "sealant": Joint sealant work.

B. "Interior wet areas": Toilets, showers, laboratories, and similar areas.

C. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

D. Finish sealant: Sealant material per this specification applied over face of compressible sealant or expanding foam sealant specified, to provide a finished, colored sealant joint.

E. Defect(ive): Failure of watertightness or airtightness.

1.5 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's installation instructions.
   c. Manufacturer's recommendations for joint cleaner, primer, backer rod, tooling and bond breaker.
3. Warranty.
4. Certification from sealant manufacturer stating product being used is recommended for and is best suited for joint in which it is being applied.
5. Certification of applicator qualification.

B. Samples:

1. Cured sample of each color for Owner’s representative's color selection.
2. Color chart not acceptable.

C. Miscellaneous Submittals: See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

D. Test Results:

1. Provide adhesion test results for each sealant sample including adhesion results compared to adhesion requirements.
2. Manufacturer's authorized factory representative recommended remedial measures for all failing tests.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver material in manufacturer's original unopened containers with labels intact: Labels shall indicate contents and expiration date on material.

1.7 WARRANTY

A. Material and Labor Warranty:

1. Sealant work free of defects for a period of five(5) years from date of Substantial Completion.
2. Remove any defective work or materials and replace with new work and materials.
3. Warranty signed jointly by Applicator and sealant manufacturer.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Polyurethane sealants:
   a. Pecora.
   b. Sika Chemical Corp.
   c. Sonneborn - Rexnord.
   d. Tremco.
2. Silicone sealants:
   a. General Electric.
   b. Dow Corning Corp.
   c. Tremco.
3. Compressible sealant:
   a. Polytite Manufacturing Corporation.
   b. Emseal.
   c. Norton.
   d. Sandell.
4. Fire-resistant sealant: See Specification Section 07 84 00 – Firestopping.
5. Acoustical sealant:
   a. Pecora.
   b. Sonneborn.
   c. Tremco.

6. Polysulfide rubber sealant:
   a. Pecora.
   b. Sonneborn.
   c. Morton Polymer Systems.
7. Expanding foam sealant:
   a. Macklanburg Duncan.
   b. Convenience Products.
   c. FAI International, Inc.
   d. Power Fasteners.
8. Polyurea joint filler:
   a. Dayton Superior Specialty Chemical Corporation.
   b. Euclid Chemical Co.
   c. L&M Construction Chemicals, Inc.
   d. Sonneborn.
9. Backer rod, compressible filler, primer, joint cleaners, bond breaker: As recommended by sealant manufacturer.

B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 MATERIALS

A. Sealants - General:
   1. Provide colors matching materials being sealed.
   2. Where compound is not exposed to view in finished work, provide manufacturer's color which has best performance.
   3. Nonsagging sealant for vertical and overhead horizontal joints.
   4. Sealants for horizontal joints: Self-leveling pedestrian/traffic grade.

B. Polyurethane Sealant:
   1. One (1) or two (2) components.
      a. Use one part component for above grade structure.
      b. Use two part component only for on or below grade and water containment structures.
   2. Paintable.
   3. Meet ASTM C920 Type S or Type M, Grade NS or P, Class 25, Use NT, T, M, A and O.
      a. Pecora Dynatrol-IXL, Dynatrol II, Urexpan NR-200, NR-201.

b. Sika Chemical Corporation Sikaflex-1a, Sikaflex-2C NS/SL.

c. Sonneborn Sonolastic NP-1, NP-II, SL-1 SL-2.

d. Tremco Dymonic or Dymeric, Vulkem 116,227,45,245.

C. Silicone Sealant:

1. One (1) component.
2. Meet ASTM C920, Type S, Grade NS, Class 25, Use NT, G, A, O.
   a. General Electric: Silpruf, Silglaze II.
   b. General Electric: Sanitary 1700 sealant for sealing around plumbing fixtures.
   c. Dow Corning: 786 for sealing around plumbing fixtures.
   d. Dow Corning: 790, 795.
   e. Tremco: Spectrem 1, Spectrem 3, Tremsil 600.
3. Mildew resistant for sealing around plumbing fixtures.

D. Compressible Sealant:

1. Size so that width of material is twice joint width.
2. Foamed polyurethane strip saturated with polymerized polybutylene waterproofing coated on front face with nonreactive release agent that will act as bond breaker for applied sealant.
   a. Polytite Manufacturing Corp. "Polytite-B."
3. Fire rated where required.

E. Joint Cleaner, Primer, Bond Breaker: As recommended by sealant manufacturer.

F. Sealant Backer Rod and/or Compressible Filler:

1. Closed cell polyethylene, polyethylene jacketed polyurethane foam, or other flexible, nonabsorbent, nonbituminous material recommended by sealant manufacturer to:
   a. Control joint depth.
   b. Break bond of sealant at bottom of joint.
   c. Provide proper shape of sealant bead.
   d. Serve as expansion joint filler.

G. Adhesive, Compressible Sealant: As recommended by sealant manufacturer.

H. Fire-Resistant Sealant: See Specification Section 07 84 00 – Firestopping.

I. Expanding Foam Sealant:

1. One (1) or two (2) component fire rated moisture cured expanding urethane.

2. Shall not contain formaldehyde.
3. Density: Minimum 1.5 pcf.
4. Minimum 70 percent closed cell content.
5. R-value minimum 5.0/IN.
6. Flame spread: Less than 25.
7. Smoke developed: Less than 25.

J. Acoustical Sealant:

1. One (1) component siliconized acrylic latex sealant.
2. Non-staining, non-bleeding.
3. Compatible with paints specified for adjoining materials.
   a. See Specification Section 09 91 00 – Painting and Protective Coatings.
4. Meet ASTM C834.
   a. Pecora - AC20+.
   b. Sonneborn - Sonolac.
   c. Tremco - Tremflex 834.

K. Polysulfide Rubber Sealant:

1. One (1) or two (2) component.
2. Meet ASTM C920.
   a. Pecora Synthacalk GC2+.
   b. Sonneborn - Sonolastic - two-part polysulfide sealant.
   c. Morton Polymer Systems - Thiokol Sealants.

L. Polyurea Joint Filler:

1. Two (2) component, semi-rigid material for filling control, sawcut and construction joints in interior concrete floors.
   a. Dayton Superior Specialty Chemical Corp. "Joint Fill, Joint Seal, Joint Saver II" as required for condition and recommended by manufacturer.
   b. Euclid Chemical Co. "EUCO QWIK" joint.
   c. L&M Construction Chemicals, Inc. "Joint Tite 750".
   d. Sonneborn "TF-100" control joint filler.
2. Comply with ACI 302.1R performance recommendations regarding control and construction joints.
3. Color: Gray.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before use of any sealant, investigate its compatibility with joint surfaces, fillers and other materials in joint system.

B. Use only compatible materials.

C. Where required by manufacturer, prime joint surfaces.

1. Limit application to surfaces to receive calking.
2. Mask off adjacent surfaces.

D. Provide joint depth for joints receiving polyurea joint filler in accordance with manufacturer's recommendations.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions and UL requirements.

B. Clean all joints.

C. Make all joints water and airtight.

D. Make depth of sealing compounds, except expanding foam and polyurea sealant, not more than one-half width of joint, but in no case less than 1/4 IN nor more than 1/2 IN unless recommended otherwise by the manufacturer.

E. Provide correctly sized backer rod, compressible filler or compressible sealant in all joints to depth recommended by manufacturer:

1. Take care to not puncture backer rod and compressible filler.
2. Provide joint backer rod as recommended by the manufacturer for polyurea joint filler.

F. Apply bond breaker where required.

G. Tool sealants using sufficient pressure to fill all voids.

H. Upon completion, leave calking with smooth, even, neat finish.

I. Where piping, conduit, ductwork, etc., penetrate wall, seal each side of wall opening.

J. Install compressible sealant to position at indicated depth.

1. Take care to avoid contamination of sides of joint.
2. Protect side walls of joint (to depth of finish sealant).
3. Install with adhesive faces in contact with joint sides.
4. Install finish sealant where indicated.

K. Install expanding foam sealant to minimum 4 IN depth or thickness of wall being penetrated if less than 4 IN or as indicated on Drawings.

1. Provide adequate fire rated backing material as required.
2. Hold material back from exposed face of wall as required to provide backer rod and finish sealant.
   a. Allow expanding foam sealant to completely cure prior to installing backer rod and finish sealant.
3. Material shall be minimum of 70 DegF prior to and during installation.
4. Trim off excess material flush with surface of the wall if not providing finished sealant.

3.3 FIELD QUALITY CONTROL

A. Adhesion Testing:

1. Perform adhesion tests in accordance with ASTM C1521 per the following criteria:
   a. Water bearing structures: One (1) test per every 1000 LF of joint sealed.
   b. Exterior precast concrete wall panels: One (1) test per every 2000 LF of joint sealed.
   c. Chemical containment areas: One (1) test per every 1000 LF of joint sealed.
   d. Building expansion joints: One (1) test per every 500 LF of joint sealed.
   e. All other type of joints except butt glazing joints: One (1) test per every 3000 LF of joint sealed.
   f. Manufacturer's authorized factory representative shall recommend, in writing, remedial measures for all failing tests.

3.4 SCHEDULE

A. Furnish sealant as indicated for the following areas:

1. Exterior areas: Polyurethane.
2. Interior wet areas: Polyurethane.
3. Interior wet, corrosive areas: Polyurethane.
4. Interior nonwet, corrosive areas: Polyurethane.
5. Interior nonwet, noncorrosive areas: Polyurethane.
6. Fire-rated construction: See Specification Section 07 84 00 – Firestopping.
7. Compressible sealant: Where indicated.
8. Sealant which will be subject to prolonged contact with or submersion in water (except wastewater and sewage):
   a. Polysulfide or polyurethane: NSF approved for use in potable water tanks.
9. Penetrations exterior wall above grade:

a. For non-corrosive areas, provide expanding urethane foam, with polyurethane finish sealant.

b. For corrosive areas, provide expanding urethane foam, bond breaker and polysulfide finish sealant on corrosive side with polyurethane finish sealant on non-corrosive side.

10. Sealant exposed to or having the potential of being exposed to concentrated chlorine gas or chlorine liquid: Polysulfide.
11. Sealant which will be immersed in wastewater or sewage: Polysulfide.
12. Interior concrete floor control joints or sawed joints: Polyurea joint filler.
13. Sealing around plumbing fixtures: Silicone.
14. Plastic laminate casework, plastic laminate countertops and solid surface materials: Silicone Latex.

3.5 OWNER TRAINING (NOT USED)

END OF SECTION

SECTION 08 15 00

FIBERGLASS REINFORCED PLASTIC (FRP) DOORS AND
BORROWED LIGHT FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. FRP doors and frames.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 08 70 00 – Finish Hardware.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):
   a. A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
2. Door and Hardware Institute/American National Standards Institute (DHI/ANSI):
   a. A115.1 – Preparation of Mortise Locks in 1-3/8 IN and 1-3/4 IN Standard Doors and Frames.
3. National Fire Protection Association (NFPA):
   a. 80 – Standard for Fire Doors and Other Opening Protectives.
4. Steel Door Institute (SDI):
   a. 117 – Manufacturing Tolerances Standard Steel Doors and Frames.
   b. All applicable SDI publications.

B. Qualifications:

1. Manufacturer shall have been producing products specified for minimum of 10 years.

2. Installer shall have minimum of five (5) years experience in the installation of fiberglass reinforced plastic doors and frames.

    a. Experience shall include field repair of fiberglass and gel coating.

C. Doors and frames shall be fabricated and prepared for hardware by single manufacturer except for fire rated frames.

D. Door hardware and accessories are to be provided by others and installed in the field.

E. All door hardware is to be provided per Specification Section 08 70 00 – Finish Hardware.

1.4 DEFINITIONS

A. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.

2. Installer and applicator are synonymous.

1.5 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

2. Product technical data including:

    a. Acknowledgement that products submitted meet requirements of standards referenced.

    b. Manufacturer's installation instructions.

3. Schedule of doors and frames specific to this Specification Section, using same reference numbers as used on Drawings.

4. Certification of manufacturer's qualifications.

5. Certification of installer's experience.

6. Certification that doors and frames have been protected against chemical exposures listed.

B. Samples:

1. Provide one (1) 6 x 6 IN sample of frame and one (1) 6 x 6 IN sample of standard door and sample of fire rated door specified.

    a. Frame sample shall show corner construction.

    b. Door sample shall show core specified and reinforcing construction.

C. Operation and Maintenance Manuals:

1. See Specification Section 01 33 00 – Submittals and Specification Section 01 78 23.13 – Operation and Maintenance Data for requirements for:
    a. The mechanics and administration of the submittal process.
    b. The content of Operation and Maintenance Manuals.

D. Miscellaneous Submittals:
1. Warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store doors and frames in a dry, weather protected area.
1. Place units on wood skids providing a minimum 6 IN air space above the ground.
2. Do not store units flat, set frames and doors on edge providing a minimum 1/2 IN air circulation space between each unit.
3. Provide covering which will ensure air flow around each unit to prevent trapping moisture.
4. If door wrapper becomes wet, remove immediately and provide dry protection equivalent to wrapper removed.

B. Storage recommendations by unit manufacturer shall take precedence over the above requirements.

1.7 WARRANTY

A. Warranty all FRP components to be free of defects in materials and workmanship for one (1) year and from degradation or failure due to corrosion for minimum of five (5) years from date of Substantial Completion.
1. Warranty against door warpage of more than 1:100 when measured diagonally across the door.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
1. FRP doors and frames:
    a. Corrim Company.
    b. Chem-Pruf Door Company, Ltd.
    c. Chase Doors - Fib-R-Door

B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 MATERIALS

A. Face Panel: Fiberglass reinforced plastic.

B. Supports and Reinforcing: Non-swelling polymer or equivalent non-corrosive material.

C. Inserts, Bolts and Fasteners: Stainless steel.

D. Core:

1. Non-fire rated:
    a. Rigid, end grain balsa.
    b. Thickness: Minimum 1-1/2 IN.
    c. Density: 8.5 - 9.0 pcf.
    d. Compressive strength: Minimum 1400 psi.
2. Fire rated:
    a. Mineral core.
    b. Intumescent seals factory applied to perimeter of door.
    c. Stiles and rails fabricated from pultruded fire retardant material.
    d. Provide stainless steel channels on the meeting edges of pairs of doors having surface mounted vertical rod exit devices.
    e. Rating as indicated on Drawings.

E. Frames:

1. Non-fire rated and fire-rated: Fiberglass reinforced plastic.

2.3 ACCESSORIES

A. Frame Anchors:

1. Jamb anchors in masonry: 9 GA steel, masonry wire anchor, galvanized per ASTM A153, G60 coating.
2. Floor anchors: 12 GA steel, galvanized per ASTM A153, G60 coating.
3. Anchors in existing openings: Stainless steel machine screws and stainless steel expansion shield.

2.4 FABRICATION

A. General:

1. Fabricate rigid, neat in appearance and free from defects.
2. Form to sizes and profiles indicated on Drawings.
    a. Sizes indicated in DOOR SCHEDULE are nominal.
    b. Refer to Architectural details for actual conditions affecting actual size of rough openings.

3. Fit and assemble in shop wherever practical.
4. Mark work that cannot be fully assembled in shop to assure proper assembly at site.
5. For door frames, all surfaces, both exposed and concealed, shall be gel coated to prevent acid attack of the glass reinforcing.
6. Fabricate doors and frames to tolerance requirements of SDI 117.
7. Fit doors to SDI clearances.
8. Doors shall be fabricated to withstand splash and spillage attack from the following chemicals for a period of 8 HRS.

B. FRP Doors:

1. General:

a. Construction:

1) 1-3/4 IN thick, minimum.

2) Face sheets, 0.125 IN thick, minimum.

3) Fabricate with flush top closure.

4) Doors with a maximum size of 48 IN wide x 96 IN tall shall be fabricated in one (1) piece.

5) Fill and dress all joints.

6) Resin: Polyester or vinyl ester as required to meet chemical resistance requirements.

7) Fiberglass content (by weight): Minimum 30 percent, maximum 40 percent.

8) UV stabilized.

9) Core:

a) End grain balsa for non-fire rated doors.

b) Mineral core for fire rated doors.

b. Finish:

1) Minimum 15 mil gel coat thickness.

2) Gel coat color:

a) Exterior doors: Match existing facility door color .

b) Interior doors: Not applicable..

C. Frames:

1. General:

a. Frame size to be 2 IN x 5-3/4 IN with equal rabbets on each side.

b. One (1) piece or if shipped knocked down, all joints shall be filled with fiberglass compound, ground and sanded smooth and finished with gel coat.

c. Minimum thickness: 0.1875 IN.

d. Resin: Polyester or vinyl ester as required to meet chemical resistance requirements.

e. Fiberglass content (by weight): Minimum 30 percent, maximum 40 percent.

f. UV stabilized.

2. FRP frames:

a. Corner reinforcement: Minimum 4 x 4 x 0.25 IN FRP angle attached to top reinforcing bar with concealed stainless steel screws.

b. Hinge reinforcement: Minimum 0.25 IN thick polymer plate attached to frame.

c. Minimum 0.25 IN thick polymer plate reinforcement bonded and mechanically fastened to frame for strikes, closers and surface-mounted hardware.

d. Fire rated where indicated on Drawings.

D. Prepare for finish hardware in accordance with hardware schedule, templates provided by hardware supplier, and DHI/ANSI A115.1.

1. See Specification Section 08 70 00 – Finish Hardware for hardware.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install doors and frames , in accordance with SDI and manufacturer's instructions.

1. Manufacturer's instructions take precedent over SDI.

B. Place frames prior to construction of enclosing walls and ceilings.

C. Plumb, align, and brace securely until permanently anchored.

D. After completion of walls, remove temporary braces and spreaders.

E. Install fire-rated frames in accordance with NFPA 80 and manufacturer's instructions.

1. Manufacturer's instructions take precedent over NFPA.

F. Use plastic plugs to keep silencer holes clear during construction.

G. Immediately after erection, repair damaged areas of gel coat and primer coat.

1. Fill corner miter joints with fiberglass compound as recommended by frame manufacturer.

    a. Filling miter joints with sealant is not acceptable.

2. Sand filled area to match adjacent frame and coat with minimum 15 mil gel coating to match adjacent frame finish.

H. On doors not requiring weather-stripping, sound seals or smoke seals, install three (3) silencers on strike jamb of single door frame and two (2) on head of double door frame.

I. Number and location of anchors shall be in accordance with frame manufacturer's recommendation with minimum of three (3) anchors per jamb.

J. Protect frames during construction.

K. Cover all thru bolts and other stainless steel accessories with minimum 15 mil gel coating to match door frame.

3.2 FIELD QUALITY CONTROL

A. Remove and replace defective units.

B. Repair damage to finish in accordance with AWI recommendations.

C. Remove and replace damaged doors that are not capable of being satisfactorily repaired.

1. Owner’s Representative to make final decision on acceptance of finish repair.

3.3 OWNER TRAINING

A. Provide owner training and demonstration on maintenance, adjustment and care of operational doors and frames.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 08 33 23

STEEL ROLLING OVERHEAD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel rolling overhead doors.
    a. Chain operated.
    b. Motor operated.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 ALTERNATES

A. The base proposal for this item will be based upon steel rolling overhead doors that are chain operated. An Alternative Item will be included on the Proposal Form for additional cost to motorize the overhead doors

1.4 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):
    a. A123 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    b. A653 – Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
    c. E283 – Standard Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
2. National Electrical Manufacturers Association (NEMA):
    a. 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).

B. Qualifications:

1. Installer to be licensed or approved in writing by door manufacturer.

1.5 DEFINITIONS

A. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

1.6 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's installation instructions.
   c. Manufacturer's standard color charts.
3. Schedule of doors using same reference number for openings as indicated on Drawings.
4. Motor operator and accessories technical data including complete wiring and control diagrams (if in Contract).
5. Certifications:
   a. Certification of installer qualifications.

B. Samples:

1. Actual metal color samples of manufacturer's full line of colors available.

C. Operation and Maintenance Manuals:

1. See Specification Section 01 33 00 – Submittals and Specification Section 01 78 23.13 – Operation and Maintenance Data for requirements for:
   a. The mechanics and administration of the submittal process.
   b. The content of Operation and Maintenance Manuals.

D. Miscellaneous Submittals:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

1.7 WARRANTY (NOT USED)

A. Specified manufacturer's limited 10 year warranty against panel delamination from date of Substantial Completion.

B. One (1) year material and workmanship warranty on balance of door from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS (NOT USED)

2.2 MATERIALS

A. Door Curtain and Hood: Galvanized steel, ASTM A653, G-60.

B. Weatherproofing: Neoprene or vinyl. Guides, Head Plates and Pipe Barrel: Galvanized steel, ASTM A123.

D. Fasteners: Same material as door construction.

2.3 ACCESSORIES

A. Motor Operator (if in Contract):

1. Motor shall be sized by door manufacturer for door size indicated on Drawings.
2. Instant reversing with electric reversing safety edge and weather seal on bottom of door.
    a. Provide complete wiring connections for instant reversing safety edge to motor operator including all intermediate junction boxes, conduit, disconnects, wiring and low voltage wiring.
3. Opening and closing rate: Between 2/3 and 1 FPS.
4. Standard oiltight three (3) pushbutton control(s).
    a. NEMA 4.
5. Electric interlock with locking device.
6. Provide manufacturer's standard reversing controller with motor thermal protection if motor is not internally protected.

2.4 FABRICATION

A. Door Curtain:

1. Non-insulated flat profile:
    a. 2-5/8 IN high.
    b. Minimum 22 GA.
    c. Galvanized steel endlocks.
2. Weather stripping:
    a. Guide sealing adjustable weatherstripping at jambs and lintel (exterior doors only).
3. Bottom bar (only if motor operated): Reversing electric safety edge with weatherseal.
4. Finish: Factory prime and finish coats.

a. Prime coat: Minimum 0.2 mil baked-on prime paint.

b. Finish coat: Minimum 0.6 mil baked-on polyester powder coat.

c. Color: To be selected by Owner's Representative from manufacturer's complete offering.

B. Hood:

1. Minimum 24 GA.
2. Provide full length air baffle weatherstripping at all exterior doors.
3. Finish: Match door curtain.

C. Guides:

1. Mounting:
   a. Interior face of wall.
2. Manufacturer's standard angle guide system for size of door specified.
   a. Rolled guides are not acceptable.
   b. Furnish wind locks.
3. Finish: Galvanized steel.

D. Head Plates:

1. Galvanized steel plate mounted to guides.
2. Sized to support counter balance assembly, curtain , motor operator (if included in Contract) and hood.
3. Finish: Galvanized.

E. Counterbalance Assembly:

1. Pipe barrel:
   a. Galvanized steel pipe shaft.
   b. Maximum deflection: 0.03 IN/FT.
2. Torsion springs:
   a. Oil-tempered helical torsion springs on cast anchors.
   b. 100,000 cycle.
3. Adjustable tension wheel.

F.Trim Pieces: Material and finish to match curtain.

G. Wind Load: 20 psf minimum.Per Structural Recommendation,

H. Operation:

Motor operated with chain operator backup, as indicated on drawings.

I. Locking:

1. Slide bolts.

J. Non-insulated door system: Overhead Door Corp. "620" Series.

K. Insulated door system: Overhead Door Corp. "625" Series.

2.5 SOURCE QUALITY CONTROL

A. Air Infiltration: 1.98 CFM/SF of door when tested on a 10 FT x 10 FT door in accordance with ASTM E283 with 25 mph wind load.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Installation shall be done by manufacturer's authorized representative.

C. Provide all required trim, weatherstripping, closures etc., for complete weather tight installation.

D. Adjust for proper counter balance.

E. Seal along bottom of vertical track (guides), seal the vertical joint between the two (2) separate track angles (if not filled by welding) and seal all holes in vertical track (not being used for fasteners) to provide a completely weather tight track and door system.

1. At fastener locations provide steel washers under bolt head to completely cover the slotted holes in the vertical track.

a. Finish of steel washer shall match finish of track (guides).

F. Electrical disconnect and conduit and wiring from standard three (3) pushbutton control to motor operator is to be provided by Division 26 – Electrical.

G. Provide bracing for motor operator to eliminate vibration.

3.2 ADJUSTMENT

A. Prior to occupancy, adjust door for smooth operation.

3.3 OWNER TRAINING

A. Prior to occupancy the owners designated maintenance personnel shall receive training and demonstration on the proper operation and maintenance of the door, safety devices and operator.

END OF SECTION

SECTION 08 51 13

ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum windows.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 07 92 00 – Joint Sealants.
4. Section 08 81 00 – Glass and Glazing.
5. Section 09 91 00 – Painting and Protective Coatings.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. Aluminum Association (AA):
   a. 45 – Designation System for Aluminum Finishes.
2. American Architectural Manufacturers Association (AAMA):
   a. 904 – Voluntary Specification for Multi-Bar Hinges in Window Applications
   b. 1503 – Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
   c. 2605 – Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
3. ASTM International (ASTM):
   a. A924 – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
   b. C1363 – Standard Test Method for the Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.

c. E283 – Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

d. E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

e. E331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

4. American Welding Society (AWS):

a. D1.2 – Structural Welding Code - Aluminum.

1.4 DEFINITIONS

A. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.

2. Installer and applicator are synonymous.

1.5 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

2. Product technical data for framing system and major accessories including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Hardware being provided by window manufacturer.

c. Glass being provided by window manufacturer in factory glazed units.

d. Manufacturer's installation instructions.

3. Elevation drawings indicating window dimensions and details.

4. Test results.

B. Samples:

1. After initial color selection, provide 2 x 3 IN minimum sample of each color and finish selected.

C. Miscellaneous Submittals:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

2. Qualifications of testing laboratory.

3. Warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store units in vertical position off ground with wood spacers between each unit.

1.7 WARRANTY

A. Five (5) year warranty of weathertightness of installation from date of Substantial Completion.

1. Air and water integrity and structural adequacy of units and hardware, including sealants and calking within and around perimeter of installation.
2. Signed jointly by fabricator, installer, and contractor.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS (NOT USED)

2.2 MATERIALS

A. Extruded Aluminum: 6063T5 alloy.

B. Sealants: As specified in Specification Section 07 92 00 – Joint Sealants.

C. Thermal Insulator: Poured in place polyurethane, self-adhering to adjacent aluminum surfaces.

D. Weatherstripping: Sponge neoprene.

2.3 ACCESSORIES

A. Flashing:

1. Minimum 0.040 IN aluminum.
2. Finish to match window frames.
3. Mill finish if concealed.

2.4 FABRICATION

A. General:

1. Fully degrease and clean members prior to assembly or application of protective coatings.
2. Weld by methods recommended by manufacturer and AWS D1.2 to avoid discoloration at welds.
3. Grind exposed welds smooth and restore finish.
4. Ease corners of cut edges to a radius of approximately 1/64 IN.
5. Conceal fasteners wherever possible.
6. Fit and assemble work at shop to maximum extent possible.
7. Maintain true continuity of line and accurate relation of planes and angles.

8. Provide secure attachment and support at mechanical joint, with hairline fit of contacting members.
9. Reinforce work as necessary to withstand wind loadings and to support system.
10. Separate dissimilar metal with paint or preformed separators to prevent corrosion.
    a. See Specification Section 09 91 00 – Painting and Protective Coatings.
11. Separate metal surfaces at moving joints with plastic inserts or other nonabrasive concealed inserts to permanently prevent freeze-up of joint.
12. Reinforce frames for hardware.
13. Structural steel reinforcement hot-dip galvanized after fabrication meeting G-90, ASTM A924, requirements.

B. Thermal Insulator: Provide minimum 1/4 IN separation between exterior and interior metal surfaces after bridge is removed.

C. Weatherstripping:
1. Thermally broken type windows:
    a. Casement and projected:
        1) Provide two (2) rows of fin type extruded neoprene weatherstrips extending around perimeter of sash at both inner and outer overlap contacts.
        2) Provide corners which are securely staked and joined.
        3) Provide units which are easily replaceable.

D. Window Hardware:
1. General:
    a. Locking device and strikes: White bronze and/or non-magnetic stainless steel.
    b. All hardware elements that bridge sash or frame thermal barrier: Reinforced nylon, deirin or suitable non-metallic, low conductivity material.
    c. Custodial key operation: Secure sash in closed position and automatically lock in washing position.
    d. Safety keys removable only in closed position.
2. Glass: See Specification Section 08 81 00 – Glass and Glazing for types of glass to be installed under this Section.

E. Fasteners:
1. Finish exposed fasteners to match finish of system.

2. Provide Phillips flat head screws where exposed.

F. Finish: AAMA 2605 Fluoropolymer paint; color to be AA-MA10C22A42 anodized.

1. Color: Medium bronze.

2.5 SOURCE QUALITY CONTROL

A. General Test Requirements:

1. Utilize independent testing laboratories specifically qualified to conduct all performance tests required.
2. Performance tests may be conducted in manufacturer's laboratories provided they are witnessed and certified by qualified independent testing laboratory personnel.
3. Perform all tests on "Test Unit":
   a. Full-sized window unit for project or a minimum 5 x 8 FT unit mounted in test chamber in exact accordance with job conditions including anchorage system caulking, sealing, etc.
   b. Test unit to be completely assembled and glazed.
      1) Thermal tests may be conducted on 4 x 6 FT unit.
4. Test air infiltration first, water resistance second.
   a. Other tests may be in any order.
5. Test data on vertical pivot windows will be accepted for fixed windows for condensation resistance, thermal, temperature exposure and acoustical tests provided the fixed windows are the same as the vertical windows tested in the following respects:
   a. Same frame section (or same family of extrusions).
   b. Same basic metal mass inside and outside.
   c. Identical thermal break.
   d. Same type of glazing.

B. Test Requirements:

1. Air infiltration test:
   a. With sash and ventilators closed and locked, test in accordance with ASTM E283.
   b. Air infiltration, in CFM/FT of crack length, at pressure differential of 6.24 psf as follows:
      1) Fixed windows: 0.06 maximum, all others 0.10 maximum.
2. Water resistance test:

a. Mount glazed unit in its vertical position, continuously supported around outside perimeter with sash and ventilators closed and locked.

b. Test in accordance with ASTM E331.

c. No uncontrolled leakage allowed, with pressure differential of 6.24 psf.

3. Uniform load deflection test:

a. Test in accordance with ASTM E330.

b. Subject unit to load of 25 psf applied to outside of window and 25 psf applied to inside of window.

c. Maximum allowable deflection of any unsupported span: L/175.

d. No glass breakage, permanent damage to fasteners, hardware parts, support arms or activating mechanisms, or any other damage which would cause window to be inoperable will be allowed.

4. Uniform load structural test:

a. Test in accord with ASTM E330.

b. Subject unit to loads indicated below.

c. Stabilize pressure and maintain it for minimum period of 10 seconds.

d. No glass breakage, permanent damage to fasteners, hardware parts, support arms or activating mechanisms or any other damage which would cause window to be inoperable will be allowed.

e. Maximum permanent deformation of any main frame, sash or ventilator member: 0.4 percent of its span.

f. After performing Uniform Load Structural Test, increase loads 1-1/2 times and perform safety test.

g. Design unit to withstand following design pressures acting normal to plane of wall, at applicable heights and locations.

1) At height of 30 FT or less: 50 psf acting inward 50 psf acting outward.

2) Refer to structural Drawings.

5. Condensation resistance test:

a. Perform on "test unit," except size may be 3 x 4 FT, minimum.

b. Test in accordance with AAMA 1503.

c. CRF (Condensation Resistance Factor): 50, minimum.

6. Thermal test:

a. Perform on "test unit" except size may be 4 x 6 FT, minimum..

b. Test in guarded hot box ASTM C1363, with an exterior temperature of 18 DegF, an interior of 68 DegF and 15 mph fan-generated wind velocity on exterior.

c. "U" value: not to exceed 0.65 BTU/HR/SF/DegF.

d. Calculated "U" values from smaller units or data or theoretical assumptions will not be acceptable.

7. Structural thermal barrier tension test:

   a. Test urethane filled sections of aluminum.

   b. Mechanically secure interior and exterior faces of 12 IN section in horizontal position.

   c. Apply heat tape to exterior face to control surface temperature at 180 DegF 5 minutes before loading, as indicated by a thermocouple wire operated by an automatic controller.

   d. Apply direct tension (pull) using a Universal testing machine set in 12,000 LB load range.

   e. Test results: No loss of bond at 4000 LB IN/IN/MIN.

8. Structural thermal barrier shear test:

   a. Test urethane filled sections of aluminum.

   b. Mechanically secure interior face of 12 IN section in vertical position.

   c. Apply heat tape to exterior face to control surface temperature at 180 DegF 5 minutes before loading, as indicated by a thermocouple wire operated by an automatic controller.

   d. Apply load to exterior face by a bearing plate resting on top of exterior face, using Universal Testing machine set in 12,000 LB load range at a strain rate of 0.050 IN/IN/MIN.

   e. Test results: No loss of bond at 5500 LB loading.

9. Structural thermal barrier combined torsion and shear test:

   a. Test urethane filled sections of aluminum.

   b. Secure interior face of 12 IN section in horizontal position.

   c. Apply heat tape to exterior face to control surface temperature at 180 DegF 5 minutes before loading, as indicated by a thermocouple wire operated by an automatic controller.

   d. Apply load to bearing plate centered on portion of glazing pocket to exterior side of thermal barrier, using a Universal Testing machine set in the 12,000 LB load range.

   e. Test results: No loss of bond at 3900 LB load applied at strain rate of 0.05 IN/IN/MIN.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Set units plumb, level, and true to line.

C. Anchor securely in place.

D. Separate metal surfaces from sources of corrosion or electrolytic action.

1. See Specification Section 09 91 00 – Painting and Protective Coatings.

E. Set sill and base members in a bed of sealant.

F. Provide joint fillers or gaskets for weathertight construction.

G. Calk all joints within and at perimeter of system.

H. Provide sealant color to match finish of system at exposed locations.

I. Provide sealants compatible with aluminum system and recommended for use with this type of installation.

J. See Specification Section 07 92 00 – Joint Sealants for sealants.

3.2 FIELD QUALITY CONTROL

A. Installation supervised or inspected by manufacturer's authorized representative.

3.3 OWNER TRAINING (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 08 70 00

FINISH HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Finish hardware.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 08 15 00 – Fiberglass Reinforced Plastic (FRP) Doors and Borrowed Light Frames

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 QUALITY ASSURANCE

A. All door hardware shall be provided by the same hardware supplier.

1. Hardware required by doors specified in Specification Section 08 15 00 – Fiberglass Reinforced Plastic (FRP) Doors and Borrowed Light Frames is to be provided under this Specification Section unless noted otherwise.

B. Referenced Standards:

1. Americans with Disabilities Act (ADA):
   a. Accessibility Guidelines for Buildings and Facilities (ADAAG).
2. Texas Accessibility Standards (TAS)
3. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
   a. A156.1 – Butts and Hinges.
   b. A156.3 – Exit Devices.
   c. A156.4 – Door Controls (Closers).
   d. A156.6 – Architectural Door Trim.
   e. A156.8 – Door Controls - Overhead Holders.
   f. A156.13 – Mortise Locks and Latches.
   g. A156.16 – Auxiliary Hardware.

h. A156.18 – Materials and Finishes.

i. A156.21 – Thresholds.

4. National Fire Protection Association (NFPA):

a. 80 – Standard for Fire Doors and Other Opening Protectives.

5. Steel Door Institute (SDI).

6. Underwriters Laboratories, Inc. (UL):

a. Building Materials Directory.

7. Building code:

a. International Code Council (ICC):

1) International Building Code and associated standards, 2012 Edition including all amendments, referred to herein as Building Code.

C. Qualifications:

1. Installation shall be performed or inspected by Certified Architectural Hardware Consultant (AHC).

1.4 DEFINITIONS

A. AHC: Certified Architectural Hardware Consultant.

B. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.

2. Installer and applicator are synonymous.

C. All weather: Capable of operation from -50 to +120 DegF.

D. Active Leaf: Right-hand leaf when facing door from keyed side unless noted otherwise on Drawings.

E. FRP: Fiberglass reinforced plastic.

1.5 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Manufacturer's installation instructions.

3. Schedule of all hardware being used on each door.

a. Number hardware sets and door references same as those indicated on Drawings.

4. Technical data sheets on each hardware item proposed for use.
5. Wiring Diagrams: For power, signal, and control wiring and including the following:
    a. Details of interface of electrified door hardware and building safety and security systems.
    b. Schematic diagram of systems that interface with electrified door hardware.
    c. Point-to-point wiring.
    d. Risers.
    e. Elevations doors controlled by electrified door hardware.
6. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
7. Warranty information for all hardware devices having extended warranties.

B. Miscellaneous Submittals:
1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Certified Architectural Hardware Consultant qualifications.
3. Letter from Certified Architectural Hardware Consultant stating all door hardware has been provided per approved Shop Drawings, has been inspected, has been installed in accordance with manufacturer's recommended installation instructions and is in proper working order.

1.6 WARRANTY

A. Provide all individual manufacturer's extended warranties as advertised.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
1. Locksets and latchsets:
    a. Corbin/Russwin.
    b. Best Access Systems.
    c. Sargent
    d. Schlage
2. Closers:
    a. LCN.

b. Norton.
c. Corbin/Russwin.

3. Hinges:
   a. Stanley Works.
   b. Hager Hinge Co.
   c. McKinney Manufacturing Co.
4. Door stops and holders:
   a. Trimco.
   b. Rockwood.
   c. Ives.
5. Overhead stops:
   a. Glynn-Johnson Corp.
   b. Rockwood.
   c. Trimco
   d. Rixson.
6. Weatherstripping and thresholds:
   a. Pemko Manufacturing Co.
   b. Reese Enterprises, Inc.
   c. Zero Weatherstripping, Inc.
   d. National Guard Products, Inc.
7. Exit devices: (Provide electric latch retraction where indicated):
   a. Von Duprin, Inc.
   b. Corbin/Russwin.
   c. Precision.
   d. Sargent.
8. Door bolts, coordinators and strikes:
   a. Ives.
   b. Trimco.
   c. Hager.
   d. Rockwood.
   e. Dorma.

9. Door and Frame Transfer Devices: Steel housing for mortise in hinge stile of door, with flexible tube for wiring bundle; accommodating doors that swing open to 120 degrees.

10. Other materials: As noted.

B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 MATERIALS

A. Fasteners: Stainless steel or aluminum.

B. Locking, Latching and Retracting Mechanism and Lock Case:

1. Manufacturer's standard.

C. Closers:

1. Shell: Aluminum or cast iron.

2. Arms and piston: Forged steel.

D. Kickplates:

1. Stainless steel.

2. FRP.

E. Thresholds: Aluminum.

F. Overhead Stops and Wall Stops: Stainless steel or aluminum.

G. Keys: Brass or bronze.

H. Weatherstripping and Smoke Seals: Polypropylene, neoprene, or EPDM.

I. Pulls and Push Plates: Stainless steel.

2.3 ACCESSORIES

A. Closer Mechanism Covers:

1. Match finish of adjacent hardware.

2. Full cover.

3. Manufacturer's standard plastic cover.

B. Arms, Brackets, and Plates: As required for complete installation of closers.

C. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; listed and labeled for use with fire alarm systems.

D. Strikes:

1. Stainless steel, 630 finish.

2. Provide with curved lips.

3. Extended lips when required.

4. Furnish strike boxes.
5. Appropriate for function and hardware listed.

2.4 FABRICATION

A. Hardware - General:

1. Generally prepare for Phillips head machine screw installation.
2. Exposed screws to match hardware finish or, if exposed in surfaces of other work, to match finish of other work as closely as possible.
3. For mineral core doors use screws which thread to head to apply butts.
4. Provide concealed fasteners unless thru bolted.
5. Through bolt closers on all doors.
6. Furnish items of hardware for proper door swing.
7. Furnish lock devices which allow door to be opened from inside room without a key or any special knowledge.

B. Hardware:

1. Fabricate hardware for fire rated openings in compliance with UL and NFPA 80.
   a. This requirement takes precedence over other requirements for such hardware.
   b. Provide only hardware which has been tested and listed by UL for types and sizes of doors.
2. Provide integral serrated knurling on lever for all doors on this Project doors leading to the following rooms or areas (grit covered tape applied to lever is not acceptable):
   a. Boiler and mechanical rooms.
   b. Stairs.
   c. Electrical rooms and engine generator rooms.
   d. Chemical storage and feed rooms.
   e. Wet wells.
   f. Laboratories.
   g. Garage areas.
   h. Storage rooms.
   i. Janitor closet.
   j. Process equipment rooms.
   k. Filter galleries.

3. Provide stainless steel dustproof strikes for all doors with automatic or manual flush bolts or other bolts into floor.

4. Provide following ANSI/BHMA A156.18 finishes:

   a. Locks: 630.

   b. Door pulls, push bars, push plates: 630.

   c. Kickplates:

      1) 630 (if metal kickplates are specified).

      2) FRP on FRP doors.

   d. Exit devices: 630 or 626.

   e. Butts: 630.

   f. Door stops, dead locks, mortise bolts, and miscellaneous hardware: 630 if available, 626 if 630 not available.

   g. Door overhead stops: 630.

   h. All parts of closers (other than corrosion resistant closers): Provide special rust inhibiting pretreatment.

C. Mortise Locks and Latches:

1. ANSI/BHMA A156.13, Series 1000, Operational Grade 1, Security Grade 1.

   a. Meet requirements of ADA.

2. Antifriction two-piece mechanical latchbolt with stainless steel anti-friction insert.

   a. One-piece stainless steel deadbolt, minimum 1-1/4 IN x 9/ 16 IN thick with 1 IN throw.

   b. 2-3/4 IN backset.

   c. Cylinder: Brass, 6 pin, with interchangeable core.

   d. ADA compliant thumb turn lever.

   e. Corbin/Russwin:

      1) Trim design "NSP" for all doors.

   f. Functions as indicated in following table in accordance with ANSI/BHMA A156.13.

      1) All electric lock hardware to be 24 Vdc.

MORTISE LOCK NUMBERS		
ANSI	FUNCTION	CORBIN/RUSS WIN
F01	Passage	ML2010
F19	Privacy	ML2030
F05	Classroom	ML2055
F07	Storeroom	ML2057
F13	Entrance or Office	ML2065
	Electronic Lockset	ML20905 x M92

D. Door Closers:

1. ANSI/BHMA A156.4, Grade 1.
2. Size door closers to comply with ANSI recommendations for door size and location.
3. Fabricate all closers with integral back check.
   a. Provide all weather fluid for all closers used in exterior doors and where otherwise indicated.
4. Closers (other than corrosion resistant closers): LCN 4040 Series or Norton 7500 Series or Corbin-Russwin DC6200 Series.
5. Provide manufacturer's standard 10 year warranty.

E. Butts and Hinges:

1. ANSI/BHMA A156.1.
2. Hinge numbers:

	HAGER	STANLEY
Type 1 (Typical butts)	BB1199	FBB199

3. Flat button tips on all butts.
4. Butt types:
   a. Type 1: Provide NRP (non-removable pin) on all exterior doors and where noted in the Schedule.
   b. All other doors: Type 1.
5. Butt quantities:
   a. Doors 61-90 IN in height: Three (3) butts.
   b. Doors 91-114 IN in height: Four (4) butts.

c. Doors 115-144 IN in height: Five (5) butts.

6. Butt sizes:

a. 1.75 IN doors: 4.5 x 4.5 IN for all doors up to and including 46 IN wide.

F. Door Stops:

1. ANSI/BHMA A156.16.

a. Wall stops: Ives WS406-CVX or WS406-CCV.

G. Overhead Door Holders/Stop:

1. ANSI/BHMA A156.8.

2. Surface mounted stops:

a. Rockwood N14400 Series or Glynn Johnson 90 Series.

b. US32D finish.

c. Provide 'hold-open' function on all stops except fire rated doors.

3. Concealed stops:

a. Rockwood N11000 Series or Glynn Johnson 100 Series.

b. US32D finish.

c. Provide 'hold-open' function on all stops except fire rated doors.

H. Kickplates:

1. ANSI/BHMA A156.6.

2. 8 IN high x 2 IN less than door width.

3. Beveled on all edges.

4. 0.050 IN thick for all doors except FRP.

I. Door Pulls, Push Plates and Bars:

1. ANSI/BHMA A156.6.

2. Push Plate: 4x16 IN, square corner, flat plate, with beveled edges.

3. Push Bar: Round.

4. Push/Pull Set:

a. 4x16 IN square corner flat plate with beveled edges and ¾ IN DIA x 12 IN long pull.

b. Provide 2-1/2 IN clearance.

5. Provide cutouts as required for cylinders.

J. Thresholds:

1. ANSI/BHMA A156.21.

2. One-piece unit:

a. Maximum 1/2 IN high.

b. 4 IN wide.

3. Provide required bolt cutouts.

K. Exit Devices:

1. ANSI/BHMA A156.3, Grade 1.

2. Type and function as indicated in Hardware Schedule under PART 3on drawings.

3. Von Duprin products listed.

L. Astragal: UL listed for labeled doors.

1. Coated with minimum 15 mil gel coating per Specification Section 08 15 00.

M. Weatherstripping: (Interior Doors):

1. Weather seal at jambs and head: Self-adhesive strip Reese #797B.

2. Sweep at bottom of doors: Reese #701D.

3. Weather seal astragal at meeting edges of pairs of doors: Reese #92D each leaf. Weatherstripping (Exterior Doors):

4. Fixed /Screwed

N. Keying:

1. Establish keying with Owner.

a. Provide and set up complete visible card indexed system with key tags and control slips.

b. Tag and identify keys.

c. Provide two (2) keys for each lock or cylinder.

d. Master key and key in groups as directed.

e. Provide construction master keys for all exterior doors.

O. Bolts:

1. ANSI/BHMAA 156.16.

2. Surface bolts: Ives SB1630 Series with top and bottom strikes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's installation instructions, supervised or inspected by an AHC.

B. Fit hardware before final door finishing.

C. Permanently install hardware after door finishing operations are complete.

D. Use SDI mounting heights for hardware.

E. Mount closers on push side of doors unless noted otherwise.

1. Provide extended arms and brackets as required.

2. Provide full cover for each closer.

3. Mount closers on pull side of the door for the following doors: N/A

F. Install closers with integral stop at all doors scheduled to receive closer unless noted otherwise.

1. Do not install integral stop on closers mounted on pull side of door.

G. Provide appropriate overhead stop when corrosion resistant closer is specified.

H. Where interior doors swing more than 105 degrees without encountering a wall and which do not have a closer scheduled, provide overhead stop.

1. Provide concealed overhead stop on doors scheduled to receive closer mounted on pull side of door.

I. Provide hold-open feature when required by Hardware Schedule.

J. Provide coordinator when required by hardware specified.

K. Wall Mount Door Stops:

1. Provide at all doors unless noted to receive overhead stop, closer with integral stop or as noted otherwise on Hardware Schedule.

2. Floor mounted stops are not acceptable unless noted otherwise in this Specification Section.

L. Install overhead stop at all inactive leafs of pairs of doors unless provided with closer.

M. Install astragal on all pairs of UL labeled fire doors.

N. Provide weather seal, door sweep and threshold at all exterior doors and where scheduled on interior doors.

1. Set thresholds in a full bed of sealant.

2. Mount door sweeps on exterior face of door.

3. Mount weather seal astragal at meeting edges of pairs of doors on the exterior face of the doors.

O. Provide smoke seals on all fire rated doors.

P. Mount kickplates on push side of doors.

Q. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

R. Boxed Power Supplies: Locate power supplies as indicated.

3.2 FIELD QUALITY CONTROL

A. Adjust and check each operating item of hardware to assure proper operation or function.

1. Lubricate moving parts with lubricant recommended by manufacturer.

B. During week prior to startup, make a final check and adjustment of all hardware items.

1. Clean and lubricate as necessary to assure proper function and operation.

2. Adjust door control devices to compensate for operation of heating and ventilating equipment.

3.3 OWNER TRAINING

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

3.4 SCHEDULES

A. Hardware Schedule:

HW-8: Butts
2 Closers
2 Stops
Kickplate each door
Exit device (active leaf) - 9847L F
Exit device (inactive leaf) - 9847L F BE no outside trim

HW-18: Butts
Closer
Exit device - 9875L
Kickplate
Cylinder

END OF SECTION

SECTION 08 81 00

GLASS AND GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass and glazing.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 07 92 00 – Joint Sealants.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. American National Standards Institute (ANSI):
   a. Z97.1 – Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
2. ASTM International (ASTM):
   a. C1036 – Standard Specification for Flat Glass.
   b. C1048 – Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
   c. E2190 – Standard Specification for Insulating Glass Unit Performance and Evaluation.
3. Code of Federal Regulations (CFR):
   a. 16 CFR 1201 – Consumer Product Safety Commission, Part 1201 Safety Standard for Architectural Glazing Materials.
4. Glass Association of North America (GANA):
   a. GANA: Glazing Manual.
5. Insulating Glass Certification Council (IGCC).
6. Insulating Glass Manufacturers Alliance (IGMA):
   a. TM-3000 – North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use.

7. National Fire Protection Association (NFPA).
8. Building code:
   a. International Code Council (ICC):
      1) International Building Code and associated standards, 2012 Edition including all amendments, referred to herein as Building Code.

B. Safety glazing shall be provided in all locations where required by the Building Code and 16 CFR 1201.

1.4 DEFINITIONS

A. Installer or Applicator:
   1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
   2. Installer and applicator are synonymous.

1.5 SUBMITTALS

A. Shop Drawings:
   1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
   2. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Manufacturer's installation instructions.
      c. Certification that glass has been tested and approved for use in fire rated doors or walls.
         1) Copies of all test criterion.
   3. Certification that insulated glass units meet requirements of IGCC and are certified by IGCC to ASTM E2190.

B. Samples:
   1. 12 x 12 IN sample of each type, color, and thickness specified except clear glass (glass Type 1 and 2.)

C. Miscellaneous Submittals:
   1. Warranty.

1.6 WARRANTY

A. Written five (5) year warranty signed by installer to cover air and weather tightness of installation from date of Substantial Completion.

B. Written five (5) year warranty signed by manufacturer or fabricator of insulating glass units against failure of integrity of air space from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Clear glass - tempered, float and heat strengthened:
    a. Libbey-Owens-Ford.
    b. PPG.
    c. Viracon.
    d. Visteon.
2. Tinted glass - tempered, float and heat strengthened:
    a. Libbey-Owens-Ford.
    b. PPG.
    c. Viracon.
    d. Visteon.
3. Insulating glass units - tinted and clear:
    a. Libbey-Owens-Ford.
    b. PPG.
    c. Viracon.
    d. Visteon.
4. Gaskets, glazing compounds, setting blocks, spacers, sealant, sealant tape, etc., as recommended by glass manufacturer, glass unit fabricator, or as required by NFPA.

B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 MATERIALS

A. Clear Float Glass:

1. 1/4 IN thick.
2. ASTM C1036.
3. Clear glass:
    a. Type I, Class I, Quality q3.

B. Clear Tempered Float Glass:

1. 1/4 IN thick.
2. ASTM C1048.

a. Kind FT, Condition A, Type 1, Class I.

3. ANSI Z97.1.

C. Tinted Tempered Float Glass:

1. 1/4 IN thick.
2. ASTM C1048.
   a. Kind FT, Condition A, Type I, Class 2.
3. ANSI Z97.1.
4. Color: See the SCHEDULES Article in PART 3 of this Specificaton Section.

D. Insulating Glass Units:

1. ASTM E2190, Class A.
2. Two (2) sheets of 1/4 IN thick glass separated by a 1/2 IN dehydrated air space hermetically sealed.
3. Color: See the SCHEDULES Article in PART 3 of this Specification Section.

E. Insulated, Low E, Translucent Glass Units:

1. ASTM E2190, Class A.
2. Two (2) sheets of 1/4 IN thick, heat strengthened glass separated by a 1/2 IN dehydrated air space hermetically sealed.
3. Exterior glass: 1/4 IN clear, heat strengthened with Low E coating on #2 surface.
4. Interior glass: 1/4 IN clear, heat strengthened screen #3058 with V1085 simulated acid etch on the #3 surface.
5. Glass specification number based on Viracon:
   a. Exterior glass: 1/4 IN clear, heat strengthened with VE85 on #2 surface.
   b. 1/2 IN air space.
   c. Interior glass: 1/4 IN clear, heat strengthened screen #3058 with V1085 simulated acid etch on the #3 surface.
6. Provide alternate glass type to meet safety glazing requirements of the Building Code, 16 CFR 1201, and any other applicable glazing safety rules, codes, laws, etc.

F. Glazing Compounds:

1. Non-sag, non-stain type.
2. Pigmented to match frame units not requiring painting.
3. Compatible with adjacent surfaces.
4. One- or two-part polyurethane or silicone sealant for use in setting glass.

a. Provide glazing compounds which will not be affected by chemicals stored in rooms where glazing compounds are used.

G. Sealant Tape: Butyl rubber sealant tape or ribbon having a continuous neoprene shim.

H. Gaskets:

1. Flexible polyvinyl chloride or neoprene.

a. Provide gaskets which will not be affected by chemicals stored in rooms where gaskets are used.

2. Extruded of profile and hardness required to receive glass and provide a watertight installation.

3. Provide gaskets in accordance with NFPA in fire rated glazing.

I. Setting Blocks and Spacers:

1. Neoprene or EPDM, compatible with sealants used.

2. Setting blocks: 70-90 durometer.

3. Spacers: 40-50 durometer.

J. Compressible Filler Stock: Closed-cell jacketed rod stock of synthetic rubber or plastic foam.

K. Shims, Clips, Springs, Angles, Beads, Attachment Screws and Other Miscellaneous Items: As required by condition.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with recommendations of manufacturer, GANA Glazing Manual and IGMA TM-3000.

B. Install setting blocks in adhesive or sealant.

C. Install spacers inside and out, of proper size and spacing, for all glass sizes larger than 50 united inches, except where gaskets are used for glazing.

D. Provide 1/8 IN minimum bite of spacers on glass.

E. Spacer thickness to equal sealant width.

F. Prevent sealant exudation from glazing channels of insulating glass which is more than 1/2 IN thick; colored, heat absorbing, coated or laminated glass sizes larger than 75 united inches; and other glass more than 9/32 IN thick or larger than 125 united inches.

1. Leave void at heel (or install filler) at jambs and head.

2. Do not leave void (or install filler) at sill.

G. Miter cut and bond gasket ends together at corners.

H. Immediately after installation, attach crossed streamers to framing held away from glass.

I. Use polysulfide-based glazing sealants in window assembly and as perimeter sealant around frames in areas which may be exposed to chlorine gas or chlorine liquid splash or spillage.

1. See Specification Section 07 92 00 – Joint Sealants for sealants.

3.2 FIELD QUALITY CONTROL

A. Do not install glass with edge damage.

B. Do not apply anything to surfaces of glass.

C. Remove and replace damaged glass.

3.3 CLEANING

A. Maintain glass reasonably clean during construction, so that it will not be damaged by corrosive action and will not contribute to deterioration of other materials.

B. Wash and polish glass on both faces not more than seven (7) days prior to acceptance of work in each area.

1. Comply with glass manufacturer's recommendations.

3.4 SCHEDULES

A. Glass Type 1: Clear float glass.

B. Glass Type 2: NOT USED.

C. Glass Type 3: NOT USED.

D. Glass Type 4: NOT USED.

E. Glass Type 6: NOT USED.

3.5 OWNER TRAINING (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 08 90 00

LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Louvers and vents.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 07 92 00 – Joint Sealants.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. Aluminum Association (AA):
   a. 45 – Designation System for Aluminum Finishes.
2. Air Movement and Control Association (AMCA).
3. ASTM International (ASTM):
   a. B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Drawing showing location of each louver or vent, indicating size and arrangement of blank-off plates if required.
3. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's installation instructions.
   c. Color chart showing manufacturer's full line of colors including exotic and special colors for color selection by Owner’s Representative.

1.5 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Louvers:

a. Airolite Co.

b. Construction Specialties, Inc.

c. Ruskin Manufacturing.

d. Industrial Louvers, Inc.

e. American Warming.

B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 MANUFACTURED UNITS

A. Louvers:

1. 4-6 IN deep.
2. Drainable with blades at 37-1/2 degrees.
3. Continuous blade appearance.
4. ASTM B221 extruded aluminum, alloy 6063T5, minimum 0.081 IN thick.
5. Minimum free area: 8.587.00 SF for 4 x 4 FT louver.
6. Maximum pressure drop: 0.10 IN of water at 700 fpm.
7. Water penetration: 0.01 OZ/SF at 873 fpm.
8. AMCA certified.
9. Ruskin "ELF 375DX".
10. Miami-Dade Approval for use in High Velocity Hurricane Zones.
11. Basis of design: Greenheck model ESD 635D.
12. Insect screen:

a. 18-16 mesh aluminum.

b. Install in standard aluminum frame.

B. Anchors, Fasteners, Reinforcing: Aluminum or stainless steel.

C. Finish:

1. Architectural Class 1 coating per AA 45.

D. Size: Refer to Drawings for louver shapes and sizes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install anchoring and bracing accessories as required.

C. Seal around perimeter on exterior and interior.

1. See Specification Section 07 92 00 – Joint Sealants.

D. Install 0.040 IN aluminum flashing at sill to match louver.

1. See Specification Section 07 62 00 – Flashing and Sheet Metal.

3.2 OWNER TRAINING (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 09 91 00

PAINTING AND PROTECTIVE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. High performance industrial coatings (HPIC).
2. Any other coating, thinner, accelerator, inhibitor, etc., specified or required as part of a complete System specified in this Specification Section.
3. Minimum surface preparation requirements.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):
   a. D4258 – Standard Practice for Surface Cleaning Concrete for Coating.
   b. D4259 – Standard Practice for Abrading Concrete.
   c. D4261 – Standard Practice for Surface Cleaning Concrete Unit Masonry for Coating.
   d. D4262 – Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces.
   e. D4263 – Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
   f. E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
2. National Association of Pipe Fabricators (NAPF):
   a. 500-03-04 – Abrasive Blast Cleaning for Ductile Iron Pipe.
   b. 500-03-05 – Abrasive Blast Cleaning for Cast Ductile Iron Fittings.
3. National Bureau of Standards (NBS):
   a. Certified Coating Thickness Calibration Standards.

4. National Fire Protection Association (NFPA):
    a. 101 – Life Safety Code.
5. National Sanitation Foundation International (NSF).
    a. Standard 61 Drinking Water Components
6. Steel Door Institute/American National Standards Institute (SDI/ANSI):
    a. A250.10 – Test Procedure and Acceptance Criteria For Prime Painted Steel Surfaces for Steel Doors.
7. The Society for Protective Coatings (SSPC):
    a. PA 2 – Measurement of Dry Paint Thickness with Magnetic Gages.
    b. SP 1 – Solvent Cleaning.
    c. SP 2 – Hand Tool Cleaning.
    d. SP 3 – Power Tool Cleaning.
    e. SP 16 – Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-ferrous Metals.
8. The Society for Protective Coatings/NACE International (SSPC/NACE):
    a. SP 5/NACE No. 1 – White Metal Blast Cleaning.
    b. SP 6/NACE No. 3 – Commercial Blast Cleaning.
    c. SP 7/NACE No. 4 – Brush-off Blast Cleaning.
    d. SP 10/NACE No. 2 – Near-White Blast Cleaning.
    e. SP 12/NACE No. 5 – Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultrahigh Pressure Water Jetting Prior to Recoating.
    f. SP 13/NACE No. 6 – Surface Preparation of Concrete.

B. Qualifications:

C. Shop Applicator Qualifications:
1. Coating manufacturer's authorized representative shall provide written statement attesting that applicator has been instructed on proper preparation, mixing and application procedures for coatings specified.

D. Field Applicator Qualifications
1. The manufacturer shall provide written certification that the coating Contractor's supervisor and each applicator performing Work on the project have been trained and approved by the manufacturer to apply the selected coating system.
2. A written certification from the Contractor stating that they are qualified and experienced in the application of the specified coating systems.
3. Field coating applicator shall provide SSPC QP 1 Certification.

E. Miscellaneous:

1. Each paint system shall be provided through one (1) manufacturer unless noted otherwise.

2. Coating used in all corridors and stairways shall meet requirements of NFPA 101 and ASTM E84.

F. Deviation from specified mil thickness or product type is not allowed without written authorization of Owner's representative.

G. Material shall not be thinned unless approved, in writing, by paint manufacturer's authorized representative.

1.4 DEFINITIONS

A. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.

2. Installer and applicator are synonymous.

B. Approved Factory Finish: Finish on a product in compliance with the finish specified in the Specification Section where the product is specified or in Specification Section 40 05 05 – Equipment: Basic Requirements.

C. Corrosive Environment: Immersion in, or not more than 6 IN above, or subject to condensation, spillage or splash of a corrosive material such as water, wastewater, or chemical solution; or exposure to corrosive, caustic or acidic agent, chemicals, chemical fumes, chemical mixture, or solutions with pH range of 5 to 9.

D. Highly Corrosive Environment: Immersion in, or not more than 6 IN above, or subject to condensation, spillage or splash of a highly corrosive material such as water, wastewater, or chemical solution; or exposure to highly corrosive, caustic or acidic agent, chemicals, chemical fumes, chemical mixture, or solutions with pH range below five (5) or above nine (9).

E. Exposed Exterior Surface:

1. Surface which is exposed to weather but not necessarily exposed to view as well as surface exposed to view.

2. Exterior surfaces are considered corrosive environment.

a. The following areas are considered highly corrosive:

1) All chemical unloading stations and areas within 10 FT-0 IN of containment areas.

2) All chemical unloading station containment areas.

3) All areas within a 6 FT radius of chemical tank vents.

F. Finished Area: An area that is listed in or has finish called for on Room Finish Schedule or is indicated on Drawings to be painted.

G. Immersion Surface:

1. Any surface immersed in water or some other liquid.
2. Surface of any pipe, valve, or any other component of the piping system subject to condensation including the pipe support system.

H. Paint includes the following:

1. High performance industrial coatings (HPIC) include: Epoxies, urethanes, vinyl ester, waterborne vinyl acrylic emulsions, acrylates, silicones, alkyds, acrylic emulsions and any other coating listed as a HPIC.

I. Surface Hidden from View: Surfaces such as those within pipe chases, surfaces between top side of ceilings (including drop-in tile ceilings) and underside of floor or roof structures above, surfaces under overhanging walkways if over five feet above adjacent walking surfaces

J. AP: Architectural paints.

K. HPIC: High performance industrial coatings.

L. SC: Special coatings.

M. Water level for purposes of painting: See Drawings.

1.5 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Field Applicator experience qualifications.
   a. No submittal information will be reviewed until Owner’s representative has received and approved applicator qualifications.
3. Shop Applicator Qualifications
   a. The Shop Coating Applicator shall provide SSPC QP 3 Certification or the coating manufacturer’s certification for selected coating system.
4. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's application instructions.
   c. Manufacturer's surface preparation instructions.
   d. If products being used are manufactured by Company other than listed , provide complete individual data sheet comparison of proposed products with specified products including application procedure, coverage rates and verification that product is designed for intended use.

e. Contractor's written plan of action for containing airborne particles created by blasting operation and location of disposal of spent contaminated blasting media.

f. Coating manufacturer's recommendation on abrasive blasting.

g. Manufacturer's recommendation for universal barrier coat.

h. Manufacturer's recommendation for providing temporary or supplemental heat or dehumidification or other environmental control measures.

5. Manufacturer's statement regarding applicator instruction on product use.

6. Certification that High Performance Coating Systems proposed for use have been reviewed and approved by Senior Corrosion Specification Specialist employed by the coating manufacturer.

B. Samples:

1. Manufacturer's full line of colors for Owner’s Representative's preliminary color selection.

2. After preliminary color selection by Owner’s Representative provide two (2) 3 x 5 IN samples of each final color selected.

C. Miscellaneous Submittals:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver in original containers, labeled as follows:

1. Name or type number of material.

2. Manufacturer's name and item stock number.

3. Contents, by volume, of major constituents.

4. Warning labels.

5. VOC content.

1.7 WARRANTY

A. The Contractor and coating manufacturers shall warrant the coating system applications against defects and workmanship after final acceptance of the Work for a period of 5 years. The Contractor shall perform all Work and supply all equipment and materials associated with the repair of failures identified in the warranty inspection at no cost to the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS (NOT USED)

2.2 MATERIALS

A. For unspecified materials such as thinner, provide manufacturer's recommended products.

B. Paint Systems - General:

1. P = prime coat.
2. F1, F2 . . . Fn = first finish coat, second finish coat . . . . nth finish coat, color as selected by Owner's representative.
3. If two (2) finish coats of same material are required, Contractor may, at his option and by written approval from paint manufacturer, apply one (1) coat equal to mil thickness of two (2) coats specified.

C. HPIC products listed in the MATERIALS Article, Paint Systems paragraph are manufactured by Tnemec.

1. Products of other listed manufacturers are acceptable for use providing the product is of the same generic resin, requires comparable surface preparation, has comparable application requirements, meets the same VOC levels or better, does not exceed TCEQ Chapter 115.453 VOC limits, provides the same finish and color options and will withstand the atmospheric conditions of the location where it is to be applied.

D. Paint Systems (Systems not shown are not used):

1. HPIC SYSTEM #1 - Polyamidoamine Epoxy Primer with Polyamidoamine Epoxy or Waterborne Acrylic Polyurethane Finish Coat(s).

a. Prime coat:

1) P1 = 1 coat, 3 mils, Series L69 Epoxoline (Polyamidoamine Epoxy).

b. Finish coat(s):

1) Interior:

a) F1 = 1 coat, 3 mils, Series L69 Epoxoline (Polyamidoamine Epoxy).

b) F2 = 1 coat, 3 mils, Series L69 Epoxoline (Polyamidoamine Epoxy).

2. HPIC SYSTEM #4 - Zinc-Rich Urethane Primer with Polyamidoamine Epoxy or Waterborne Acrylic Polyurethane Top Coat(s).

1) P1 = 1 coat, 2.5 mils, Series 90-97 Tneme-Zinc (Zinc-Rich Urethane).

b. Finish coat(s):

1) Interior:

a) F1 = 1 coat, 3 mils, Series L69 Epoxoline (Polyamidoamine135 Chembuild (surface tolerant epoxy).

2) Exterior:

a) F1 = 1 coat, 2.5 mils, Series 1080 Endura-Shield W.B. (Waterborne Acrylic Polyurethane).

3. HPIC SYSTEM #5 - Modified Polyamidoamine Epoxy Primer with Polyamidoamine Epoxy or Waterborne Acrylic Polyurethane Top Coat(s).

a. Prime coat:

1) P1 = 1 coat, 2.0 mils, Series 135 Chembuild (Modified Polyamidoamine Epoxy).

b. Finish coat(s):

1) Interior:

a) F1 = 1 coat, 2.5 mils, Series L69 Epoxoline (Polyamidoamine Epoxy).

2) Exterior:

a) F1 = 1 coat, 2.0 mils, Series 1080 Endura-Shield W.B. (Waterborne Acrylic Polyurethane).

4. HPIC SYSTEM #9 - Modified Polyamidoamine Epoxy.

a. Prime coat:

1) P1 = 1 coat, 3 mils, Series 135 Chembuild (Modified Polyamidoamine Epoxy).

5. HPIC SYSTEM #11 - Single Pack Liquid Organic Zinc-Rich Aromatic Urethane Primer. Compound

a. Prime coat:

1) P1 = 1 coat, 3.01.5 mils, 90-97 Tneme-ZRC Galvilite Galvanized Repair Compound (Liquid Organic Zinc (Zinc-Rich UrethaneCompound).

PART 3 - EXECUTION

3.1 ITEMS TO BE PAINTED

A. General:

1. Paint the following surfaces in a corrosive or highly corrosive area, whether exposed to view or not unless otherwise specified in PCS attachments:

a. Concrete and/or concrete masonry units identified in the finish schedule as shown on drawings.

b. Conduit.

c. Ducts.

d. Galvanized metal surfaces.

2. Piping, valves, fittings, and hydrants.
3. Ductwork.
4. Conduit, device boxes, junction boxes , pull boxes .
5. Exterior and interior surfaces of ferrous metal tankage.
6. Miscellaneous ferrous metal surfaces.
7. Hollow metal doors and frames and window frames.
8. Steel pipe bollards (if not galvanized).
9. Steel lintels.
10. Steel components of concrete lintels (plain or galvanized only).
    a. Steel components shall be completely painted (with both prime and finish coats) prior to installing in the wall.
11. Exposed wood.
12. Structural steel. (if not galvanized).
13. Steel joists that are not galvanized (including bridging).
14. Copper and brass surfaces.
15. External and internal surfaces of digester covers whether sealed from direct exposure of outside atmosphere or digester atmosphere or not, and associated equipment.
    a. Internal surfaces include trusses and other inside surfaces.
16. Gas appliance flue vents and cast iron pipe plumbing vents.

B. Interior Finished Areas:
1. Refer to Room Finish Schedule on Drawings.
2. If room is scheduled in the Room Finish Schedule, the space is considered to be a finished area, therefore, paint all appurtenant surfaces within the space unless specifically noted not to be painted in the Contract Documents.
    a. If walls are not required to be painted, appurtenant concrete surfaces are not required to be painted unless specifically noted otherwise.
    b. Appurtenant surfaces include:
        1) Concrete columns, equipment pads, pipe supports, and equipment supports, underside of overhead concrete slabs which are exposed, semi-exposed or concealed from view but still exposed to the adjacent atmosphere and as noted in the finish schedule shown on drawings.
        2) Piping, valves, fittings and hydrants.

a) All bituminous coated ductile iron pipe to have coating completely removed prior to painting.

3) Miscellaneous ferrous metal surfaces that are not galvanized.

4) Hollow metal doors and frames and borrowed light window frames.

5) Ferrous metal angle supports at top of masonry walls that are not galvanized.

6) Steel lintels.

7) Steel components of concrete lintels (plain or galvanized only).

a) Steel components shall be completely painted (with both prime and finish coats) prior to installing in the wall.

C. Surfaces in Areas Not Considered Finished:
1. Paint following surfaces in areas not considered as finished area:
a. Piping, valves, fittings, and hydrants and supports.
b. Miscellaneous ferrous metal surfaces that are not galvanized .
c. Steel lintels.
d. Steel components of concrete lintels (plain or galvanized only).
1) Steel components shall be completely painted (with both prime and finish coats) prior to installing in the wall.
e. Inside and outside of ferrous metal tankage. (if not galvanized).
f. Hollow metal doors and frames and borrowed light window frames.

3.2 ITEMS NOT TO BE PAINTED

A. General: Do not paint items listed in this Article unless specifically noted in the Contract Documents to be painted.

B. Items with Approved Factory Finish: These items may require repair of damaged painted areas or painting of welded connections.

C. Electrical Equipment:

1. Do not field paint electrical equipment except where painting is specifically stated elsewhere in these Contract Documents, or where the equipment is subject to a corrosive environment and is specifically noted to be painted.

2. Pump motors to be factory painted by pump manufacturer. Color to match piping and equipment with which it is associated.

D. Other Items:

1. Stainless steel surfaces except:

a. Piping where specifically noted to be painted.

b. Banding as required to identify piping.

2. Aluminum surfaces except:

a. Where specifically shown in the Contract Documents.

b. Where in contact with concrete.

c. Where in contact with dissimilar metals.

3. Fiberglass surfaces except:

a. Fiberglass piping where specifically noted to be painted.

b. Piping supports where specifically noted to be painted.

4. Interior of pipe, ductwork, and conduits.
5. Moving parts of mechanical and electrical units where painting would interfere with the operation of the unit.
6. Code labels and equipment identification and rating plates.
7. Concealed surfaces of precolored masonry.
8. Structural steel or steel deck required to be fireproofed.
9. Clad aluminum, clad steel, anodized aluminum, PVDF coated aluminum and PVDF coated steel.
10. Prefinished wood doors and Prefinished wood trim.

a. Provide touch-up painting to damaged areas of prefinished surfaces.

11. Steel deck, unless specifically noted to be painted in these Contract Documents.
12. Standing seam metal roof, fascia, trim, and roof accessories.
13. Contact surfaces of friction-type connections.
14. Metal soffit.
15. Galvanized steel items, unless specifically noted to be painted.
16. Bituminous coated ductile iron pipe.

a. See the ITEMS TO BE PAINTED Article, Interior Finished Areas paragraph of this Specification Section.

3.3 SCHEDULE OF ITEMS TO BE PAINTED AND PAINTING SYSTEMS

A. Concrete:

1. Interior cast-in-place and interior precast surfaces (other than prefinished panels):
SYSTEM #15 .

a. Includes equipment bases, pads, walls, beams, slabs, columns, ceilings, pedestals, pilasters, etc.

2. Exterior cast-in-place and exterior precast surfaces (other than SYSTEM #13).

B. Concrete Masonry Units:

1. Interior smooth faced standard (heavy) weight: SYSTEM #16 .
2. Exterior smooth faced standard (heavy) weight: SYSTEM #27.
3. Exterior rough faced standard (heavy) weight: SYSTEM #17.
4. Interior face of exterior precolored standard (heavy) weight: SYSTEM #16 .
5. Interior smooth face of exterior prefaced masonry units: SYSTEM #32 .

C. Wood:
1. Interior Paint: SYSTEM #18.
2. Interior stain and varnish: SYSTEM #42.

D. Steel:
1. Structural:
   a. Immersion or non-immersion surfaces subject to highly corrosive environment: SYSTEM #24 .
   b. Immersion surfaces subject to corrosive environment and not requiring NSF approval: SYSTEM #2.
   c. Immersion surfaces subject to corrosive or highly corrosive environment requiring NSF approval: SYSTEM #23.
   d. Non-immersion surfaces subject to corrosive environment: SYSTEM #7.
   e. All other surfaces (non-corrosive dry environment): SYSTEM #1.
2. Joists:
   a. Exposed: SYSTEM #6.
   b. Above lay-in acoustical or suspended GWB ceiling: SYSTEM #9.
3. Potable water storage tanks and all ferrous metal items subject to contact with potable water requiring NSF approval: SYSTEM #23.
   a. Includes all ferrous metal surfaces subject to splash, spillage, vapor, condensation or other chronic potable water exposure.
   b. Also includes ferrous metal surfaces within concrete potable water storage tankage requiring NSF approval.
   c. Exterior surfaces of potable water storage tanks: SYSTEM #7.

E. Miscellaneous ferrous metals (non-corrosive dry environment): SYSTEM #1.
1. Not for coating galvanized steel, steel (hollow metal) doors, steel (hollow metal) door and window frames, and products with approved factory finishes.

F. Ferrous metals subject to corrosive environment: SYSTEM #2.

1. Includes ferrous metal components of equipment located in corrosive environments such as bar screens, grit washers, wetted parts of aerobic digester covers, final clarifier covers and mechanisms, sluice gates, slide gates, trickling filter mechanisms, bare steel handrails and guardrails, piping, stairs, tank or equipment bridges, pumps, and similar items.
2. Does not include items subject to contact with potable water.

G. Ferrous metals subject to highly corrosive environment: SYSTEM #35.

1. Includes ferrous metal components of equipment located in highly corrosive environments such as bar screens, grit washers, wetted parts of anaerobic digester covers, primary clarifier covers and mechanisms, sluice gates, slide gates, trickling filter mechanisms, piping, tank or equipment bridges, pumps and similar items.
2. Does not include items subject to contact with potable water.

H. Galvanized Metals:

1. Field touch-up where top coat is required: SYSTEM #3, prime and first finish coat only.
    a. Prime paint only the damaged area.
2. Assembled galvanized steel items: SYSTEM #3.
3. Field touch-up of galvanized surfaces not requiring a finish top coat: SYSTEM #11.
    a. Paint only damaged areas.
4. Galvanized pipe bollards: SYSTEM #3.

I. Steel (hollow metal) doors and frames and window frames primed in the factory in accordance with SDI/ANSI A250.10.

1. For doors and frames in non-corrosive environments: SYSTEM #5.
2. For doors and frames in corrosive or highly corrosive environments: SYSTEM #5.1.
    a. Specifically including all chemical room door openings having fiberglass reinforced plastic doors with hollow metal frames.

J. Steel equipment with existing paint coating or factory-applied prime or finish coating not complying with this Specification Section: SYSTEM #5.

1. Includes equipment specifically indicated in the Contract Documents to be painted.
2. Factory-applied coats to remain.

K. Non-ferrous metals (except galvanized): SYSTEM #3.

1. Includes copper, brass, aluminum and aluminum flashing specifically indicated on the Drawings to be painted.

L. Plastic Surfaces:
   1. PVC, FRP, and CPVC surfaces: SYSTEM #3.
      a. Includes tankage and piping.

M. Electrical Conduit:
   1. Galvanized: SYSTEM #3.
   2. PVC coated: SYSTEM #3.

N. Pipe, Valves, and Fittings:
   1. Bare steel pipe bollards: SYSTEM #2.
   2. Steel, cast-iron, and uncoated ductile iron: SYSTEM #2.
   3. Stainless steel: SYSTEM #1.
   4. Brass and bronze: SYSTEM #3.
   5. Steel aeration piping: SYSTEM #8.
   6. PVC and CPVC piping (exterior only): System #3.

O. Pipe and duct insulation: SYSTEM #12.

P. Aluminum buried in concrete, between dissimilar metals and dissimilar materials: SYSTEM #19.

Q. Aluminum colored pipe thread touch-up, and aluminum colored finish where top coat is not required: SYSTEM #21.
   1. Not for coating aluminum material.

R. Steel pipe, ducts, and equipment subject to maximum high temperatures of 400 DegF: SYSTEM #8.

S. Emergency generator engine exhaust piping: SYSTEM #10.

T. Interior gypsum board:
SYSTEM #14 .

U. Field painting of fusion bonded epoxy coated piping, valves, couplings, etc.:
SYSTEM #43.

3.4 PREPARATION

A. General:
   1. Verify that atmosphere in area where painting is to take place is within paint manufacturer's acceptable temperature, humidity and sun exposure limits.
      a. Provide temporary heating, shade and/or dehumidification as required to bring area within acceptable limits.
         1) Provide temporary dehumidification equipment properly sized to maintain humidity levels required by paint manufacturer.

2) Provide clean heat with heat exchanger type equipment sufficient in size to maintain temperature on a 24 HR basis.

a) Vent exhaust gases to exterior environment.

b) No exhaust gases shall be allowed to vent into the space being painted or any adjacent space.

2. Prepare surfaces to be painted in accordance with coating manufacturer's instructions and this Specification Section unless noted otherwise in this Specification Section.

a. Where discrepancy between coating manufacturer's instructions and this Specification Section exists, the more stringent preparation shall be provided unless approved otherwise, in writing, by the Owner's Representative.

3. Remove all dust, grease, oil, compounds, dirt and other foreign matter which would prevent bonding of coating to surface.

4. Adhere to manufacturer's recoat time surface preparation requirements.

a. Surfaces that have exceeded coating manufacturer's published recoat time and/or have exhibited surface chalking shall be prepared prior to additional coating in accordance with manufacturer's published recommendations.

1) Minimum SSPC SP 7/NACE No. 4 unless otherwise approved by Owner's Representative.

B. Protection:

1. Protect surrounding surfaces not to be coated.

2. Remove and protect hardware, accessories, plates, fixtures, finished work, and similar items; or provide ample in-place protection.

C. Prepare and paint before assembly all surfaces which are inaccessible after assembly.

D. Wood:

1. Sandpaper smooth, then dust.

2. Seal all knots, pitch and resinous sapwood after priming coat has dried.

3. Putty nail holes and minor defects to match wood color.

E. Ferrous Metal:

1. Prepare ductile iron pipe in accordance with pipe manufacturer's recommendations and NAPF.

a. All piping, pumps, valves, fittings and any other component used in the water piping system that requires preparation for painting shall be prepared in accordance with requirements for immersion service.

1) Pipe: NAPF 500-03-04.

2) Fittings: NAPF 500-03-05

b. Prepare all areas requiring patch painting in accordance with recommendations of manufacturer and NAPF.

c. Remove bituminous coating per piping manufacturer, paint manufacturer and NAPF recommendations.

1) The most stringent recommendations shall apply.

2. Complete fabrication, welding or burning before beginning surface preparation.

a. Chip or grind off flux, spatter, slag or other laminations left from welding.

b. Remove mill scale.

c. Grind smooth rough welds and other sharp projections.

3. Solvent clean in accordance with SSPC SP 1 or detergent and low-pressure water clean in accordance with SSPC SP 12/NACE No. 5 all surfaces scheduled to receive additional SSPC surface preparation.

4. Surfaces subject to corrosive or highly corrosive environment and all surfaces subject to immersion service:

a. Near-white blast clean in accordance with SSPC SP 10/NACE No. 2.

5. All interior and exterior structural steel not included in corrosive, highly corrosive or immersion service surfaces:

a. Minimum commercial blast clean in accordance with SSPC SP 6/NACE No. 3.

6. Surfaces subject to high temperatures.

a. Heat in excess of 600 DegF: SSPC SP 10/NACE No. 2.

b. Heat in excess of 200 DegF but less than 600 DegF: SSPC SP 6/NACE No. 3.

7. Surfaces of steel joists and steel trusses:

a. Commercial blast clean the major portion of the truss in accordance with SSPC SP 6/NACE No. 3.

b. Power tool or hand tool clean tight connection areas and other difficult to access areas in accordance with SSPC SP 2 or SSPC SP 3.

8. Steel surfaces scheduled to receive SYSTEM #24 or #35:9

a. White metal blast clean in accordance with SSPC SP 5/NACE No. 1.

b. Provide 2-1/2 to 3 mil anchor profile for SYSTEMS #24 and #359.

9. All fusion bonded epoxy coated surfaces identified to be field painted:

a. Remove all traces of gloss finish by sanding or by abrasive brush blasting.

b. Clean surface after removing gloss finish to remove sanding or blasting residue.

10. Restore surface of field welds and adjacent areas to original surface preparation.

11. Black iron piping: Remove surface varnish by solvent or waterjet and detergent cleaning or brush-off blast cleaning in accordance with SSPC SP 7/NACE No. 4.

F. Hollow Metal:

1. Clean in accordance with SSPC SP 1 or SSPC SP 12/NACE No. 5 and in accordance with hollow metal manufacturer.

G. Galvanized Steel and Non-ferrous Metals:

1. Solvent clean in accordance with SSPC SP 1 followed by brush-off blast clean in accordance with SSPC SP 16 to remove zinc oxide and other foreign contaminants.

a. Provide uniform 1 mil profile surface.

H. Abrasive blast clean the following equipment or surfaces regardless of previous finish, if any.

I. Gypsum Wallboard:

1. Repair minor irregularities left by finishers.

2. Avoid raising nap of paper face on gypsum wallboard.

3. Verify moisture content is less than 8 percent before painting.

J. Concrete:

1. Cure for minimum of 28 days.

2. Verify that concrete surfaces have been cleaned and that voids have been patched in accordance with Specification Section 03 31 32 – Concrete Finishing and Repair of Surface Defects.

a. Concrete surfaces shall be cleaned in accordance with ASTM D4258.

3. Mechanically abrade concrete surfaces in accordance with ASTM D4259 as recommended by coating manufacturer.

4. Abrasive blast concrete surfaces in accordance with SSPC SP 13/NACE No. 6 to provide profile recommended by coatings manufacturer in accordance with ICRI Technical Guideline 310.2 Concrete Surface Profile 4.

5. Test pH of surface to be painted in accordance with ASTM D4262.

a. If surface pH is not within coating manufacturer's required acceptable range, use methods acceptable to coating manufacturer as required to bring pH within acceptable range.

b. Retest pH until acceptable results are obtained.

6. Verify that moisture content of surface to be painted is within coating manufacturer's recommended acceptable limits.
    a. Test moisture content of surface to be coated in accordance with ASTM D4263.
    b. After remedial measures have been taken to lower or raise moisture content, retest surface until acceptable results are obtained.

K. Concrete Unit Masonry:
1. Cure for minimum of 28 days.
2. Remove all mortar spatters and protrusions.
3. Verify that concrete unit masonry surfaces have been cleaned in accordance with Specification Section 04 22 00 – Concrete Masonry and ASTM D4261.
4. Test pH of surface to be painted in accordance with ASTM D4262.
    a. If surface pH is not within coating manufacturer's required acceptable range, use methods acceptable to coating manufacturer as required to bring pH within acceptable limits.
    b. Retest pH until acceptable results are obtained.
5. Verify that moisture content of surface to be painted is within coating manufacturer's recommended acceptable limits.
    a. Test moisture content of surface to be coated in accordance with ASTM D4263.
    b. After remedial measures have been taken to lower or raise moisture content, retest surface until acceptable range is obtained.

L. Metal Surface Preparation by Abrasive Blasting:
1. All abrasive-blasted ferrous metal surfaces shall be inspected immediately prior to application of paint coatings.
    a. Inspection shall be performed to determine cleanliness and profile depth of blasted surfaces and to certify that surface has been prepared in accordance with these Specifications.
2. Schedule the abrasive blasting operation so blasted surfaces will not be wet after blasting and before painting.
3. Perform additional blasting and cleaning as required to achieve surface preparation required.
    a. Prior to painting, reblast surfaces allowed to set overnight and surfaces that show rust bloom.
    b. Surfaces allowed to set overnight or surfaces which show rust bloom prior to painting shall be reinspected prior to paint application.

4. Profile depth of blasted surface: Not less than 1 mil or greater than 2 mils unless required otherwise by coating manufacturer.
5. The Field Coating Applicator shall abrasive blast the shop coated surfaces per SSPC SP7 prior to the application of the final coats.
6. The Field Coating Applicator shall not apply a coating on a bare steel surface that has not been prepared to the required SSPC SP6, SP10 or SP5 standard. Special attention shall be given to uncoated steel weld joints, coating holdbacks, and bare metal.
7. Provide compressed air for blasting that is free of water and oil.
   a. Provide accessible separators and traps.
8. Confine blast abrasives to area being blasted.
   a. Provide shields of polyethylene sheeting or other such barriers to confine blast material.
   b. Plug pipes, holes, or openings before blasting and keep plugged until blast operation is complete and residue is removed.
9. Protect nameplates, valve stems, rotating equipment, motors and other items that may be damaged from blasting.
10. Reblast surfaces not meeting requirements of these Specifications.
11. Abrasive blasting media may be recovered, cleaned and reused providing Contractor submits, for Owner’s representative's review, a comprehensive recovery plan outlining all procedures and equipment proposed in reclamation process.
12. Properly dispose of blasting material contaminated with debris from blasting operation not scheduled to be reused.

M. All Plastic Surfaces and Non-Ferrous Surfaces Except Galvanized Steel:
   1. Sand using 80-100 grit sandpaper to scarify surfaces.

3.5 APPLICATION

A. General:
   1. Thin, mix and apply coatings by brush, roller, or spray in accordance with manufacturer's installation instructions.
      a. Application equipment must be inspected and approved in writing by coating manufacturer.
      b. Hollow metal shall be spray applied only.
   2. Temperature and weather conditions:
      a. Do not paint surfaces when surface temperature is below 50 DegF unless product has been formulated specifically for low temperature application and application is approved in writing by Owner’s representative and paint manufacturer's authorized representative.

b. Avoid painting surfaces exposed to hot sun.

c. Do not paint on damp surfaces.

3. Immediately after surface has been inspected , apply structural steel and miscellaneous steel prime coat in the factory.

   a. Finish coats shall be applied in the factory.

   b. Prime coat referred to here is prime coat as indicated in this Specification.

      1) Structural steel and miscellaneous steel prime coating applied in factory (shop) as part of Fabricator's standard rust inhibiting and protection coating is not acceptable as replacement for specified prime coating.

4. Provide complete coverage to mil thickness specified.

   a. Thickness specified is dry mil thickness.

   b. All paint systems are "to cover." In situations of discrepancy between manufacturer's square footage coverage rates and mil thickness, mil thickness requirements govern.

   c. When color or undercoats show through, apply additional coats until paint film is of uniform finish and color.

5. If so directed by Owner’s Representative, do not apply consecutive coats until Owner’s Representative has had an opportunity to observe and approve previous coats.

6. Apply materials under adequate illumination.

7. Evenly spread to provide full, smooth coverage.

8. Work each application of material into corners, crevices, joints, and other difficult to work areas.

9. Avoid degradation and contamination of blasted surfaces and avoid intercoat contamination.

   a. Clean contaminated surfaces before applying next coat.

10. Smooth out runs or sags immediately, or remove and recoat entire surface.

11. Allow preceding coats to dry before recoating.

    a. Recoat within time limits specified by coating manufacturer.

    b. If recoat time limits have expired re-prepare surface in accordance with coating manufacturer's printed recommendations.

12. Allow coated surfaces to cure prior to allowing traffic or other work to proceed.

13. Coat all aluminum in contact with dissimilar materials.

14. When coating rough surfaces which cannot be backrolled sufficiently, hand brush coating to work into all recesses.

15. Backroll concrete and masonry surfaces with a roller if paint coatings are spray applied.

B. Prime Coat Application:

1. Prime all surfaces indicated to be painted.
    a. Apply prime coat in accordance with coating manufacturer's written instructions and as written in this Specification Section.
2. Ensure field-applied coatings are compatible with factory-applied coatings.
    a. Employ services of coating manufacturer's qualified technical representative.
        1) Certify through material data sheets.
        2) Perform test patch.
    b. If field-applied coating is found to be not compatible, require the coating manufacturer's technical representative to recommend, in writing, product to be used as barrier coat, thickness to be applied, surface preparation and method of application.
    c. At Contractor's option, coatings may be removed, surface re-prepared, and new coating applied using appropriate paint system listed in the MATERIALS Article, Paint Systems paragraph of this Specification Section.
        1) All damage to surface as result of coating removal shall be repaired to original condition or better by Contractor at no additional cost to Owner.
3. Prime ferrous metals embedded in concrete to minimum of 1 IN below exposed surfaces.
4. Back prime all wood scheduled to be painted, prior to installation.
5. After application of primer to gypsum board surfaces, inspect surface and repair in accordance with the PREPARATION Article of this Specification Section.
    a. Re-prime repaired surfaces to uniform finish before application of finish coat(s).
6. Apply zinc-rich primers while under continuous agitation.
7. Ensure abrasive blasting operation does not result in embedment of abrasive particles in paint film.
8. Brush or spray bolts, welds, edges and difficult access areas with primer prior to primer application over entire surface.
9. Touch up damaged primer coats prior to applying finish coats.
    a. Restore primed surface equal to surface before damage.

10. All surfaces of steel lintels and steel components of concrete lintels used in wall construction shall be completely painted with both prime and finish coats prior to placing in wall.

C. Finish Coat Application:

1. Apply finish coats in accordance with coating manufacturer's written instructions and in accordance with this Specification Section; manufacturer instructions take precedent over these Specifications.
2. Touch up damaged finish coats using same application method and same material specified for finish coat.
   a. Prepare damaged area in accordance with the PREPARATION Article of this Specification Section.

3.6 COLOR CODING

A. Color and band piping in accordance with the SCHEDULES Article of this Specification Section.

1. Band piping using maximum of three (3) different colors at 20 FT maximum centers.
2. Factory painted piping shall be color banded in the factory per the Schedule in the SCHEDULE Article of this Specification Section.
3. Place bands:
   a. Along continuous lines.
   b. At changes in direction.
   c. At changes of elevation.
   d. On both sides of an obstruction (e.g., wall, ceiling) that painted item passes through.
4. Band width for individual colors (pipe diameter measured to outside of insulation, if applicable):
   a. Piping up to 8 IN DIA: 2 IN minimum.
   b. Piping greater than 8 IN up to 24 IN DIA: 4 IN minimum.
   c. Piping greater than 24 IN up to 48 IN DIA: 6 IN minimum.
   d. Piping greater than 48 IN DIA: 8 IN minimum.

3.7 FIELD QUALITY CONTROL

A. Contractor to provide protection for surfaces painted with epoxy coatings to prevent chalking.

1. Surfaces showing chalking will not be accepted regardless of condition of paint film.

B. Maintain Daily Records:

1. Record the following information during application of each coat of paint applied:
   a. Date, starting time, end time, and all breaks taken by painters.
   b. For exterior painting:
      1) Sky condition.
      2) Wind speed and direction.
   c. Air temperature.
   d. Relative humidity.
   e. Moisture content and surface temperature of substrate prior to each coat.
   f. Provisions utilized to maintain work area within manufacturer's recommended application parameters including temporary heating, ventilation, cooling, dehumidification and provisions utilized to mitigate windblown dust and debris from contaminating the wet paint film.
   g. Record environmental conditions, substrate moisture content and surface temperature information not less than once every four (4) hours during application.
      1) Record hourly when temperatures are below 50 DegF or above 100 DegF.
2. Record the following information daily for the paint manufacturer's recommended curing period:
   a. Date and start time of cure period for each item or area.
   b. For exterior painting:
      1) Sky conditions.
      2) Wind speed and direction.
   c. Record environmental conditions not less than once every 12 hours.
      1) Record once every four (4) hours when ambient temperature is below 35 DegF.
   d. Provisions utilized to protect each item or area and to maintain areas within manufacturer's recommended curing parameters.
3. Format for daily record to be computer generated.

C. Measure wet coating with wet film thickness gages.

D. Measure coating dry film thickness in accordance with SSPC PA 2 using a digital magnetic-type dry film thickness gauge, Elcometer 456, or equal.
   1. Owner’s Representative may measure coating thickness at any time during project to assure conformance with these Specifications.

E. Measure surface temperature of items to be painted with surface temperature gage specifically designed for such.

F. Measure substrate humidity with humidity gage specifically designed for such.

G. Provide wet paint signs.

3.8 CLEANING

A. For every 100 square feet, or less, of surface blasted, the surface profile shall be tested with the use of Press-o-Film as manufactured by Testex, or other RP0287 approved equal, at locations to be determined by the INSPECTOR. The replica tape thickness shall be measured using a dial micrometer manufactured by Testex, or other ASTM D4417 Type C approved equal. For each test area, three replica tape tests shall be performed within a single test area 12 inches in diameter. For each test area, the three replica tape thickness values shall be recorded and must be within 10% of the coating manufacturer's recommended profile.

B. Clean paint spattered surfaces.

   1. Use care not to damage finished surfaces.

C. Upon completion of painting, replace hardware, accessories, plates, fixtures, and similar items.

D. Remove surplus materials, scaffolding, and debris.

3.9 SCHEDULE

A. Piping and Pipe Banding Color Schedule (Colors based on Tnemec):
   1. Match existing piping and banding colors.
   2. Piping systems shown in italics with no paint color shown for the pipe but having paint colors shown for the banding color are systems that will be banded using material other than paint.
      a. Refer to Specification Section 10 14 00 – Identification Devices for the piping system and banding material and refer to this Specification Section and this Schedule for the banding colors.

      b. Finished water piping to include suction header and pump suction to high service pumps, high service pump discharge and discharge header from the pumps.

3.10 OWNER TRAINING (NOT USED)

END OF SECTION

SECTION 13 34 19

METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal building system:
    a. Building system design.
    b. Materials.
    c. Fabrication.
    d. Shipment.
    e. Erection of building system.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 - General Requirements.
3. Division 03 - Concrete.
4. Section 07 92 00 – Joint Sealants.
5. Section 08 15 00 – Fiberglass Reinforced Plastic (FRP) Doors and Borrowed Light Frames.
6. Section 08 51 13 – Aluminum Windows
7. Section 08 33 23 – Steel Rolling Overhead Doors
8. Section 08 70 00 – Finish Hardware
9. Section 08 81 00 – Glass and Glazing
10. Section 09 91 00 – Painting and Protective Coatings.

1.2 MEASUREMENT AND PAYMENT

A. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. American Architectural Manufacturers Association (AAMA):

a. 621, Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates.

2. American Institute of Steel Construction (AISC):
    a. 303, Code of Standard Practice for Steel Buildings and Bridges (referred to herein as AISC Code of Standard Practice).
3. ASTM International (ASTM):
    a. A36, Standard Specification for Carbon Structural Steel.
    b. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
    c. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
    d. A490, Standard Specification for Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.
    e. A792, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
    f. C991, Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings.
    g. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
4. American Welding Society (AWS):
    a. D1.1, Structural Welding Code - Steel.
5. Metal Building Manufacturer's Association (MBMA):
    a. Low Rise Building Systems Manual.
6. Research Council on Structural Connections (RCSC):
    a. Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts, referred to herein as Specification for Structural Joints.
7. Steel Structures Painting Council/NACE International (SSPC/NACE).
    a. SP 6/NACE No. 3, Commercial Blast Cleaning.
8. Underwriters Laboratories, Inc. (UL):
    a. Building Materials Directory.
9. Building code:
    a. International Code Council (ICC):
        1) International Building Code and associated standards, 2012 Edition including all amendments, referred to herein as Building Code.

B. Qualifications:

1. Manufacturer's qualifications:

a. Manufacturer must be member in good standing of the MBMA.

b. Manufacturer must be an AISC Quality Certified Fabricator in the category of Metal Building Systems (MB).

2. Erector qualification:

a. Erector (installer) must be approved in writing by metal building manufacturer.

b. Erector must have minimum of 10 years current experience in erection of similar structures.

3. Manufacturer's Structural Engineer: Registered in the state where project is located.

1.4 DEFINITIONS

A. Code: The word "code" refers to the Building Code

B. Installer, Erector or Applicator:

1. Installer, erector or applicator is the person actually installing, erecting or applying the product in the field at the Project site.

2. Installer, erector and applicator are synonymous.

C. PVDF: Polyvinylidene fluoride.

1. Nomenclature as listed in Bibliography of the MBMA Low Rise Building Systems Manual.

1.5 SYSTEM DESCRIPTION

A. Building shall be insulated, single span pin-connected base column rigid frame type, with vertical walls and gable type roof.

1. Provide cross bracing in the side walls perpendicular to the rigid frame.

1.6 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Manufacturer's technical reference manual containing all of the manufacturer's standard construction details and specifications.

1) Manufacturer's erection manual containing all details and methods for installation of building frame, roof system, wall system, and accessories.

2) Edit to mark out items not used for this installation.

c. Certificate signed and sealed by Professional Engineer that structural calculations have been performed in accordance with project criteria and standard engineering practices.

1) Include list of design loads and loads transmitted to foundation through columns or walls and location where loads occur.

2) Include foundation/footing design and soil preparations.

3) Engineer licensed in Texas.

3. Fabrication drawings:

a. Erection drawings minimum scale: 1/8 IN = 1 FT-0 IN.

b. Details and sections minimum scale: 1-1/2 IN = 1 FT-0 IN.

c. List of all design loads and combination of loads.

d. Size and location of each component of the building.

1) Include clearance under structural framing members.

2) Include cross-section of components.

e. Fasteners and details of fasteners connecting each component of the building.

f. Size, location and details of anchor bolts, base plates, and all other components fastened to the foundation.

g. Details of wall panels, roof panels, finishes, flashings, closures, closure strips, trim, gutters, downspouts, calking, and all other miscellaneous components.

B. Samples:

1. Metal color and finish samples of roof and wall panels, roof trim, wall trim, and interior liner panel colors for Owner’s representative's selection.

2. Color chart is not acceptable.

C. Miscellaneous Submittals:

1. Manufacturer's and Erector's Qualifications.

2. Manufacturer's approval of erector.

1.7 WARRANTY

A. Manufacturer's standard warranty.

B. Manufacturer's standard warranty for factory applied PVDF coating system against blistering, chipping, cracking, peeling, or color fading of wall and roof panels.

C. Warranty commences on date of Substantial Completion.

D. Provide notice of any exceptions taken to warranties.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS (NOT USED)

2.2 MATERIALS

A. Structural Members: Galvanized steel.

B. Anchor Bolts:

1. ASTM A307, ASTM A36, or equal, galvanized steel.
2. Embedment details to be developed by Owner’s Engineer upon receipt of anchor bolt and loading information for approved Shop Drawings from building manufacturer.

C. Fasteners:

1. Building frame, girts, and purlins: Galvanized ASTM A325 or ASTM A307 bolts.
2. Roof and wall panels: Carbon Steel, zinc coated or approved equal.
3. Miscellaneous fasteners: Corrosion resistant.

D. Any structural member to be hot-dipped galvanized shall be minimum 12 GA thickness.

E. Roof and Wall Panels: Steel.

F. Insulation:

1. Wall: Fiberglass, ASTM C991, Type I.
2. Roof:
    a. Fiberglass, ASTM C991, Type I.

G. Translucent Panels: Fiberglass or acrylic.

H. Gutters and Downspouts: Same material as wall panels.

I. Grout: See Division 03.

J. Closures: Neoprene.

K. Calking and Sealants: See Specification Section 07 92 00.

L. Trim: Same material as wall or roof panel.

2.3 ACCESSORIES

A. Overhead Doors: See Division 08.

B. Fiberglass Pedestrian Doors and Frames: See Specification Section 08 15 00.

C. Insulation:

1. Glass or other inorganic fibers and resinous binders formed into flexible blankets or semi-rigid sheets with vinyl or aluminum foil vapor retarder.
2. Thermal conductivity (k-value at 75 DegF): 0.27.
3. Flame spread: ASTM E84, not greater than 25.
4. Minimum thickness – 3-1/4 IN (R-10).
5. Cover all exposed insulation with bird proof netting.

D. Windows:

1. General:
    a. Sizes and types as indicated on the Drawings.
    b. Complete unit with all required hardware, framing, fasteners, glazing, weatherstripping, and accessories.
    c. Refer to Specification Section 08 81 00 for glass requirements.
2. Fixed and/or projected windows:
    a. Extruded aluminum sash ASTM B221, 6063.
        1) Minimum 0.062 IN thickness.
        2) Minimum 1-1/2 IN deep sash.
    b. Hardware: White bronze.
    c. Screen: Extruded aluminum frame with 18-16 aluminum mesh.
    d. Glazing channel capable of accepting maximum of 1/4 IN glass.
    e. Finish: Manufacturer's standard lacquer finish.
    f. Provide trim to cover all exposed areas of window frames to match with the wall panels.

E. Framed Openings:

1. Walls:
    a. Provide all necessary subframing to support wall openings for doors, windows, louvers, pipe or duct penetrations, etc.
        1) Material gage to be determined by metal building manufacturer for size of opening.
    b. Size and location of opening as shown on the Drawings.
    c. Jamb, lintel and girts:

1) Steel:

a) Factory applied prime coat per Specification Section 09 91 00.

2) Metal building manufacturer responsible for providing correct size opening for penetration scheduled, shown or specified.

d. Provide trim to cover all exposed areas of opening frames to match with the wall panels.

2. Roofs:

a. Provide all necessary roof subframing to support roof mounted equipment and to frame roof penetrations.

1) Material gage to be determined by metal building manufacturer for size of equipment or opening.

b. Location of roof mounted equipment and/or roof or wall opening as shown on the Drawings.

c. Purlins, angles, clips:

1) Steel:

a) Factory applied prime coat per Specification Section 09 91 00.

2) Metal building manufacturer responsible for providing correct size of opening for penetration scheduled, shown or specified.

F. Roof Crickets:

1. Provide roof crickets on all roof curbs to direct water to each side of the curb.
2. Roof cricket material shall be same material as roof panels.

G. Gutters and Downspouts:

1. Size: Provide minimum 4 x 4 IN gutter and minimum 3 x 5 IN downspout in manufacturer's standard profile best suited for project.
2. Minimum 24 GA steel.
3. Corrosion protection treatment and final finish same as roof panels.
4. Expansion joints: 150 FT maximum spacing but not less than 1 per side of building requiring gutters.
5. Locate/arrange downspouts to avoid drainage on sidewalks, landings, stoops, driveways, etc.

H. Exhaust fans: Aluminum or stainless steel with backward inclined centrifugal fan wheel.

1. Fans (Exhaust):

a. V-belt driven or direct drive connected to a low speed TEFC motor.

1) V-belt drive fans: Enclosed in an extruded 0.04 IN thick (minimum) aluminum penthouse with fan, drive, motor and accessories in separate compartment, out of air stream.

2) Direct drive fans: Sparkproof, non-ferrous wheels with motor in separate compartment, arranged for explosive vapor exhaust.

3) Fans to have disconnect device factory installed and wired in motor compartment.

b. Framed Operable Louvers for Exhaust Fans:

1) Frame: 18 GA minimum, 3 IN deep.

2) Slats: 20 GA minimum.

3) Minimum G90 galvanized per ASTM A653.

4) Screen: #4 galvanized hardware cloth.

5) Factory applied prime painted.

6) Open position: 45 DegF.

I. Roof Penetration Flashing (Maximum 13 IN DIA):

1. Flashing material: EPDM rubber with an aluminum sealing ring base.
2. Minimum projection above the weather surface of the roof: 8 IN.
3. Configuration of the flanges to match the roof panel.

2.4 BUILDING DESIGN CRITERIA

A. Critical Dimensions:

1. Roof slope: 2:12.
2. Provide minimum clear height of 16 FT at lowest interior structure line.
3. Provide minimum clear inside dimensions as noted on the Drawings.

B. Building Foundation:

1. All footings, pedestals, piers, foundations and floor slabs shall be designed by Contractor, sealed and signed by a registered Engineer, based on assumed loadings and reactions provided by metal building manufacturer. Design documents and drawings shall be reviewed by SJRA prior to construction.
2. All anchor bolts will be designed by manufacturer based on assumed loadings and reactions.

a. Do not construct these members until Owner's representative has verified design with approved Shop Drawings of metal building being supplied.

C. Modifications:

1. Buildings which vary dimensionally from those indicated may be bid providing:
    a. Minimum interior horizontal dimensions and clear heights are maintained.
    b. Door and window locations and sizes are maintained.
2. Design changes must be approved by Owner's Representative prior to constructing changed item or system.
3. Contractor is responsible for incorporating any necessary changes to foundations, mechanical, or electrical systems or to any other building component.
    a. Design changes must be approved by Owner's representative prior to constructing changed item or system.
4. Itemize modifications in a separate attachment to the bid form and include all modifications in the bid price.
5. Completed building to be free of excessive noise from wind induced vibrations under ordinary weather conditions to be encountered at location of erection, and meet all specified design requirements listed below.

D. Roof Live Loads:

1. Design structure for roof live loading as set forth in the Building Code.

E. Snow Loads:

1. Design structure for snow loading as set forth in the Building Code.

F. Wind Loads:

1. Design structure for wind loading as set forth in the Building Code.
    a. Project site conditions are as follows:
        1) Basic wind speed: 120 mph.
        2) Site exposure: Class B.
        3) Site-structure resonance: 2.0 unless analysis, submitted to and approved by the Owner's representative, shows a lesser value may be used.

G. Auxiliary Loads:

1. Magnitude and location of auxiliary loads as shown on Drawings and as specified.
    a. Contractor to coordinate and verify magnitude and location of auxiliary loads before fabrication.

H. Combination of Loads:

1. The combining of dead, live, wind, seismic and auxiliary loads for design purposes shall be set forth in the Building Code, unless otherwise specified.
2. Horizontal sway deflection of building due to combination of required design loads: 2 IN.
3. Deflection of purlins and secondary members not to exceed L/180 of its span when supporting applicable vertical live, dead, and auxiliary loads.

2.5 FABRICATION

A. General:

1. Fabricate building structure, roof and wall panels, accessories and trim in accordance with requirements of AISC and MBMA.
2. Provide all necessary clips, flashing angles, caps, channels, closures, bases and any other miscellaneous trim required for complete water and airtight installation.
    a. Provide an inside closure at the base of all corrugated panels and an outside closure at the top of all corrugated panels in addition to all other closure strips required.
        1) Form closure strips to fit the corrugation of the metal panels and securely support in place.
        2) Closure strips shall fit between corrugated panels and trim or flashing as required to completely separate the interior of the building from the exterior.
    b. Provide flashing at all intersections of wall panels and roof panels, and above all openings in wall and roof panels, in addition to all other flashing required.
        1) Form flashing:
        2) To completely contain water on the outside of the building.
            a) To be watertight and securely fastened in place.
    c. Provide calking at all edges where metal panel trim or flashing is adjacent to the foundation of the building in addition to all other calking required.
        1) Securely adhere calk material to the foundation and the metal panels trim or flashing.
3. Provide roof and wall insulation with factory laminated vinyl facing with foil scrim.
    a. UL flame spread 25 or less.
    b. Perm rating of vinyl not more than 0.02.
    c. Wall insulation minimum R-10.
    d. Roof insulation minimum R-10.

4. At door and window and louver openings, provide additional framing and fasteners as required to structurally replace the wall panel and/or framing displaced.
5. Fabricate and prepare material for shipment knocked down.
6. Factory punch frame to receive all fasteners.
7. Finishes:
    a. Clean ferrous surfaces of oil, grease, loose rust, loose mill scale, and other foreign substances.
        1) Clean all primary and secondary structural steel members, not noted as being galvanized, in accordance with SSPC SP 6/NACE No. 3.
    b. All structural components shall have primer paint coats applied in the shop and finish coats applied in the shop.
        1) Shop paint, prime and finish coats, all surfaces which will be inaccessible after erection.
        2) Paint in accordance with Specification Section 09 91 00.
        3) Paint surfaces of all components not exposed to view.
        4) Manufacturer's standard shop applied primer is not acceptable as substitute for primer specified.
    c. Wall and roof panels:
        1) Exterior surface:
            a) Thermosetting fluoropolymer resin enamel.
                (1) Minimum 70 percent "KYNAR" resin.
            b) Meet requirements of AAMA 621.
            c) Exposed screw heads shall match color of panel.
        2) Interior surface:
            a) Manufacturer's standard shop applied polyester coating.

B. Roof Panels:
1. 26 GA minimum, Galvalume per ASTM A792.
2. Exposed Fastener “R-Panel”.
3. Factory applied color coating.
4. Meet requirements of AAMA 621.
5. Length: Sufficient to cover entire length of any unbroken roof slope up to 40 FT.

C. Wall Panels:

1. 26 GA minimum, Galvalume per ASTM A792.
2. Factory applied color coating.
3. Meet requirements of AAMA 621.
4. Length sufficient to cover entire height of any unbroken wall up to 40 FT.

2.6 SOURCE QUALITY CONTROL (NOT USED)

2.7 MAINTENANCE MATERIALS

A. Provide 4 OZ of touch up paint for each color provided on the building.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.
   1. Install tolerances in accordance with AISC Code of Standard Practice.
      a. Install products straight without bowing, sagging, or warping.
   2. Install all fasteners.
   3. Install base plates on grout bed.
      a. Grout bed to be 1 IN thick unless noted otherwise on the Drawings.

B. Place roof insulation over roof support members.
   1. Tape all joints and tears in vapor barrier with tape recommended by vapor barrier manufacturer.

C. Place wall insulation between girts and wall panels.
   1. Tape all joints and tears in vapor barrier with tape recommended by vapor barrier manufacturer.

D. Separate the roof support member from the roof panel, except at each concealed structural fastener, with a spacer of material having a density of not less than 2 pcf and, if of a combustible material, having a flame spread rating no greater than 25.

E. Fasten roof panels to purlins or secondary support members in accordance with manufacturer's recommendations.

F. Install wall panels to supporting structure with exposed fasteners.
   1. Finish of fasteners to match panel finish.

G. Install door frames, window frames, louvers, trim and other miscellaneous items in accordance with manufacturer's instructions and details.

3.2 ADJUSTING AND CLEANING

A. Touch up paint any scratched factory finished surfaces or remove and replace as directed by Owner's representative.

B. Remove and replace any damaged wall or roof panels, frames, etc., as directed by Owner's representative.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 27 04 00

FIBER OPTIC CABLE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for Single Mode Fiber Optic Cable and associated appurtenances.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 27 04 10 – Ground Boxes.
4. Section 27 04 30 – Fiber Splicing and Termination.
5. Section 27 07 00 – Fiber Optic Cable Testing.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

B. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 SYSTEM DESCRIPTION

A. One (1) Fiber Optic Cable will be supplied:

1. The cable will consist of three ribbons contained within loose tubes. Ribbons will each house twelve (12) strands of fiber.

B. Fiber Optic Fan-out Kits

1. Fiber fan-out kits may be terminated to LC/APC type connectors in the field or purchased as a prefabricated package from an equipment supplier.
2. Connectors must integrate with termination enclosures.

1.4 QUALITY ASSURANCE

A. Referenced Standards:

1. International Telecommunication Union Telecommunication Standardization:
   a. Sector ITU-T G.652 (Categories A, B, C & D).
2. International Electrotechnical Commission (IEC) :

a. Specifications 60793-2 Type B1.3.

3. Telecommunications Industry Association/Electronic Industries Alliance:
   a. TIA/EIA 492-CAAB.
4. International Organization for Standardization:
   a. ISO 11801 OS2.

1.5 SUBMITTALS

A. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

B. Product Data:
   1. Submit all product data for cable and jumper kits.
   2. Submit manufacturer's installation instructions and requirements.
   3. Submit operation and maintenance manuals in accordance with Specification Section 01 78 23.13 – Operation and Maintenance Data

C. Measure bulk cable loss prior to installation.

D. Work Plan:
   1. Identify the number of reels to be used for the cable. Each reel will require testing prior to installation. This test documentation will be delivered to Owner's Representative prior to installation. Testing requirements are described in Specification Section 27 07 00 – Fiber Optic Cable Testing.
   2. Identify force required to pull Fiber Optic Cable between ground boxes.
      a. Identify equipment to be used to protect Fiber Optic Cable during installation.
      b. Provide documentation on how the limiting device will operate at the calculated force.
   3. Measure bulk cable loss prior to installation.
   4. Identify lubrication to be used during cable installation.
      a. Provide calculation for volume required for cable pulls between ground boxes.
   5. Provide a narrative of the installation process.
      a. Bulk fiber optic cable.
      b. Fiber fan-out kit.

E. Design Data:
   1. Indicate power loss for each transmission fiber using the proposed installed cable lengths.

2. Provide a table containing all sections of cables, including the locations of all splices and all coil lengths (in ground boxes, termination locations, etc.). A segment is the fiber run between PLC cabinets, or Administrative facilities.
    a. Identify estimated cable losses for each segment.
    b. Identify estimated splice losses for each segment.
    c. Identify estimated connector losses for each segment.
    d. Identify jumper losses for each segment.
    e. Identify total loss for each segment connecting termination locations.

F. Project Record Documents: Record actual locations of equipment and modifications to submittals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.7 COORDINATION

A. Coordinate work with Owner and Owner's Representative per Specification Section 01 14 19 – Use of Premises.

1.8 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.3 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with Contract Documents, the following manufacturers are acceptable.

B. Bulk Fiber Optic Cable:
    1. Corning SMF-28e Optical Fiber, thirty-six (36) strand, or approved equal.

C. Fiber Optic Cable Jumper Kits:
    1. Corning fiber pigtail: CCH-CS-A9-P00RJ.

D. Submit request for substitutions in accordance with Specification Section 01 25 13 – Product Substitutions.

2.4 MATERIALS

Optical Specifications				
1. Maximum Attenuation (nm)	Wave Length 1310 1383** 1550 1625	dB/km 0.33 – 0.35 0.34 – 0.35 0.19 – 0.20 0.20 – 0.23		
*The attenuation values at this wavelength represent post-hydrogen aging performance.				
2. Attenuation vs. Wavelength	Range (nm) 1285 – 1330 1525 - 1575	Ref λ (nm) 1310 1550	Max α Difference (dB/km) 0.03 0.02	
*The attenuation in a given wavelength range does not exceed the attenuation of the reference wavelength λ by more than the value α.				
3. Macrobend Loss	Mandrel Diameter (mm) 32 50 50 60	Number Of Turns 1 100 100 100	Wavelength (nm) 1550 1310 1550 1625	Induced Attenuation (dB) ≤ 0.05 ≤ 0.05 ≤ 0.05 ≤ 0.05
4. Point Discontinuity	Wavelength (nm) 1310 1550	Point Discontinuity (dB) ≤ 0.05 ≤ 0.05		
5. Cable Cutoff Wavelength	λ ≤ 1260 nm			
6. Mode-Field Diameter	Wavelength (nm) 1310 1550	MFD (µm) 9.2 ± 0.4 10.4 ± 0.5		

7. Dispersion	Wavelength (nm) 1550 1625	Dispersion Value [ps/(nm*km)] ≤ 0.06 ≤ 22.0
8. Polarization Mode Dispersion (PMD)	PMD Link design value Max individual fiber	≤ 0.06 ≤ 0.2
Dimensional Specifications		
9. Glass Geometry	Fiber Curl Cladding Diameter Core-Clad Concentricity Cladding Non-Circularity	≥ 4.0 m radius of curvature 125.0 ± 0.7 µm ≤ 0.5 µm ≤ 7%
10. Coating Geometry	Coating Diameter Coating-Cladding Concentricity	245 ± 5 µm < 12 µm
Environmental Specifications		
11. Environmental Test	Test Condition	Induced Attenuation 131, 1550 & 1625 nm (dB/km)
12. Temperature Dependence	-60˚C to +85˚C	≤ 0.05
13. Temperature Humidity Cycling	-10˚C to +85˚C Up to 98% RH	≤ 0.05
14. Water Immersion	23˚ ± 2˚C	≤ 0.05
15. Heat Aging	85˚ ± 2˚C	≤ 0.05
16. Damp Heat	85˚C at 85% RH	≤ 0.05
17. Operating Temperature Range	-60˚C to +85˚C	

Mechanical Specifications	
18. Proof Test	Entire fiber length is subjected to a tensile stress ≥ 11 kpsi (0.7GPa)
19. Length	Fiber lengths available to 50.4 km/spool
Performance Characteristics	
20. Core Diameter	8.2 µm
21. Numerical Aperture	0.14 NA measured at the one percent power level of a one-dimensional far-field scan at 1310 nm
22. Zero Dispersion Wavelength	1313 nm
23. Zero Dispersion Slope	0.086 ps/(nm²·km)
24. Refractive Index Difference	0.36%
25. Effective Group Index of Refraction	1310 nm: 1.4677 1550 nm: 1.4682
26. Coating Strip Force	Dry: 0.6 lbs. (3N) Wet, 14-day room temperature 0.6 lbs. (3N)
27. Rayleigh Backscatter Coefficient (for 1 ns Pulse Width)	1310 nm: -77dB 1550 nm: -82 dB
28. Individual Fiber Polarization Mode Dispersion	0.02 ps/√km
Single Mode Fiber Fan-out Kit – FC	
1. Connector	LC/APC
2. Length	36 inches
Single Mode Fiber Fan-out Kit Performance Characteristics	

1. Fiber	9/125 µm SMF-28e
2. Insertion Loss	≤ 0.3 dB
3. Return Loss	≥ 50 dB
4. Repeatability	≤ 0.2 dB
5. Repeatability	≤ 0.2 dB typical, 1000 matings
6. Interchangeability	≤ 0.2 dB
7. Tensile Strength	> 10 kg
8. Operating Temperature	-40 to 80˚C

PART 3 - EXECUTION

3.3 INSTALLATION

A. Identify all equipment used for pulling fiber optic cable in conduits.

B. Identify all equipment used to limit torque/force on cable.

1. Break away swivels or torque limiting devices are acceptable.

C. Distance between ground boxes will not exceed one thousand (1000) feet. Refer to Specification Section 27 04 10 – Ground Boxes for requirements on ground boxes.

D. Terminations are identified in Table 3.1. All fibers will be terminated at all locations. All terminations shall be completed in accordance to Specification Section 27 04 30 – Fiber Splicing and Termination.

END OF SECTION

SECTION 27 04 10

GROUND BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for Ground Boxes.

B. Ground Boxes include all subsurface boxes required for use as ground boxes, pull boxes, splice boxes, termination boxes, and crossing boxes.

C. Related Specification Sections include, but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 QUALITY ASSURANCE

A. Referenced Standards

1. Part 2 American Association of State Highway & Transportation Official (AASHTO)
   a. AASHTO H-20-44
2. American National Standards Institute/Society of Cable Telecommunication Engineers
   a. ANSI/SCTE 77 – Specification for Underground Enclosure Integrity
3. American Society for Testing and Materials
   a. ASTM D-570
4. Telecommunications Industries Association (TIA)/Electronic Industries Alliance (EIA)
   a. TIA/EIA-607 – Commercial Building Grounding and Bonding Requirements for Telecommunications

1.4 SUBMITTALS

A. The following shall be submitted in accordance with the requirements of Section 01 33 00 – Submittals

B. Shop Drawings:

1. Provide dimensioned fabrication/construction drawings from manufacturer, along with complete specifications for materials and construction.
2. Indicate complete installation details.

C. Product Data: Submit cut sheets and other data on all proposed products and components for the work. Clearly indicate the options and features being provided.

D. Manufacturer's Installation Instructions: Submit complete installation requirements.

1.5 SYSTEM DESCRIPTION

A. Ground boxes shall be installed to support the future Fiber Optic Cable installation.

1. Ground boxes will house coiled Fiber Optic Cable.
2. Ground boxes may house splice enclosures and termination enclosures for fiber optic cable.

B. As shown on the drawings, ground boxes are required as pull boxes every 1000 FT or less. If there are any bends in a conduit reach between ground boxes (excluding sweeps up into the ground boxes), the maximum distance between ground boxes shall not exceed 600 FT. In addition, the total sum of horizontal and vertical changes in direction between any two ground boxes shall not exceed 180 degrees.

C. Ground boxes shall be Polymer Concrete for non-roadway areas.

D. Ground Boxes required shall be.

1. Polymer Concrete for non-roadway areas.

1.6 DESIGN REQUIREMENTS

A. Type 1 – Polymer Concrete (General Use)

1. Size
   a. Minimum 36IN width x 36IN length x 36IN depth, inside dimensions, where not more than two conduits enter the ground box
2. Load Rating
   a. ANSI Tier 15 or 22
3. Material
   a. Polymer concrete
4. Cover
   a. Polymer concrete

b. Overlapping to eliminate soil infiltration
c. Gasket
d. Bolt holes shall be arranged to drain dirt
e. Recessed handles
f. Cast label: “SJRA COMMUNICATIONS”

5. Required options
   a. Unistrut cable rack

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 COORDINATION

A. Coordinate work with Owner’s Representative.

1.9 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Polymer Concrete Ground Boxes
   1. Manufacturers:
      a. Quazite – Model PG
B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install as shown on the drawings, and in accordance with the specifications.
B. Except as otherwise shown or specified, install per manufacturer’s instructions and recommendations.

C. Internal dimensions of polymer ground boxes shall not be reduced by more than 1.0 IN after installation, nor shall other deformation be allowed. Where needed to prevent deflections of sidewalls, internally brace polymer concrete ground boxes during installation. Do not remove braces until all compaction and work in the vicinity of the box have been completed. Any ground box whose internal dimensions have changed more than 2.5% (approximately 1 IN for 36 IN) as a result of installation shall, at the discretion of the OWNER'S REPRESENTATIVE, be excavated and reinstalled in such a manner to reduce dimensional changes below 2.5%.

D. Where needed, knockout holes shall be made as small as practical to insert the conduit and seal around it. Do not remove the entire knockout wall. Seal knockout and conduit entry holes with grout or approved sealant.

E. Where required, pour 10-IN wide concrete collar around box after placement and compaction of backfill aggregate.

F. Any ground box damaged during installation shall be repaired in accordance with the manufacturer's recommendations, or replaced.

3.2 GROUNDING AND BONDING

A. Install in accordance with BICSI TDM Manual, TIA/EIA 607, and NFPA 70.

3.3 GROUND BOX LABELING

A. Each ground box shall be labeled both inside the box and on the outside (top) of the cover with the ground box number from the Drawings.

B. Ground box labels shall be stainless steel, 1.5 IN high and 3 IN wide, minimum. Each label shall be clearly engraved with the box number in 7/8-IN characters. Labels shall be permanently affixed to the ground box (inside wall near cover) and the ground box cover with stainless steel screws or approved epoxy adhesive.

3.4 OWNER TRAINING (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 27 04 30

FIBER OPTIC SPLICING AND TERMINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for splicing and terminating fiber optic cable.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 27 04 00 – Fiber Optic Cable.
4. Section 27 07 00 – Fiber Optic Cable Testing.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

B. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 SYSTEM DESCRIPTION

A. The fiber specified is ribbon fiber which is designed to be spliced with a mass fusion splicer.

1. Fusion device must be designed to fuse 12 strand Single Mode Fiber.
2. All devices must have NIST calibration with certificate demonstrating calibration occurred within one calendar year.
3. Fiber to fiber splices are not permitted.

B. Fiber termination equipment includes the following:

1. Mass fusion splicer for 12 strand fiber.
2. Cleaver for 12 strand fiber.
3. Hot Jacket Stripper for ribbon fiber – 12 strands.

C. Fiber termination components are identified in Specification Section 27 04 00 – Fiber Optic Cable.

1.4 QUALITY ASSURANCE

A. Referenced Standards:

1. Building Industry Consulting Service International, Inc.:
   a. BICSI TDM Manual - Telecommunications Distribution Methods Manual.
2. International Telecommunication Union telecommunication Standardization Sector:
   a. ITU-T G652.

1.5 SUBMITTALS

A. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

B. Unless otherwise specified, provide all submittals prior to ordering products or testing cables.

C. Bill of Materials: Provide a complete listing of all components to be provided, including description, part numbers, quantities, etc.

D. NIST calibration certificates for all Mass Fusion Splicers used.

E. Product Data: Submit data on all specified components.

F. Manufacturer's Installation Instructions: Submit complete installation requirements.

1.6 COORDINATION

A. Coordinate work with Owner and Owner's Representative per Specification Section 01 14 19 – Use of Premises.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Mass Fusion Splicer

1. Submit splicer data to owner for approval

B. Cleaver

1. Submit cleaver data to owner for approval

C. Stripper:

1. Submit stripper data to owner for approval

A. Jumper Cables:
   1. Corning Cable Systems

B. Wall-Mount Termination Enclosure:
   1. Corning Enclosure : WCH-06P
   2. Splice Cassette: CCH

3. Heat Shrink Sleeve Ribbon: 2806031.012
4. Pigtailed Splice Cassette: CCH-CS12-B3-P00RJ

D. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 MATERIALS

A. Jumper Cables
1. Provide single-mode fiber jumper cables where shown on the Drawings and as required in this Section.
2. Jumper cables shall be compatible with the single-mode fiber system.
3. Connectors: LC UPC or as required for compatibility with patch panels.
4. Single mode, OS-2 fibers.
5. Insertion loss: Typical: 0.1 db

PART 3 EXECUTION

3.1 INSTALLATION

A. Contractor is responsible for ensuring a highly integrated fiber system using standard components designed for use with 12 strand ribbon Fiber Optic Cable.

B. Install all components per manufacturer's recommendations, applicable standards, and industry best practices.

3.2 DEMONSTRATION

A. Refer to Specification Section 27 07 00 – Fiber Optic Cable Testing.

3.3 OWNER TRAINING (NOT USED)

END OF SECTION

SECTION 27 07 00

FIBER OPTIC CABLE TESTING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for test fiber optic cable and associated components.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 27 04 00 – Fiber Optic Cable.
4. Section 27 04 30 – Fiber Splicing and Termination.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

B. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 SYSTEM DESCRIPTION

A. Provide comprehensive testing of the fiber optic cable and all other products and work to demonstrate full compliance with Contract Documents and referenced standards.

B. Testing will be performed prior to any splicing and terminations are performed. If any of the pre-spliced/terminated fibers are shown to have a failing test, the Owner will determine if they wish to install new fiber to replace the failing fiber or to accept the fiber as is and how to proceed with the fiber splicing and terminations.

C. The tests shall determine the viability of the following:

1. Splices
2. Termination
3. Segment (from both ends)

D. Testing will be performed with a Fiber Testing System

1. System will consist of the following, minimum:
    a. OTDR – Optical Time Domain Reflectometer

b. Equipment to detect number and location of connectors within a segment.

c. Inspection device (video probe) to inspect connectors for end-face contamination.

d. Loss/length and power meter.

e. Testing equipment manufacturer's software to organize testing data.

2. Testing will be conducted for both 1310 and 1550 nm.

E. All testing devices must have NIST calibration with certificate demonstrating calibration occurred within one calendar year.

F. Prepare a testing plan.

1.4 QUALITY ASSURANCE

A. Referenced Standards:

1. Building Industry Consulting Service International, Inc.:

a. BICSI TDM Manual - Telecommunications Distribution Methods Manual.

2. International Telecommunication Union telecommunication Standardization Sector:

a. ITU-T G652.

B. Nationally Recognized Testing Laboratory (NRTL).

C. Telecommunications Industries Association/Electronic Industries Association/American National Standards Institute (TIA/EIA/ANSI):

1. 455-78-B, Optical Fibers - PART 1-40: Measurement Methods and Test Procedures - Attenuation.

1.5 SUBMITTALS

A. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

B. Unless otherwise specified, provide all submittals prior to ordering products or testing cables.

C. Testing Equipment:

1. Submit catalog data on all testing devices proposed for use plus certifications of accuracy, calibration, and traceability to standards of the National Institute for Standards and Testing.

2. Provide prior to starting installation work.

D. Testing plan as described herein.

1. Develop a narrative that identifies the goals for testing.
2. Identify procedures and test setup.
3. Document work-flow and identify requirements of testing at various phases of construction.
4. Prepare a schedule of tasks with the anticipated time required to complete each task.

E. Documentation of testing results.

1. Submit test results for each cable, at each step of testing, within 7 working days of completing each test.
2. At each step, Contractor shall certify that test results meet the test passing criteria, before proceeding to the next installation step.
3. Each test sheet or individual test report must clearly state who performed the test, who witnessed the test, dates and times of each test, and be signed by the Contractor's lead field testing technician or supervisor.
4. Installation work shall not proceed on subsequent cable installation steps until test results on preceding steps have been submitted and favorably reviewed (no resubmittal required) by the Principal Architect/Engineer or Owner's Representative. Exceptions or modifications to this requirement may be allowed on a case-by-case basis, at the sole discretion of the Principal Architect/Engineer.

F. Test Data:

1. Provide a complete set of well-organized fiber testing data for the Owner.
2. Copies of all submitted test reports, and all other test data, shall be organized into hard copy and electronic format, and submitted with other record documents. The electronic format shall be both in PDF and native format.
3. The organization and content of the test data document shall be approved by the Principal Architect/Engineer.

G. Product Data:

1. Submit complete product data on all testing equipment and other specified components.
2. Include NIST certificates for all equipment.

H. Sample Test Forms:

1. Submit proposed test forms and example test output for each required test.

2. Test forms and example testing equipment outputs shall be reviewed by the Principal Architect/Engineer without resubmittal required before starting any testing.

I. Anticipated Performance Report:

1. This report will identify the theoretical loss for each splice, each termination and conductor for each strand in each cable.
2. Report anticipated end to end performance for each segment.
3. Summarize segment performance between each termination panel.
4. Prepare a spreadsheet in Microsoft Excel with each loss value.

1.7 COORDINATION

A. Coordinate work with Owner and Owner's Representative per Specification Section 01 14 19 – Use of Premises.

1.8 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Acceptable Manufacturers:

1. Fluke – OptiFiber Certifying OTDR
2. EXFO OTDR
3. AFL OTDR
4. Software Documentation – EXFO Fast Reporter 2.

B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 TESTING SYSTEM TO BE USED BY CONTRACTOR

A. System shall consist of the following, minimum, plus equipment as needed to meet all specified testing requirements:

1. OTDR – Optical Time Domain Reflectometer
2. Equipment to detect number and location of connectors within a segment.
3. Inspection device (video probe) to inspect connectors for end-face contamination.
4. Loss/length and power meter.
5. Launch cables, 150 meters.

6. Testing equipment manufacturer's software to organize testing data.
7. Other equipment as required to perform all specified testing.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Testing Overview:

1. Test installed fiber, before any splicing performed. Documentation must be submitted to Owner prior to performing any splicing.
2. When splicing is performed: Document splicing using the estimated losses identified by the Mass Fusion Splicer.
3. End to end testing: Test each cable segment from termination location to termination location.

B. General:

1. The Contractor shall conduct tests of the fiber optic system in accordance with these provisions. All test results shall meet or exceed manufacturer specifications and the performance requirements of this specification section.
2. Any fiber that does not meet or exceed manufacturer specifications and the requirements of this Section shall be replaced at the Contractor's expense. Tests are to be performed on each fiber of each cable.
3. Testing shall be performed at three separate stages: (1) prior to installation (2) after installation and termination of the entire system, and (3) individual cable splices shall be tested at the time of performing the splice.
4. Prior to conducting any tests, the Contractor shall provide the Principal Architect/Engineer with detailed descriptions of test procedures for review and approval.
5. Pre-installation tests and Post-installation tests shall be witnessed and signed off by the Principal Architect/Engineer or Owner's Representative.
6. The Contractor shall provide the Principal Architect/Engineer with a copy of the manufacturers' test procedures and quality assurance procedures for information. If the manufacturer recommends any tests that are not described in this Specification Section, these additional tests shall be performed by the Contractor, at no additional cost to the Owner. Any

additional performance requirements recommended by the manufacturer shall be met with these additional tests, and shall be considered part of the test requirements of this section.

7. The Contractor shall provide documentation certifying that the fiber optic cable has passed each testing stage. Provide separate documentation for each phase of the project and each testing stage result. Documentation shall consist of print outs of the test results and an electronic copy of the file (PDF and native format) for each test performed.

8. Attenuation tests shall be performed with an Optical Loss Test Set capable and calibrated to show anomalies of 0.1 dB as a minimum. Single mode fibers shall be tested at 1310 and 1550 nm.

9. OTDR tests performed on fiber cables shall be performed with the aid of a launch cable at least 150 feet in length; longer if required by any referenced standard or recommended by the manufacturer. OTDR pulse width settings shall be adjusted to a maximum setting of 1/1000th of the cable length or 10 nanoseconds.

10. All tests required to ensure the satisfactory installation, adjustment, operation, and performance of all equipment and materials erected and installed under this specification, shall be performed by the Contractor.

11. The Contractor shall furnish all test equipment, meters, instruments and miscellaneous equipment and perform all work required for the tests.

B. Testing of Spliced Cable:

1. For all post-installation tests the Contractor shall notify the Engineer and Owner's Representative a minimum of two working days in advance. Regardless, all tests shall be witnessed; do not proceed without a written waiver from the Owner's Representative.

2. At the conclusion of splices at one location, and before they are enclosed and sealed, all splices shall be tested with the OTDR at the optimal wavelengths (1310 and 1550 for single mode), in both directions. The splices shall be tested for integrity as well as attenuation. Individual fusion splice losses shall not exceed 0.12 dB. All pigtail splices shall have a loss no greater than 0.12 dB, as determined by either a Profile Alignment System (PAS) or Light Injection (LID) splice loss estimate, at the time the splice is made. Splices with an optical loss of greater than 0.12 dB shall

be redone.

3. If the test results for splices do not meet the above requirements, the splice shall be unacceptable and shall be replaced with a new splice at the Contractor's expense, and retested. Upon the written approval of the Principal Architect/Engineer, individual splices can be tested as part of the test of the overall cable.

4. When each fiber cable has been completely installed, each completed cable shall be tested with an OTDR and an Optical Loss Test Set, as described in this section.

5. An OTDR shall be used to provide the information listed below for each optical fiber in each fiber cable. Tests shall be conducted at both 1310 and 1550 nm, and shall be conducted in both directions along the cable.

    a. The overall fiber length and the distance of the splice and connector points from the source.

    b. Splice and connector loss.

    c. Fiber attenuation in dB/km.

    d. Excess Fiber Coefficient (EFC) Test: An excess fiber coefficient measurement shall be made as part of the cable testing. The following procedure shall be performed from both ends on each fiber provided.

        1) Prior to stripping the cable for splicing, the meter marks shall be recorded for the purpose of determining the physical cable length.

        2) The fiber Index of Refraction (IOR) shall be recorded from the cable data submitted by the Manufacturer.

        3) With the OTDR set to the proper IOR, record the OTDR fiber length.

        4) Calculate the excess fiber coefficient (EFC) according to the following formula:

        EFC = OTDR length/Sheath length

6. Fiber Attenuation: The attenuation of each optical fiber shall be measured in both directions using a Laser Light Source and Optical Power Meter at both 1310 nm and 1550 nm. The test shall require the establishment of a reference power level measured with a patch cord and connectors of the same types used on the fiber cable. Care shall be taken so that an exact match of connectors and mating hardware are used in the

reference measurement so that the same setup losses are reproduced when measuring the full cable. Do not turn off the laser source at any time during the testing. Make sure all connectors are properly cleaned. Proceed with the measurements as follows:

a. Measure and record the reference power level of the Laser Light Source at both 1310 nm and 1550 nm.

b. Measure and record the received power level of each optical fiber at both 1310 and 1550 nm.

c. Repeat the same measurements in the other direction.

d. The measured insertion loss shall be no greater than the loss calculated in the formula below:

IL = 2(Ls) + 2(Lc) + (La)(Length) + 0.5

where:

IL = Insertion Loss

Ls = Splice losses at the pigtails (maximum 0.15 dB) Lc = Connector face loss (maximum 0.6 dB)

La = Manufacturer's cable attenuation (dB/km) Length = Fiber length (km)

7. Measurement results shall be recorded, validated by trace, and filed with the records of the respective cable runs. Copies of traces and test results shall be submitted to the Principal Architect/Engineer.

8. Requirements for Installed Cables:

a. Fibers shall perform within 5 percent of pre-installation values, unless otherwise acceptable to the Principal Architect/Engineer.

b. Fibers shall meet or exceed all manufacturer's specifications.

c. Fibers and related equipment and components shall meet all criteria specified in Specification Section 27 04 00 – Fiber Optic Cable, and other sections of Division 27.

d. All splices shall have a loss no greater than 0.12 dB.

e. OTDR traces at both 1310 nm and 1550 nm wavelengths shall not display any unexplained losses, reflectance events, or other discontinuities.

f. The insertion losses measured at both 1310 nm and 1550 nm wavelengths and in both directions shall not exceed the maximum allowed values.

g. Visual inspection shall not detect any damage or unworkmanlike installation.

9. Cables that do not meet all requirements shall be repaired or replaced, at the Contractor's expense, and retested.

C. Test Reports:

1. The Contractor shall furnish the Owner three (3) copies of all test reports showing the results of all tests specified herein.

2. Test forms shall clearly label the test type, the test location, test date, wavelength, index of refraction, cable identification, fiber type, fiber number, fiber color, and the result of the value of the tested parameter.

3. All OTDR traces shall be supplied on printed hard-copy, and uploaded to SharePoint in PDF and native format. Test reports shall state "PASS" or, "NOT PASSED." The native electronic test files shall also be provided.

D. Site Test and Inspection:

1. Subsequent to the Post-Installation testing, the fiber network shall be placed into service and functional tested along with the control system and network components.

3.2 OWNER TRAINING (NOT USED)

END OF SECTION

SECTION 31 21 33.01

EXTRA UNIT PRICE WORK FOR EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Measurement and payment applicable to extra unit price work items for excavation and backfill made necessary by unusual or unforeseen circumstances encountered during utility installations.
2. Extra unit price work for excavation and backfill is paid only when authorized in advance by Owner or Owner's Representative.

B. Related Specification Sections include, but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Excavation Around Obstructions: Payment for excavation around obstructions is on cubic yard basis, measured in place, without deduction for volume occupied by portions of pipes, ducts, or other structures left in place across trenches excavated under this item.

B. Extra Hand Excavation: Payment for extra hand excavation is on cubic yard basis, measured in place.

C. Extra Machine Excavation: Payment for extra machine excavation is on cubic yard basis, measured in place.

D. Extra Placement of Backfill Material: Payment for extra placement of backfill material is on cubic yard basis, measured in place, for material installed as part of Work. At discretion of Owner or Owner's Representative, measurement of cubic yards may be calculated from volume of Extra Hand Excavation or Extra Machine Excavation for which replacement is made, minus volume of any Extra Placement of Granular Backfill authorized in conjunction with Work.

E. Extra Placement of Granular Backfill: Payment for extra placement of granular backfill material is on cubic yard basis, measured in place.

F. Extra Select Backfill: Payment for extra select backfill is on cubic yard basis, measured in place for a theoretical minimum trench width. The Owner or Owner's Representative may authorize extra select backfill when soil from the excavation work does not include adequate quantities for placement of suitable on-site material (random backfill).

G. Refer to Section 00 21 00 – Unit Prices for unit price procedures.

1.3 DEFINITIONS

A. Excavation Around Obstructions: Excavation necessitated by obstruction of pipes (other than service connections 3 inches in diameter or less), ducts, or other structures, not shown on Drawings, and of an unusual or unforeseen nature which interfere with installation of utility piping by normal methods of excavation or auguring.

B. Extra Hand Excavation: Excavation by manual labor made necessary by unusual or unforeseen circumstances at locations approved in advance by Owner's representative.

C. Extra Machine Excavation: Excavation by machine at or near project site to perform related work not included in original project scope but added for convenience of Owner, as approved in advance by Owner's representative.

D. Extra Placement of Backfill Material: Handling, backfill, and compaction of excavated material authorized under extra work bid items for Extra Hand Excavation or Extra Machine Excavation. Placement and compaction shall conform to requirements specified for excavation and backfill in Division 31 – Earthwork.

E. Extra Placement of Granular Backfill: Hauling, placing, and compacting granular backfill materials as approved by Owner's Representative in conjunction with Extra Placement of Backfill Material. Materials placed under this item shall conform to requirements for Bank Run Sand, Cement Stabilized Sand, Concrete Sand, Gem Sand, Crushed Stone, or Crushed Concrete specified for backfill material in Division 31 - Earthwork.

F. Extra Select Backfill: Unsuitable material removed from the project and select backfill material hauled to the project, or conditioning unsuitable material on the site to make it select backfill. Provide select backfill material specified in Section 31 21 33 Trenching, Backfilling, and Compacting for Utilities.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 32 11 00.01

RECYCLED CRUSHED CONCRETE BASE COURSE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Foundation course of recycled crushed concrete.

B. Related Specification Sections include, but are not necessarily limited to:

1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 - General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

B. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):

B. Unit Prices.

1. Payment for Recycled Crushed Concrete Base (RCCB) is on a per square yard basis, furnished and compacted in place.
2. Payment for RCCB for transitions and base repairs is on a per square yard basis.
3. Payment for RCCB for temporary driveway, roadway shoulders, and elsewhere shown on Drawings is on a per square yard basis.
4. Refer to Section 00 21 00 0 Unit Prices and Payment for unit price procedures.

   a. C 150 - Standard Specification for Portland Cement.

5. Texas Department of Transportation (TxDOT):

   a. Tex-101-E - Preparing Soil and Flexible Base Materials for Testing.

   b. Tex-106-E - Calculating the Plasticity Index of Soils.

   c. Tex-110-E - Particle Size Analysis of Soils.

d. Tex-113-E - Laboratory Compaction Characteristics and Moisture-Density Relationship of Base Materials.

e. Tex-115-E - Field Method for Determining In-place Density of Soils and Base Materials.

f. Tex-120-E - Soil-Cement Testing.

1.4 SUBMITTALS

A. Conform to requirements of Section 01 33 00 – Submittals.

B. Submit Representative samples of crushed concrete for testing.

C. Submit weight tickets, certified by supplier, for each delivery of recycled crushed concrete, gravel, and soil binder.

D. Submit manufacturer's description and characteristics for pug mill and associated equipment, mixer trucks, spreading and compaction equipment for approval.

1.5 TESTS

A. Follow Section 01 45 29 - Testing Laboratory Services.

B. Test and analyze aggregate and binder products following TxDOT Tex-110-E.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Provide materials from stockpiles that are protected during storage from contaminants detrimental to concrete base.

B. Load material from same area of stockpile to maintain uniformity of each successive delivery to Project site.

C. Store cement in weatherproof enclosures. Protect from ground dampness.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Provide RCCB with following performance:

1. Minimum 5 percent cement.
2. Minimum compressive strength: 650 psi at 14 days following TxDOT Tex-120-E.
3. Prepare concrete product in on-site or off-site pug mill, or in on-site or off-site portable concrete mixer.

B. Preliminary Design: Prepare preliminary mix with minimum cement to crushed concrete ratios of 5 percent by dry mass of materials.

1. Designate source of concrete for crushing. Follow Section 01 45 29 - Testing Laboratory Services for tests of concrete from source.

2. Results of laboratory and compression tests will be used by the Engineer to select final mix design.

2.2 PORTLAND CEMENT

A. ASTM C 150 Type I, II, or III; bulk or sacked.

2.3 WATER

A. Potable.

2.4 AGGREGATE

A. Recycled Crushed Concrete: Material retained on No. 40 Sieve, and durable coarse particles of crusher-run reclaimed cured Portland cement concrete, obtained from approved source. Organic material is prohibited.

1. The crushed concrete shall be substantially free of foreign matter including, but not limited to asphalt, base, and dirt.
2. Obtain Owner's Representative's written approval, prior to crushing salvaged concrete.

B. Soil Binder (classified below): Meeting following requirements when tested following TxDOT Tex-106-E:

1. Maximum liquid limit: 35
2. Maximum plasticity index: 10

C. Mixed Aggregate and Soil Binder: Grading following TxDOT Tex-101-E and Tex-110-E within following limits:

Sieve	Percent Crushed Concrete Retained
1¾ inch	0 to 10
No. 4	45 to 75
No. 40	55 to 80; classified as Soil Binder

1. Obtain prior permission from Owner's Representative for use of additives to meet above requirements.
2. Bank sand may be added to mix at pug mill with prior written permission of Owner's Representative.

2.5 ASPHALTIC SEAL CURE

A. Acquire written approval from Owner's Representative before curing and before proceeding with curing.

B. Use following as option to curing by sprinkling:

1. Cut-back asphalt: MC30 following Section 32 12 13.19 - Prime Coats.

2. Emulsified petroleum resin: EPR-1 Prime following Section 32 12 13.19 - Prime Coats.

2.6 MATERIAL MIX

A. Design mix for minimum compressive strength of 650 psi at 14 days following TxDOT Tex-120-E unconfined compressive strength.

B. Cement Ratio: Follow Paragraph 2.1A. Increase cement content in two percent steps up to 9 percent maximum when compressive strength of design mix samples fail TxDOT Tex-120-E test.

2.7 MIXING EQUIPMENT

A. Mix following Paragraph 2.1A, with metering devices adding specified quantities of crushed concrete, cement, and water into mixer. Dry mix crushed concrete and cement prior to adding water. Produce homogeneous and uniformly mixed product.

2.8 SOURCE QUALITY CONTROL

A. Test following Section 01 45 29 -Testing Laboratory Services.

B. When directed by Owner's Representative, test for unconfined compressive strength following Test Method TxDOT Tex-120-E as follows:

1. Mold minimum of three samples each day or for each 500 tons of production or one for each day.
2. Compressive strength: average of 3 specimens for each sample lot.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Follow Section 01 45 23 – Testing and Inspecting Services.

B. Verify buried utility work is complete.

C. Verify lime treatment of base is complete.

D. Verify subgrade is ready to support imposed loads.

E. Verify flatwork, foundations, projecting reinforcement and similar Work interfacing with base is in place.

F. Verify lines and grades are correct.

3.2 PREPARATION

A. Complete backfill of new utilities below future grade.

B. Prepare subgrade in accordance with requirements of Section 31 24 00 - Embankment and Section 31 23 16.01 - Roadway Excavation, or Section 32 11 13.13 - Lime Treated Subgrades and Section 32 11 13.01 - Lime-Fly Ash Stabilized Subgrade and Section 32 11 13.02 - Portland Cement Stabilized Subgrade.

C. Correct subgrade deviations in excess of plus or minus ¼ 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.

E. Have sufficient products and equipment on hand to expeditiously apply base.

3.3 MIXING

A. Maintain moisture content of between optimum and 5 percent above optimum.

3.4 PLACEMENT

A. Place mixture with approved spreading equipment. Spread to eliminate planes of weakness or pockets of nonuniformly graded material resulting from hauling and dumping operations.

B. Provide approximately vertical construction joints between fresh base and base-in-place 4 hours or longer. Form joint with temporary header or make vertical cut of in-place base immediately before placing fresh base.

C. Make cold joints at center line of head-to-head parking stalls.

D. Place base so that projecting reinforcing steel from curbs remain at approximate center of base. Provide proper bond between reinforcement and base.

E. Transverse and longitudinal joints shall be vertical.

F. Unless noted otherwise, place recycled crushed concrete base in courses not to exceed 8 inches in depth. All courses shall be placed on same working day unless approved by Owner's Representative. Construction joints between new base and base previously placed shall be wetted and coated with dry cement prior to addition of new base.

G. Complete finishing operations within period of 6 hours after cement is added to base materials.

3.5 COMPACTION

A. Start compaction maximum 3 hours after start of mixing. Compact loose mixture with approved tamping rollers until entire depth is uniformly compacted. Do not allow base to mix with underlying material.

1. Do not rework uncompacted material that has set up for more than 30 minutes.
2. Complete placement and compaction work within 6 hours from start of moist mixing.

B. Correct irregularities or weak spots immediately by replacing material and recompacting.

C. Apply water to maintain moisture between optimum and 5 percent above optimum moisture.

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 or flat wheel rollers which are sufficiently light to prevent surface hair line cracking.

F. Compact to minimum density of 95 percent of dry density, following TxDOT Tex-113-E, at moisture content of treated material between optimum and 5 percent above optimum.

G. Test roadway base course compaction in accordance with TxDOT Tex-115-E.

H. Maintain surface to required lines and grades throughout operation.

3.6 CURING

A. Moist cure for minimum of 72 hours before adding pavement courses.

B. Use sprinkling or, at option, apply following curing membrane as soon as initial set begins, using approved light-weight self-propelled pressure distributor:

1. MC30: 0.1 gallon per square yard.
2. EPR-1 Prime: 0.15 gallon of asphalt residual per square yard.

C. Do not use cut-back asphalt during period of April 16 through September 15.

3.7 TOLERANCES

A. Completed Surface: Smooth and conform to typical section and established lines and grades.

B. Top Surface of Base Course: Plus or minus ¼ inch in cross section or in 16 foot length.

3.8 FIELD QUALITY CONTROL

A. Test following Section 01 45 29 - Testing Laboratory Services.

B. Perform compaction tests following TxDOT Tex-113-E at randomly selected locations. Remove and replace areas failing compaction requirements at no additional cost to Owner.

3.9 PROTECTION

A. Maintain base in proper condition until surface is placed. Surface must be placed within 14 days after final mixing and compaction unless otherwise approved by Owner's Representative. Repair unacceptable base course immediately by replacing base to full depth.

B. Curing membrane may remain in place at areas where surface courses or other base courses are applied.

C. Prevent construction traffic on base for minimum 3 days. Light vehicles, used to maintain proper cure, are permitted on base after initial set or as permitted by Owner's Representative.

END OF SECTION

SECTION 32 11 13.01

LIME/FLY–ASH STABILIZED SUBGRADE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Foundation course of lime/fly-ash stabilized subgrade material, application of lime slurry and fly-ash to subgrade, and mixing, compaction, and curing of lime, slurry, fly-ash, water and subgrade into a stabilized foundation.
2. Limits for installed lime/fly ash stabilized subgrade material: Extends 1 foot beyond outside edge of proposed pavement, except where proposed pavement section shares a common longitudinal or transverse edge with existing pavement section.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 32 11 13.13 – Lime Treated Subgrades

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 DEFINITIONS

A. Moist Cure: Curing soil lime/fly-ash material to obtain optimum hydration:

B. 1,000-Foot Roadway Section: 1,000 feet per lane width or approximately 500 square yards of compacted subgrade for other than full-lane-width roadway sections.

1.4 REFERENCES

A. ASTM C 618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Concrete Words and terms used in these Specifications are defined in ACI 116R.

1.5 SUBMITTALS

A. Conform to requirements of Section 01 33 00 – Submittals.

B. Submit certification that fly-ash, hydrated lime, quicklime, or commercial lime slurry complies with these specifications.

C. Submit weight tickets, certified by supplier, with each bulk delivery of materials to work site.

1.6 DELIVERY, STORAGE AND HANDLING

A. Conform to requirements of Section 32 11 13.13 – Lime Treated Subgrades.

B. Quicklime can be dangerous; exercise extreme caution if used for Work. Become informed about recommended precautions in handling, storage and use of quicklime.

1.7 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 MATERIALS

A. Water: clean, clear and free from oil, acids, alkali, or vegetable matter.

B. Conform to requirements of Section 32 11 13.13 – Lime Treated Subgrades for Type A hydrated lime, Type C quicklime, and Type B commercial lime slurry shall.

C. Fly-Ash: Residue or ash remaining after burning finely pulverized coal at high temperatures conforming to requirements of ASTM C 618, Class C, and following:

1. Minimum CaO content of 20 percent.
2. Loss on ignition not to exceed 3 percent.
3. Contain no lignite ash.

D. Asphaltic Seal Cure: Conform to requirements of Section 32 11 13.13 – Lime Treated Subgrades.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Conform to Part 3 of Section 32 11 13.13 – Lime Treated Subgrades with following exceptions.

1. Include fly ash in percentage amounts in lime or lime slurry as established from geotechnical evaluation for application, mixing, and compaction.
2. Apply lime/fly-ash as single mix, single pass over lower PI soils.
3. Conduct operations to minimize elapsed time between mixing and compacting lime/fly-ash stabilized subgrade in order to take advantage of rapid initial set characteristics. Complete compaction within 2 hours of commencing compaction, and not more than 6 hours after adding and mixing last stabilizing agent.

3.2 QUALITY CONTROL

A. Testing will be performed under provisions of Section 01 45 29 – Testing and Laboratory Services

B. Soil will be sampled to establish percent of fly-ash and hydrated lime, quicklime, or lime slurry to be applied to subgrade material.

C. Testing will be in accordance with Part 3 of Section 32 11 13.13 – Lime Treated Subgrades.

3.3 OWNER TRAINING (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 32 11 13.02

PORTLAND CEMENT-STABILIZED SUBGRADE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Foundation course of Portland cement stabilized natural subgrade material.
2. Limits for installed Portland cement treated subgrade material: Extends 1 foot beyond outside edge of proposed pavement, except where proposed pavement section shares a common longitudinal or transverse edge with existing pavement section.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 REFERENCES

A. C 150 – Standard Specification for Portland Cement.

B. ASTM D 558 – Standard Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement-Mixtures.

C. ASTM D 1556 – Standard Test Methods for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

D. ASTM D 6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

E. ASTM D 4318 – Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.4 SUBMITTALS

A. Conform to requirements of Section 01 33 00 – Submittals.

B. Submit certification that Portland cement complies with these specifications.

1.5 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 WATER

A. Water: clean, clear and free from oil, acids, alkali, or organic matter.

2.2 PORTLAND CEMENT

A. ASTM C 150 Type I: bulk or sacked.

2.3 SOIL

A. Provide soil consisting of approved material free from vegetation or other objectionable matter.

2.4 TESTS

A. Testing will be performed under provisions of Section 01 45 29 – Testing Laboratory Services.

B. Tests and analysis of soil materials will be performed in accordance with ASTM D 4318.

C. Soil will be evaluated to establish ratio of cement to soil to obtain desired stability. Normal range is 6 percent to 10 percent by weight.

D. The percentage of moisture in soil, at time of cement application, will be determined by ASTM D558. Moisture will not be allowed to exceed quantity that will permit uniform, complete mixture of soil and cement during dry mixing operations nor specified optimum moisture content for soil cement mixture, as determined.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade is ready to support imposed loads.

B. Verify subgrade lines and grades are correct.

3.2 EQUIPMENT

A. Apply Portland cement treatment with machine or combination of machines and auxiliary equipment to produce specified results. Mixing may be accomplished by multiple-pass traveling mixing plant or single-pass traveling mixing plant. Provide sufficient equipment to enable continuous prosecution of work.

3.3 PREPARATION

A. Backfill for utilities below future grade.

B. Verify subgrade is firm and able to support, without displacement, construction equipment at specified density. Correct soft or yielding subgrade and stabilize by scarifying and aerating or by adding cement and compacting to uniform stability.

C. Grade, shape, and compact, as required, to allow construction of Portland cement treatment for in-place materials to lines, grades, thickness, and typical cross section shown on Drawings. Remove unsuitable soil or material and replace with acceptable material.

D. Pulverize soil so that at completion of moist-mixing, 100 percent by dry weight passes 1-inch sieve, and minimum of 80 percent passes No. 4 sieve, exclusive of gravel or stone retained on these sieves. Pulverize existing bituminous wearing surfaces so that 100 percent will pass 2-inch sieve.

3.4 MIXING

A. Do not place and mix cement when temperature is below 40 degrees F and falling. Place base when temperature taken in shade and away from artificial heat is above 35 degrees F and rising.

B. Spread cement uniformly on soil at rate specified by laboratory. When bulk cement spreader is used, position it by string lines or other approved method to ensure uniform distribution of cement. Apply cement only to area where operations can be continuous and completed in daylight, within 1 hour of application. Amount of moisture in soil at time of cement placement shall not exceed quantity that will permit uniform mixture of soil and cement during dry mixing operations. Do not exceed specified optimum moisture content for soil cement mixture.

C. Do not allow equipment other than that used in spreading and mixing, to pass over freshly spread cement until it is mixed with soil.

D. Dry mix cement with soil after cement application. Continue mixing until cement has been sufficiently blended with soil to prevent formation of cement balls when water is applied. Mixture of soil and cement that has not been compacted and finished shall not remain undisturbed for more than 30 minutes.

E. Immediately after dry mixing is complete, uniformly apply water as necessary and incorporate it into mixture. Pressurized equipment must provide adequate supply to ensure continuous application of required amount of water to sections being processed within 3 hours of cement application. Ensure proper moisture distribution at all times. After last increment of water has been added, continue mixing until thorough and uniform mix has been obtained.

F. Ensure percentage of moisture in mixture, based on dry weights, is within 2 percentage points of specified optimum moisture content prior to compaction. When uncompacted soil cement mixture is wetted by rain indicating that average moisture content exceeds tolerance given at time of final compaction, reconstruct entire section in accordance with this Section at no additional cost to Owner.

3.5 COMPACTION

A. Prior to beginning compaction, ensure mixture is in loose condition for its full depth. Uniformly compact loose mixture to specified density, lines, and grades.

B. After soil and cement mixture is compacted, apply water uniformly as needed and mix thoroughly. Then reshape surface to required lines, grades, and cross section and lightly scarify to loosen imprints left by compacting or shaping equipment.

C. Roll resulting surface with pneumatic-tired roller and "skin" surface with power grader. Thoroughly compact with pneumatic roller, adding small increments of moisture, as needed. When aggregate larger than No. 4 sieve is present in mixture, make one complete coverage of section with flat-wheel roller immediately after skinning operation. When approved by Owner's representative, surface finishing methods may be varied from this procedure, provided dense uniform surface, free of surface compaction planes, is produced. Maintain moisture content of surface material at its specified optimum during finishing operations. Compact and finish surface within period not to exceed 2 hours, to produce smooth, closely knit surface, free of cracks, ridges, or loose material, conforming to crown, grade, and line shown on Drawings within period not to exceed 2 hours.

3.6 CONSTRUCTION JOINTS

A. At end of each day's construction, form straight transverse construction joint by cutting back into total width of completed work to form true 2-inch depth vertical face free of loose and shattered material. Construct cement treatment for large wide areas in series of parallel lanes of convenient length and width approved in advance by Owner's representative.

3.7 CURING

A. Moist cure for minimum of 3 days before placing base or surface course, or opening to traffic. When open, restrict traffic to light pneumatic rollers or vehicles weighing less than 10 tons.

B. Keep subgrade surface damp by sprinkling. Roll with light pneumatic roller to keep surface knit together.

C. Place base and surface within 14 days after final mixing and compaction, unless prior approval is obtained from Owner's Representative.

3.8 TOLERANCES

A. Completed surface: smooth and conforming to typical section and established lines and grades.

B. Top of compacted surface: Plus or minus ¼-inch in cross section or in 16-foot length.

3.9 FIELD QUALITY CONTROL

A. Testing will be performed under provisions of Section 01 45 29 – Testing and Laboratory Services.

B. In-place density will be determined in accordance with ASTM D 6938 or ASTM D 1556. Minimum of three tests will be taken for each 1000 feet per lane of roadway or 500 square yards of embankment.

3.10 PROTECTION

A. Maintain stabilized subgrade to lines and grades and in good condition until placement of base or surface course.

B. Repair defects immediately by replacing material to full depth.

3.11 OWNER TRAINING (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 32 11 13.13

LIME-TREATED SUBGRADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Foundation course of lime-stabilized subgrade material including application of lime slurry to subgrade, and mixing, compaction, and curing of lime slurry, water, and subgrade into a stabilized foundation.
2. Limits for installed lime treated subgrade material: Extends 1 foot beyond outside edge of proposed pavement, except where proposed pavement section shares a common longitudinal or transverse edge with existing pavement section.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 DEFINITIONS

A. Moist Cure: Curing soil and lime to obtain optimum hydration.

B. 1,000-Foot Roadway Section: 1,000 feet per lane width or approximately 500 square yards of compacted subgrade for other than full-lane-width roadway sections.

1.4 REFERENCES

A. ASTM D 698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3).

B. ASTM D 6938 – Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

C. ASTM D 4318 – Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

D. TxDOTTex-101-E – Preparing Soil and Flexible Base Material for Testing.

E. TxDOT Tex-140-E – Measuring Thickness of Pavement Layer.

F. TxDOT Tex-600-J – Sampling and Testing Hydrated Lime, Quicklime, and Commercial Lime Slurry.

1.5 SUBMITTALS

A. Conform to requirements of Section 01 33 00 – Submittals.

B. Submit certification that hydrated lime, quicklime, or commercial lime slurry complies with specifications.

C. Submit weight tickets, certified by supplier, with each bulk delivery of lime to work site.

1.6 DELIVERY, STORAGE AND HANDLING

A. Bagged lime shall bear manufacturer's name, product identification, and certified weight. Bags varying more than 5 percent of certified weight may be rejected; average weight of 50 random bags in each shipment shall not be less than certified weight.

B. Store lime in weatherproof enclosures. Protect lime from ground dampness.

1.7 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 WATER

A. Water: clean, clear and free from oil, acids, alkali, or organic matter.

2.2 LIME

A. Type A - Hydrated Lime: Dry material consisting essentially of calcium hydroxide or mixture of calcium hydroxide and an allowable percentage of calcium oxide as listed in chemical composition chart.

B. Type B - Commercial Lime Slurry: Liquid mixture consisting essentially of lime solids and water in slurry form. Water or liquid portion shall not contain dissolved material in sufficient quantity to be injurious or objectionable for purpose intended.

C. Type C - Quicklime: Dry material consisting essentially of calcium oxide. Furnish quicklime in either of the following grades:

1. Grade DS: Pebble quicklime of gradation suitable for use in preparation of slurry for wet placing.

2. Grade S: Finely-graded quicklime for use in preparation of slurry for wet placing. Do not use grade S quicklime for dry placing.

D. Conform to the following requirements:

CHEMICAL COMPOSITION	TYPE		
	A	B	C
Active lime content, % by weight $Ca(OH)_2$+CaO	90.0 min[1]	87.0 min[2]	-
Unhydrated lime content, % by weight CaO	5.0 max	-	87.0 min
Free water content, % by weight H_2O :	5.0 max	-	-
SIZING			
Wet Sieve, as % by weight residue retained:			
No. 6	0.2 max	0.2 max[2]	8.0 max[3]
No. 30	4.0 max	4.0 max[2]	-
Dry sieve, as % by weight residue retained:			
1-inch	-	-	0.0
¾-inch	-	-	10.0 max

Notes:

1. Maximum 5.0% by weight CaO shall be allowed in determining total active lime content.
2. Maximum solids content of slurry.
3. Total active lime content, as CaO, in material retained on No. 6 sieve shall not exceed 2.0% by weight of original Type C lime.

E. Deliver lime slurry to job site as commercial lime, or prepare at job site by using hydrated lime or quicklime. Provide slurry free of liquids other than water and of consistency that can be handled and uniformly applied without difficulty.

F. Lime containing magnesium hydroxide is prohibited.

2.3 SOIL

A. Soil to receive lime treatment may include borrow or existing subgrade material, existing pavement structure, or combination of all three. Where existing pavement or base material is encountered, pulverized or scarify material so that 100 percent of sampled material passes 2-inch sieve.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade is ready to support imposed loads.

B. Verify subgrade lines and grades are correct.

3.2 PREPARATION

A. Complete backfill of utilities prior to stabilization.

B. Cut material to bottom of subgrade using an approved cutting and pulverizing machine meeting following requirements:

1. Cutters accurately provide smooth surface over entire width of cut to plane of secondary grade.

2. Provide cut to depth as specified or shown in the Drawings.

C. Alternatively, scarify or excavate to bottom of stabilized subgrade. Remove material or windrow to expose secondary grade. Obtain uniform stability.

D. Correct wet or unstable material below secondary grade by scarifying, adding lime, and compacting as directed by Owner's representative.

E. Pulverize existing material so that 100 percent passes a 1¾-inch sieve.

3.3 LIME SLURRY APPLICATION

A. Apply slurry with distributor truck equipped with an agitator to keep lime and water in consistent mixture. Make successive passes over measured section of roadway to attain proper moisture and lime content. Limit spreading to an area where preliminary mixing operations can be completed on same working day.

B. Minimum lime content shall be 5 percent of dry unit weight of subgrade as determined by ASTM D 698.

3.4 PRELIMINARY MIXING

A. Use approved single-pass or multiple-pass rotary speed mixers to mix soil, lime, and water to required depth. Obtain homogeneous friable mixture free of clods and lumps.

B. Shape mixed subgrade to final lines and grades.

C. Eliminate following operations and final mixing if pulverization requirements of Paragraph 3.5C can be met during preliminary mixing:

1. Seal subgrade as precaution against heavy rainfall by rolling lightly with light pneumatic rollers.

2. Cure soil-lime material for 24 to 72 hours or as required to obtain optimum hydration. Keep subgrade moist during cure.

3.5 FINAL MIXING

A. Use approved single-pass or multiple-pass rotary speed mixers to uniformly mix cured soil and lime to required depth.

B. Add water to bring moisture content of soil mixture to optimum or above.

C. Mix and pulverize until all material passes 1¾-inch sieve; minimum of 85 percent, excluding non-slacking fractions, passes ¾-inch sieve; and minimum of 60 percent excluding non-slacking fractions passes No. 4 sieve. Test according to TxDOT Tex-101-E, using dry method.

D. Shape mixed subgrade to final lines and grades.

E. Do not expose hydrated lime to open air for 6 hours or more during interval between application and mixing. Avoid excessive hydrated lime loss due to washing or blowing.

3.6 COMPACTION

A. Aerate or sprinkle to attain optimum moisture content to 3 percent above optimum, as determined by ASTM D 698 on material sample from roadway after final mix with lime.

B. Start compaction immediately after final mixing.

C. Spread and compact in two or more equal layers where total compacted thickness is greater than 8 inches.

D. Compact with approved heavy pneumatic or vibrating rollers, or combination of tamping rollers and light pneumatic rollers. Begin compaction at bottom and continue until entire depth is uniformly compacted.

E. Do not allow stabilized subgrade to mix with underlying material. Correct irregularities or weak spots immediately by replacing material and recompacting.

F. Compact subgrade to minimum density of 95 percent of maximum dry density, according to ASTM D 698, at moisture content of optimum to 3 percent above optimum, unless otherwise indicated on Drawings.

G. Seal with approved light pneumatic tired rollers. Prevent surface hair line cracking. Rework and recompact at areas where hairline cracking develops.

3.7 CURING

A. Moist cure for minimum of 3 days before placing base or surface course, or opening to traffic. Subgrade may be opened to traffic after 2 days when adequate strength has been attained to prevent damage. Restrict traffic to light pneumatic rollers or vehicles weighing less than 10 tons.

B. Keep subgrade surface damp by sprinkling. Roll with light pneumatic roller to keep surface knit together.

C. Place base or surface within 14 days after final mixing and compaction. Restart compaction and moisture content of base material when time is exceeded.

3.8 TOLERANCES

A. Completed surface: smooth and conforming to typical section and established lines and grades.

B. Top of compacted surface: Plus or minus ¼-inch in cross section or in 16-foot length.

C. Depth of lime stabilization shall be plus or minus one inch of specified depth for each 1,000-foot roadway section.

3.9 FIELD QUALITY CONTROL

A. Testing will be performed under provisions of Section 01 45 29 – Testing and Laboratory Services.

B. Test soils, lime, and mixtures as follows:

1. Tests and analysis of soil materials will be performed in accordance with ASTM D 4318, using the wet preparation method.
2. Sampling and testing of lime slurry shall be in accordance with TxDOT Tex-600-J, except using a lime slurry cup.
3. Sample mixtures of hydrated lime or quicklime in slurry form will be tested to establish compliance with specifications.
4. Moisture-density relationship will be established on material sampled from roadway, after stabilization with lime and final mixing, in accordance with ASTM 698, Moist Preparation Method.

C. In-place depth will be evaluated for each 1,000-foot roadway section and determined in accordance with TxDOT Tex-140-E in hand excavated holes. For each 1,000-foot section, 3 phenolphthalein tests will be performed. Average stabilization depth for 1,000-foot section will be based on average depth for three tests.

D. Perform compaction testing in accordance with ASTM D 2922. Three tests will be performed for each 1,000-foot roadway section.

E. Pulverization analysis will be performed as required by Paragraph 3.05C on material sampled during mixing of each production area. Three tests will be performed per 1,000-foot roadway section or a minimum of once daily.

3.10 REWORK OF FAILED SECTIONS

A. Rework sections that do not meet specified thickness.

B. Perform the following steps when more than 72 hours have lapsed since completion of compaction.

1. Moist cure for minimum of 3 days after compaction to required density.
2. Add lime at rate of 25 percent of specified rate at no additional cost to Owner.
3. Moisture density test of reworked material must be completed by laboratory before field compaction testing can be completed.

3.11 PROTECTION

A. Maintain stabilized subgrade to lines and grades and in good condition until placement of base or surface course. Protect asphalt membrane from being picked up by traffic.

B. Repair defects immediately by replacing material to full depth.

3.12 OWNER TRAINING (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 32 12 16

ASPHALTIC CONCRETE VEHICULAR PAVEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Asphaltic concrete vehicular paving.

B. Related Specification Sections include, but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.
3. Section 09 91 00 – Painting and Protective Coatings.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. Federal Specifications (FS):
   a. TT-P-115F, Paint, Traffic (Highway, White and Yellow).
2. Construction standards: State of Texas, Department of Transportation, as amended to date.

B. Miscellaneous:

1. Should conflicts arise between standard specifications of government agencies mentioned herein and Contract Documents, Contract Documents shall govern.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's installation instructions.
3. Asphalt design mix.

1.5 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asphaltic Concrete:
   1. TxDOT Specification – Item 300 Asphalts, Oils, & Emulsions
   2. TxDOT Specification – Item 310 Prime Coat
   3. TxDOT Specification – Item 340 Dense Graded Hot-Mix Asphalt.
   4. TxDOT Specification – Item 247 Flexible Base

B. Line Paint:
   1. Nonreflective.
   2. White.
   3. FS TT-P-115F.
   4. Refer to Specification Section 09 91 00 – Painting and Protective Coatings.

2.2 MIXES

A. Comply with mix design category per TxDOT Specification – Item 340, Dense Graded Hot-Mix Asphalt.
   1. Fine-Graded Surface Course, Type D

PART 3 - EXECUTION

3.1 INSTALLATION

A. Construct to line, grade and section as shown on Drawings and in accordance with referenced State and Federal Specifications.

B. Install base course in accordance with TxDOT Specification – Item 247, Flexible Base, and drawings.

C. Spread a prime coat uniformly on compacted aggregate base course at rate of 0.25 to 0.35 GAL per square yard in accordance with TxDOT Specification – Item 310, Prime Coat.

D. Install Tack Coat in accordance with TxDOT Specification – Item 300, Asphalts, Oils, & Emulsions.

E. Install surface course, Type D, in accordance with TxDOT Specification – Item 340, Dense Graded Hot Mix Asphalt.

F. Tolerance of Finished Grade: +0.10 FT from required elevations.

3.2 OWNER TRAINING (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 32 13 13

CONCRETE PAVEMENT, CURB, SIDEWALKS, AND STEPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete pavement.

B. Related Specification Sections include, but are not necessarily limited to:

1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. Unit Price. No separate payment will be made for this item. Include the cost in associated items for this project.

B. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. American Association of State Highway and Transportation Officials (AASHTO):
   a. M153 – Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction (ASTM D1752).
   b. M171 – Sheet Materials for Curing Concrete.
   c. M182 – Burlap Cloth Made from Jute or Kenaf.
   d. M213 – Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) (ASTM D1751).
   e. M224 – Use of Protective Sealers for Portland Cement Concrete.
   f. M233 – Boiled Linseed Oil Mixture for Treatment of Portland Cement Concrete.
2. American Concrete Institute (ACI):
   a. 305R – Hot Weather Concreting.
   b. 306R – Cold Weather Concreting.
3. ASTM International (ASTM):

a. A185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

b. A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

c. C33 – Standard Specification for Concrete Aggregates.

d. C150 – Standard Specification for Portland Cement.

e. C174 – Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores.

f. C309 – Standard Specification Liquid Membrane-Forming Compounds for Curing Concrete.

g. D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3).

h. D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

i. D1752 – Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

j. D4253 – Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

k. D4254 – Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.

4. Federal Specification (FS):

a. SS-S-1614 – Sealants, Joint, Jet-Fuel-Resistant, Hot-Applied for Portland Cement and Tar Concrete Pavements.

b. TT-S 00227 E – Sealing Compound: Elastomeric Type, Multi-Component (for Calking, Sealing, and Glazing in Buildings and Other Structures).

1.4 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

3. Mix design(s) in accordance with Specification Section 03 09 00 – Concrete.

4. Qualifications of concrete installer.

5. Drawings detailing all reinforcing.
6. Scaled cross section detail of crown template with dimensions showing off sets from level line.
7. Concrete pavement joint pattern for paved areas.
8. Test reports:
    a. Concrete cylinder Test results from field quality control.

B. Samples:
1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Samples of fabricated jointing materials and devices.

1.5 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement: ASTM C150, Type I or II.

B. Aggregates:
1. ASTM C33, gradation size #67, 3/4 IN to #4.
2. Clean, crushed gravel.

C. Water: Clean, clear; and free from oil, acids, alkali, or vegetable matter.

D. Admixtures: Comply with Specification Section 03 31 30 – Concrete, Materials and Proportioning.

E. Reinforcing Bars: ASTM A615, Grade 60.

F. Welded Wire Reinforcement:
1. ASTM A185.
2. Flat.
3. Clean, free from dirt, scale, rust.

G. Preformed Joint Filler:
1. Non-extruding cork, self-expanding cork, sponge rubber or cork rubber.
2. AASHTO M153 or AASHTO M213.

H. Hot-Poured Joint Sealing Material: FS SS-S-1614.

I. Sidewalk Joint Sealant:
1. Two (2) compound polyurethane.
2. Class A, Type 1.

3. Self-leveling.
4. Non-tracking.
5. FS TT-S 00227 E(3).

J. Membrane Curing Compound: ASTM C309.

K. Cover Materials for Curing:

1. Burlap:
   a. AASHTO M182.
   b. Minimum Class 2, 8 0Z material (1 YD x 42 IN).
2. Polyethylene film, AASHTO M171.

L. Paper Subgrade Cover: Polyethylene film, AASHTO M171.

M. Concrete Treatment:

1. Boiled linseed oil mixture.
2. AASHTO M233.

N. Traffic Paint: FS TT-P-115, Type 1 - Alkyd.

O. Forms:

1. Steel or wood.
2. Size and strength to resist movement during concrete placement and able to retain horizontal and vertical alignment.
3. Free of distortion and defects.
4. Full depth.
5. Metal side forms:
   a. Minimum 7/32 IN thick.
   b. Depth equal to edge thickness of concrete.
   c. Flat or rounded top minimum 1-3/4 IN wide.
   d. Base 8 IN wide or equal to height, whichever is less.
   e. Maximum deflection 1/8 IN under center load of 1,700 LBS.
   f. Use flexible spring steel forms or laminated boards to form radius bends.

2.2 MIXES

A. Mix design to provide 4,000 psi 28-day compressive strength, 1-1/2 IN plus 1 IN slump, 6 percent air.

B. Comply with Specification Section 03 09 00 – Concrete.

PART 3 - EXECUTION

3.1 PREPARATION

A. Subgrade Preparation:

1. Prepare using methods, procedures, and equipment necessary to attain required compaction densities, elevation and section.
2. Scarify and recompact top 6 IN of fills and embankments which will be under paved areas.
3. Remove soft or spongy areas.
4. Replace with aggregate material.
5. Compact to the following densities:
    a. Cohesive soils: 95 percent per ASTM D698.
    b. Non-cohesive soils: 75 percent relative per ASTM D4253 and ASTM D4254.
6. Assure moisture content is within limits prescribed to achieve required compaction density.
7. Following compaction, trim and roll to exact cross section.
    a. Check with approved grading template.
8. Perform density tests on subgrade to determine that subgrade complies with the specification.

B. Aggregate Course:

1. Place material in not more than 6 IN thick layers.
2. Spread, shape, and compact all material deposited on the subgrade during the same day.
3. Compact to 75 percent relative per ASTM D4253 and ASTM D4254.

C. Loose and Foreign Material: Remove loose and foreign material immediately before application of paving.

D. Appurtenance Preparation:

1. Block out or box out curb inlets and curb returns.
2. Provide for joint construction as detailed and dimensioned on Drawings.
3. Adjust manholes, inlets, valve boxes and any other utility appurtenances to design grade.
    a. Secure to elevation with concrete.
    b. Place concrete up to 5 IN below design grade.
4. Headers:
    a. Construct at open ends of pavements.

b. Use same concrete to construct headers as that used in the abutting structure.

c. Extend header full width of pavement and crown same as pavement.

5. Clean and oil forms.

3.2 INSTALLATION

A. Concrete Production: Comply with Specification Section 03 09 00 – Concrete.

B. Forms:

1. Form support:

a. Compact soil foundation and cut to grade to support forms and superimposed machine loads.

b. Use bearing stakes driven flush with bottom of form to supplement support as necessary.

c. Do not use earth pedestals.

2. Staking forms:

a. Joint forms neatly and tightly.

b. Stake and pin securely with at least three (3) pins for each 10 FT section.

3. Clean and oil forms prior to placement of concrete.

4. Set forms sufficiently in advance of work (minimum of 2 HRS) to permit proper inspection.

5. Previously finished concrete pavement, curb or sidewalk contiguous with new work may serve as side form when specifically approved.

C. Reinforcing:

1. Locate longitudinal edge bars between 3 IN and 6 IN from edge of slab.

2. Lap mats one (1) full space.

3. Tie end transverse member of upper mat securely to prevent curving.

4. Lap non-welded bars 12 IN minimum.

5. Support:

a. Place bars and heavy mats securely on chairs at called-for height.

b. Place other fabric on the first of a two-course pour and cover promptly with final pour, or place fabric by a fabric-placer if procedure is reviewed and approved by Owner's Representative.

D. Joints:

1. Hold joint location and alignment to within +1/4 IN.

2. Finish concrete surface adjacent to previously placed slab to within +1/8 IN, with tooled radius of 1/4 IN.

3. Metal keyway joints:
    a. Form by installing metal joint strip left in place.
    b. Stake and support like side form.
    c. Provide dowels or tie bars.
4. Weakened plane joints:
    a. Tooled joints:
        1) Form groove in freshly placed concrete with tooling device.
        2) Groove dimensions shall be 3/8 IN at surface and 1/4 IN at root.
    b. Sawed joints:
        1) Saw 1/4 IN groove in green concrete.
        1) Commence sawing as soon as concrete is hard enough to withstand operation without chipping, spalling or tearing, regardless of nighttime or weather.
        2) Thoroughly wet surface to protect membrane cure and recoat afterward.
        3) Complete saw cutting before shrinkage stresses cause cracking.
    c. Locate at 6 FT intervals.
5. Stake in place load transfer device for expansion joints consisting of dowels:
    a. Supporting and spacing means and pre-molded joint filler as per Drawing details.
    b. Located at 48 FT intervals and at all intersection curb returns.
    c. Provide preformed joint filler at all junctions with existing curb, sidewalk, steps, or other structures.
6. Install construction joints at end of day's work or wherever concreting must be interrupted for 30 minutes or more.
7. Thoroughly clean and fill joints with joint sealing material as specified.
8. Fill joints without overflowing onto pavement surface.
9. Upper surface of filled joint to be flush to 1/8 IN below finish surface.

E. Place Concrete:
1. Comply with Specification Section 03 09 00 – Concrete.
2. Construct driveway openings, ramps, and other features as per Drawing details.

F. Cold and Hot Weather Concreting:
1. Cold weather:

a. Cease concrete placing when descending air temperature in shade falls below 40 Deg F.
b. Do not resume until ambient temperature rises to minimum 40 Deg F.
c. If placing below 40 Deg F is authorized by Owner's Representative, maintain temperature of mix between 60 and 80 Deg F.
d. Heat aggregates or water or both.
e. Water temperature may not exceed 175 Deg F.
f. Aggregate temperature may not exceed 150 Deg F.
g. Remove and replace frost damaged concrete.
h. Salt or other antifreeze is not permitted.
i. Comply with ACI 306R.

2. Hot weather:
   a. Cease concrete placing when plastic mix temperature cannot be maintained under 90 Deg F.
   b. Aggregates or water or both may be cooled.
   c. Cool water with crushed ice.
   d. Cool aggregates by evaporation of water spray.
   e. Never batch cement hotter than 160 Deg F.
   f. Comply with ACI 305R.

G. Finishing:
1. As soon as placed, strike off and screed to crown and cross section, slightly above grade, so that consolidation and finishing will bring to final Drawing elevations.
2. Maintain uniform ridge full width with first pass of first screed.
3. Pavement and similar surfaces:
   a. Float by longitudinally reciprocating float, passing gradually from edge to edge.
   b. Assure successive advances do not exceed half the length of the float.
   c. Test level of slab with minimum 10 FT straightedge.
   d. Fill depressions with fresh material, consolidate and refinish.
   e. Cut down high areas and retest.
   f. Belt surface with two-ply canvas belt, using transverse strokes while advancing along center line.
   g. Provide final finish by full width burlap or carpet drag, drawn longitudinally.

h. Keep drag clean to avoid build up and consequent scarring.

i. Tool pavement edges with suitable edger.

j. Retest with straightedge and if pavement shows deviation of more than 1/8 IN in 10 FT, remove and replace.

4. Curb and similar surfaces:

a. Bring curb to grade by running straightedge over steel templates with sawing motion.

b. Float surface with a wood float to draw cement to surface.

c. Broom finish after floating.

d. Tool edges with suitable edger.

e. Upon removal of forms, fill honeycombed or unevenly filled sections immediately with cement mortar.

f. Assure that expansion joints are cleared of concrete.

5. Sidewalk, steps, ramps, and similar surfaces:

a. Test with 6 FT straightedges equipped with long handles and operated from off the sidewalk.

b. Draw excess water and laitance off from surface.

c. Float finish so as to leave no disfiguring marks, but to produce a uniform granular or sandy texture.

d. Broom finish after floating.

e. Tool pavement edges with suitable edger.

f. Provide exposed aggregate surfaces in areas indicated on the Drawings.

g. Provide method such as abrasive blasting, bush hammering, or surface retarder acceptable to the Owner’s Representative.

H. Curing:

1. Apply membrane curing compound complying with ASTM C309, and in accordance with manufacturer's directions, but at a minimum rate of 200 SF per gallon.

2. Apply curing compound within 4 HRS after finishing or as soon as surface moisture has dissipated.

3. Cure for minimum of seven (7) days.

4. When average daily temperature is below 50 Deg F, provide insulating protection of 12 IN minimum thickness loose dry straw, or equivalent, for 10 days.

5. Linseed oil sealant:

a. For concrete pavement or sidewalk, seal surface with linseed oil.

b. Apply linseed oil to clean surface as per AASHTO M224 after concrete has cured for one (1) month.

c. Apply first application at minimum rate of 67 SY per gallon.

d. Apply second application to a dry surface at minimum rate of 40 SY per gallon.

I. Protection of Concrete:

1. Protect concrete surfaces and appurtenances from traffic for minimum of 14 days.
2. Erect and maintain warning signs, lights, watchmen to direct traffic.
3. Repair or replace parts of concrete surfaces damaged by traffic, or other causes, occurring prior to final acceptance.
4. Protect concrete pavement against public traffic, construction traffic and traffic caused by employees and agents.
5. No equipment shall be driven or moved across concrete surfaces unless such equipment is rubber-tired and only if concrete is designed for and capable of sustaining loads to be imposed by the equipment.
6. Do not drive over new or existing concrete with tracked vehicles and equipment.

J. Painting and Striping:

1. Stripe and mark pavement per the Drawings following sufficient cure time for pavement.
2. Lay out markings with guidelines, templates, and forms.
3. Apply 6 IN wide stripe with self-contained striping machine to a clean and dry pavement surface.
4. Temperature must be above 40 Deg F and precipitation should not be expected during drying period.
5. Use yellow or white paint as approved complying with FS TT-P-115.
6. Apply at 1 GAL per 105 SF.

K. Opening to Traffic:

1. After 14 days, pavement may, at Owner's discretion, be opened to traffic if job cured test cylinders have attained a compressive strength of 3,000 LBS per square inch when tested in accordance with ASTM standard methods.
2. Prior to opening to traffic, clean and refill joints as required with the specified filler material.

L. Clean Up:

1. Assure clean up work is completed within two (2) weeks after pavement has been opened to traffic.
2. No new work will begin until clean up work has been completed, or is maintained within two (2) weeks after pavement has been opened to traffic.

M. Pavement Patching:

1. Comply with material and density requirements as mentioned elsewhere in this Specification Section except provide minimum 6 IN aggregate immediately below the patch.
2. Place pavement patch providing a thickened edge.
3. Assure that patch in plane of "cold" joint has a thickness 6 IN greater than that of the existing pavement.
4. Extend patch under existing pavement for a distance of 6 IN minimum.
5. Fill void under existing pavement with concrete.
6. Undercut existing pavement 6 IN all around patch and to a depth of 6 IN.
7. Prior to placing patch, sawcut edge of existing concrete to 1/4 depth and remove to provide a vertical face for a straight and true joint.

3.3 FIELD QUALITY CONTROL

A. Provide test cylinders in accordance with Specification Section 03 09 00 – Concrete for each CY of concrete placed.

B. Pavement Thickness Testing:

1. General:
   a. Core pavement to determine the actual thickness as directed by Owner’s Representative.
   b. Determine thickness by ASTM C174.
   c. Fill holes from removal of cores with concrete of the same mixture as specified.
   d. Cost incidental to coring of cores showing a deficiency greater than 1/4 IN shall be paid by the Contractor.
   e. Cost of cores showing a deficiency of 1/4 IN or less shall be paid by the Owner.
   f. If average pavement thickness, as directed by core measurement, is outside specified tolerances, payment will be reduced per PART 1 of this Specification Section.
   g. If deficiency in pavement thickness is 1 IN or more, remove and replace pavement at Contractor's expense.
2. Core categories:

a. In determining the average thickness of acceptable pavement for which payment will be made, utilize the following core categories:

CATEGORY NUMBER	CORE THICKNESS IN RELATION TO DESIGN	CORE LENGTH USED IN CALCULATING
1	1 IN or more deficiency	NOT USED
2	Less than 1 IN deficiency through 1/2 IN excess	Actual Core Thickness
3	More than 1/2 IN excess	Design Thickness plus 1/2 IN

b. Core sampling:

   1) Take cores in each lane in each block.

c. Take cores at locations where the cement content was found to be low when checking the quantities of cement used during the progress of the work.

d. Each separately poured lane of the pavement to be considered as a unit.

e. A lane shall be considered to be the pavement surface between longitudinal construction joints, between a longitudinal construction joint and the edge, or between two (2) pavement edges in cases where the entire width of the pavement is poured in one (1) operation.

f. Should any core show a deficiency in thickness in excess of 1 IN, check cores shall be taken 5 FT on either side of this location parallel to the centerline of the pavement.

g. If both of these cores are within the 1 IN tolerance, no further special borings for this individual zone of deficiency will be made.

h. If either one (1) or both of these cores are not within the 1 IN tolerance, the procedure will be to cut cores in the following order on either side of the original short core parallel to the centerline of the pavement:

   1) 25 FT, 50 FT, the same to be measured from the location of original core found to be deficient in thickness, then at 50 FT intervals until a thickness within the 1 IN tolerance is found in both directions.

   2) On either side of the original deficient core, the procedure will then be to make a coring approximately half the distance within the first core which comes within the 1 IN tolerance.

   3) Repeat the above procedure until the station (+5 FT), at which the pavement comes within the 1 IN tolerance is located.

   4) If for some reason two (2) or more cores are taken at the same station and at least one (1) of them is beyond the 1 IN tolerance, the section of pavement at the station shall be considered as unacceptable.

3.4 OWNER TRAINING (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

GENERAL ELECTRICAL

PART 1 – REQUIREMENTS

1.1 ELECTRICAL WORK

A. Requirements

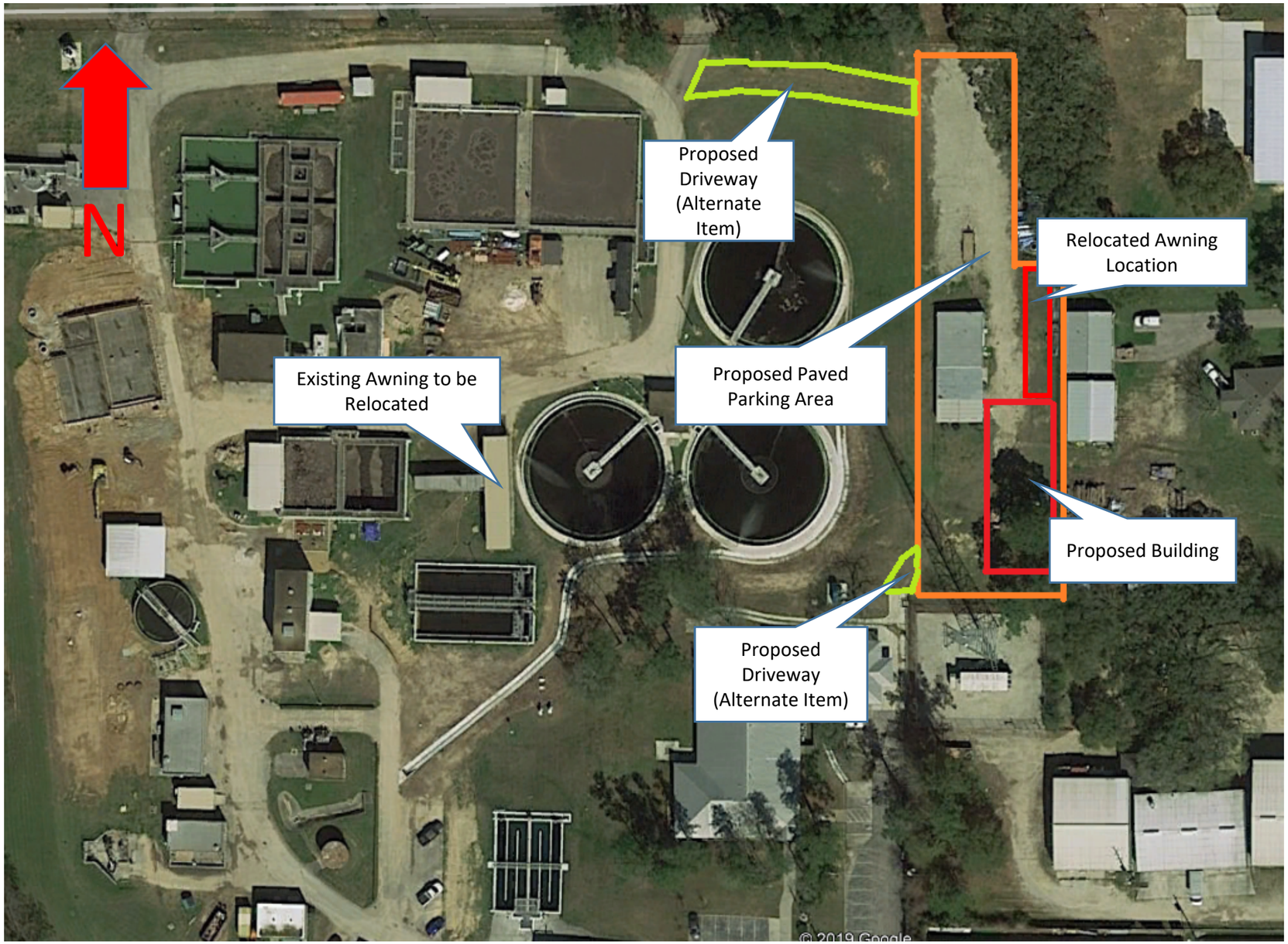
1. The electrical installation shall be installed per the current 2017 NEC.
2. All persons performing electrical work on this project must have a current State of Texas Master, Journeyman or Apprentice Electrical License.
3. No electrical work shall be performed without a Texas State Licensed Master or Journeyman Electrician present.
4. All installations shall be installed in a neat and craftsman-like manner, i.e., level, plumb and square.
5. All interior hardware and fasteners shall be zinc plated steel.
6. All exterior hardware and fasteners shall be 316 SS.
7. All panels shall be properly labeled and circuits identified on a panel schedule. This schedule shall be typed or computer generated. No hand printing accepted.
8. Apply No-Alox (GB-OX800) or equal to all breakers, panel board(s) and load centers threaded terminal connections.
9. All load center wire terminations to be labeled with associated circuit number. Install permanently identified, waterproof, heat shrink wire ID tags at each conductor terminated in the load center(s).
10. All wire pulls shall be made using wire lubricant designed for the purpose.
11. All wire pulls shall be accomplished by using approved equipment designed for the purpose of pulling wire (wire tugger or hand method). No trucks, tractors, cranes, etc. shall be permitted for pulling wire.
12. All interior conduit shall be EMT ¾-inch minimum.
13. All EMT connectors and couplings shall be set screw type.
14. All device boxes shall be 1900 series with required covers for device mounting. A maximum of two extension rings will be allowed.
15. All under or in-slab conduits shall be Schedule 40 PVC, 1-inch minimum diameter in size.
16. All conduit risers shall be PVC coated steel for 6-inch AFF, then transition to EMT (SEE DETAIL).

17. All connections to vibrating equipment shall be made with flexible metal conduit, BX or Greenfield using required connectors and anti-short bushings.
18. All conduits shall contain a code size ground wire, no raceway grounding is permitted.
19. The minimum size for a power wire shall be #12 AWG stranded wire. No solid wire will be permitted.
20. All wire shall have THHN/THWN insulation.
21. All duplex receptacles shall be 20A GFCI type, brown in color.
22. All switches shall be 20A rated, brown in color.
23. Device covers shall be the steel type designed to fit a 1900 box.
24. Interior lights shall be 4 foot, 120V, (4) F32T8 lamps, electronic ballast, mounted on roof purlins (Lithonia AFST432MVOLT1/4GEB10RS or approved equal).
25. Exterior building fixtures shall be 120-277V, 40W LUMAPRO LED wall pack, 5000K Color Temperature, Lumens 3985 lm (Grainger Item #446M62) or approved equal. Mount 10 foot above finished grade.
26. Pole light shall be 175W Metal Halide with glass refractor (Lithonia TFL175M120 with P/C or approved LED equal).
27. Exterior GFCI receptacles shall have in-use covers.
28. All ground rods shall be ¾-inch x 10-foot copper clad installed in a concrete ground well with cover marked GROUND: Brooks 3RT or equal.
29. Ground clamps shall be Burndy type GUV or approved equal.

END OF SECTION

APPENDICES

OVERVIEW MAP



Overview Map

BUILDING RENDERINGS
(1-4)


adows

EXISTING AWNING TO BE RELOCATED

East Elevation

West Elevation

Existing Awning to be Relocated

DRAWING SHEETS

1. Existing Site Conditions
2. Proposed Site Layout (1 of 2)
3. Proposed Site Layout (2 of 2)
4. Proposed Conduit Layout
5. Building Layout
6. Lighting Layout
7. Power Layout
8. Equipment Layout
9. Conduit Schedule
10. Conduit Riser Details
11. Pull Box Detail
12. Low Voltage Equipment Layout
13. Panel Breaker Layout
14. Electrical Details
15. Paving Details
16. Storm Sewer Details (1 of 2)
17. Storm Sewer Details (2 of 2)
18. General Details

EXISTING OAK TREES

8.45' 8.30' 7.10' 7.24 7.15'

7.60' 7.05' 6.38' 6.12'

EXISTING PINE TREE TO BE REMOVED BY OTHERS.

6.85' 6.70' 6.72' 5.57'

EXISTING INLET

5.88' 5.55' 5.10

EXISTING BUILDING TO BE DEMOLISHED BY OTHERS.

EXISTING DRAIN

6.17' 3.07' 3.77' 3.80'

EXISTING PULL BOX

3.10' 2.85' 2.34' 1.76' 1.50' 1.21'

(1.) EXISTING STRUCTURES AND TREE TO BE REMOVED WILL BE REMOVED PRIOR TO CONSTRUCTION PROJECT.

EXISTING CLARIFIER 3

EXISTING CLARIFIER 1

EXISTING GENERATOR

BM 1 = 0.00'

SAN JACINTO RIVER AUTHORITY

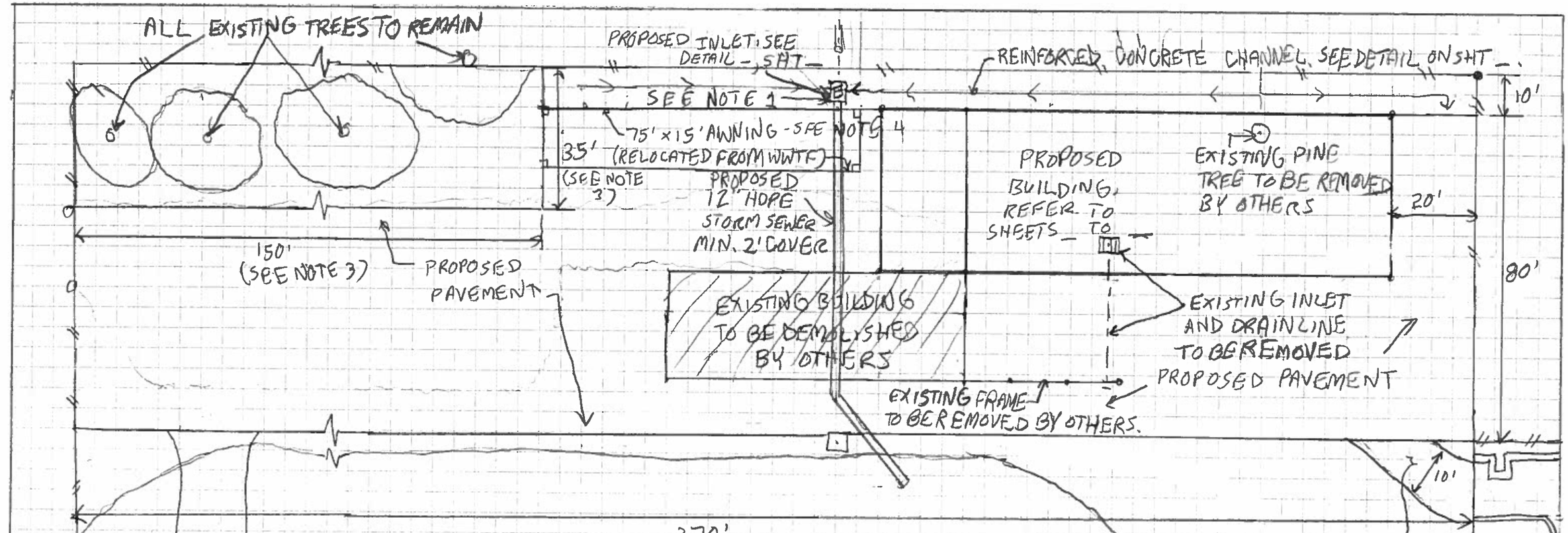
STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER

1-15-2020

EMERGENCY REPAIR SERVICE CENTER

EXISTING SITE CONDITIONS

SHEET 1 OF 18



NOTES:

1. PROPOSED INLET TO BE TYPE "E" INLET WITH TYPE "A" INLET GRATE TOP.
2. REFER TO SHEET - OF - FOR CONTINUATION AND DRIVEWAY LAYOUT.
3. NO CONSTRUCTION ACTIVITIES ALLOWED IN AREA NOT TO BE PAVED AROUND TREE. PROVIDE TEMPORARY FENCING TO PROTECT TREES AND ROOTS DURING CONSTRUCTION.
4. AWNING TO BE RELOCATED IS APPROX. 14'-6" TALL. HOWEVER, COLUMNS MAY NEED TO BE CUT TO REMOVE. SALVAGE COLUMNS TO ALLOW FOR 12' COLUMNS ON HIGH SIDE (WEST) OF AWNING.

SAN JACINTO RIVER AUTHORITY

STATE OF TEXAS
AARON K. SCHNOEWOLF
102379
LICENSED PROFESSIONAL ENGINEER
1-15-2020

EMERGENCY REPAIR SERVICE CENTER

PROPOSED SITE LAYOUT (1 OF 2)

SHEET 2 OF 18

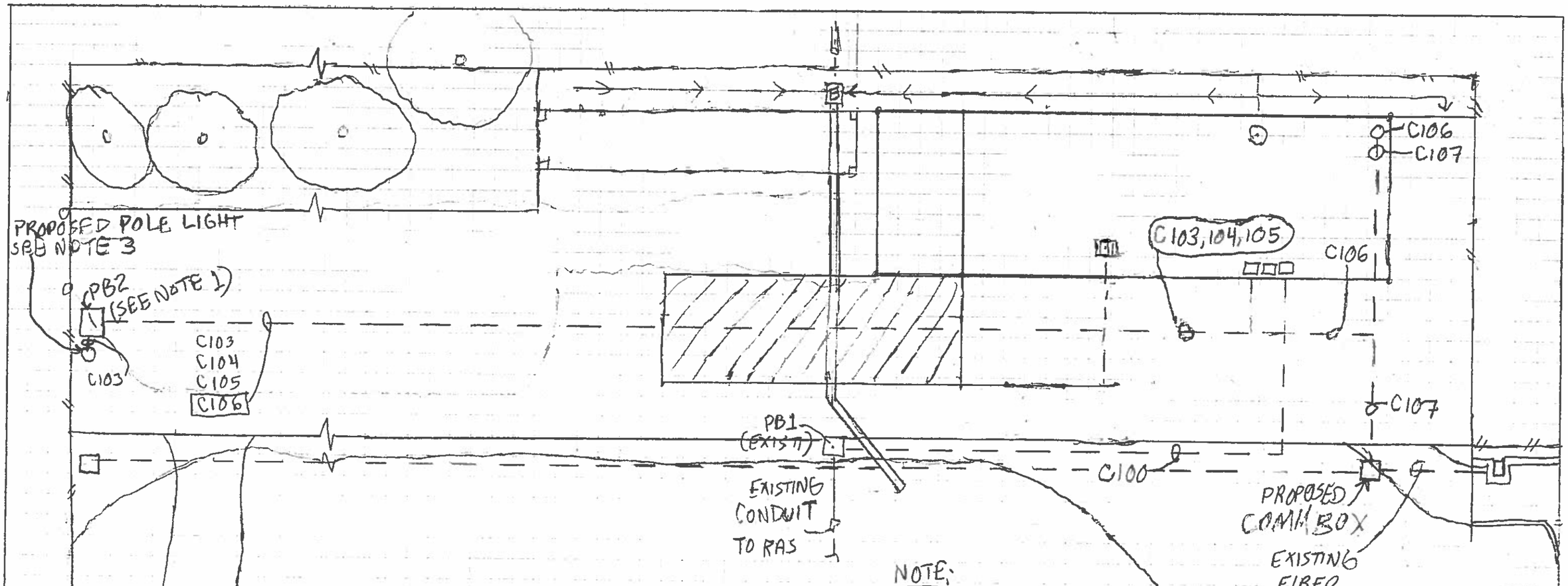
25'
15'
145'
PROPOSED DRIVEWAY
PROPOSED DRIVEWAY
EXIST. DRIVEWAY
EXIST. GENERATOR
EXISTING CLARIFIER 3
EXISTING CLARIFIER 1
10'
15'
EXISTING ASPHALT
15'
SAN JACINTO RIVER AUTHORITY
EXISTING ASPHALT ROAD
EXISTING BUILDING
EXISTING CLARIFIER 2
EXISTING AWNING TO BE RELOCATED (WEST 100', WEST OF CLARIFIER 2)

STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER
1-15-2020

EMERGENCY REPAIR SERVICE CENTER

PROPOSED SITE LAYOUT (2 OF 2)

SHEET 3 OF 18



NOTE:

1. COORDINATE LOCATION OF PB2 AND COMM. PULLBOXES WITH OWNER.
2. COORDINATE EXACT PLACEMENT OF CONDUIT WITH OWNER. LOCATIONS SHOWN ON DRAWING ARE APPROXIMATE ONLY.
3. COORDINATE EXACT LOCATION WITH OWNER. SEE DETAIL, SHT 14.

SAN JACINTO RIVER AUTHORITY

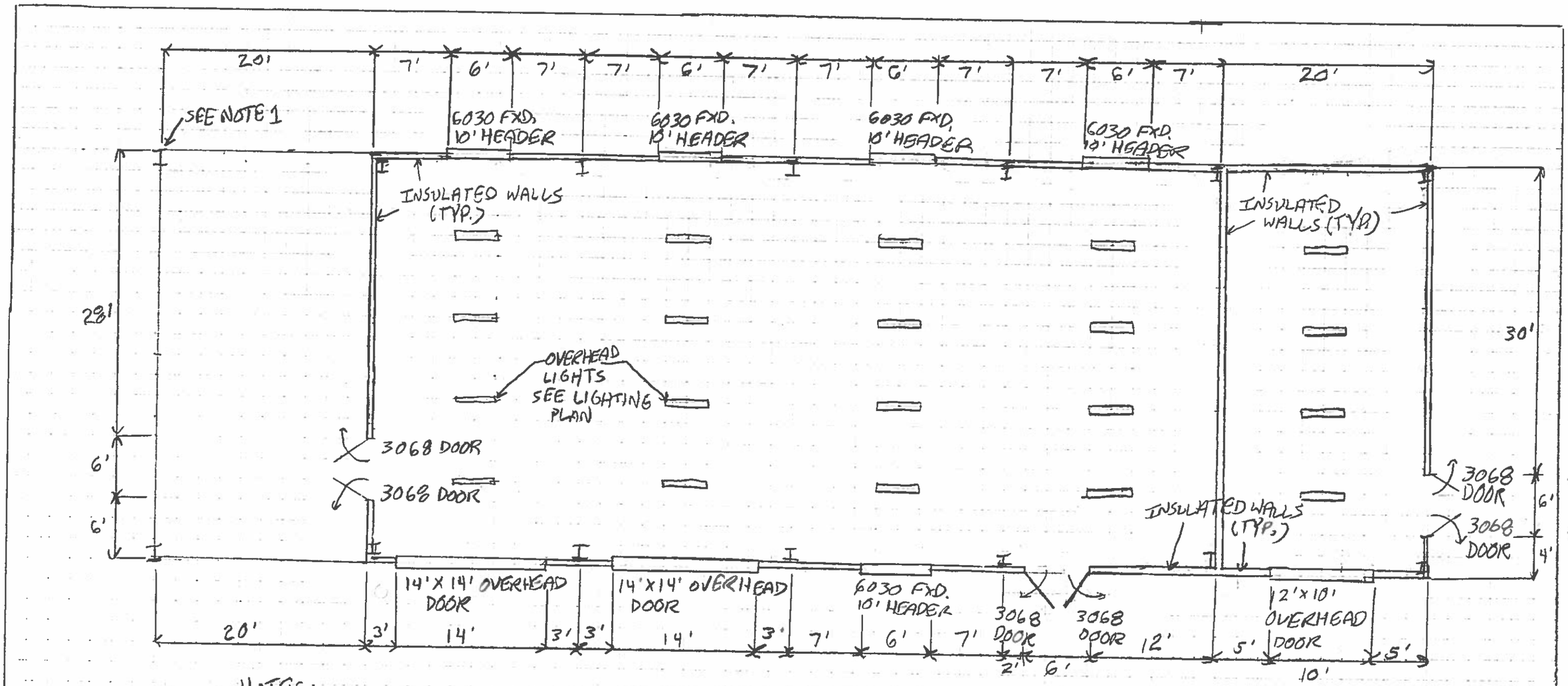
STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER

1-15-2020

EMERGENCY REPAIR SERVICE CENTER

PROPOSED CONDUIT SITE LAYOUT

SHEET 4 OF 18



NOTES:

① COLUMNS SHOWN FOR ILLUSTRATION PURPOSES ONLY DESIGN FOR STRUCTURAL MEMBERS TO ALLOW FOR 40' DEEP CLEAR-SPAN SPACE WITH 20' WIDE BAYS. STRUCTURAL DESIGN TO BY SEALED/SIGNED BY PROFESSIONAL ENGINEER LICENSED IN TEXAS.

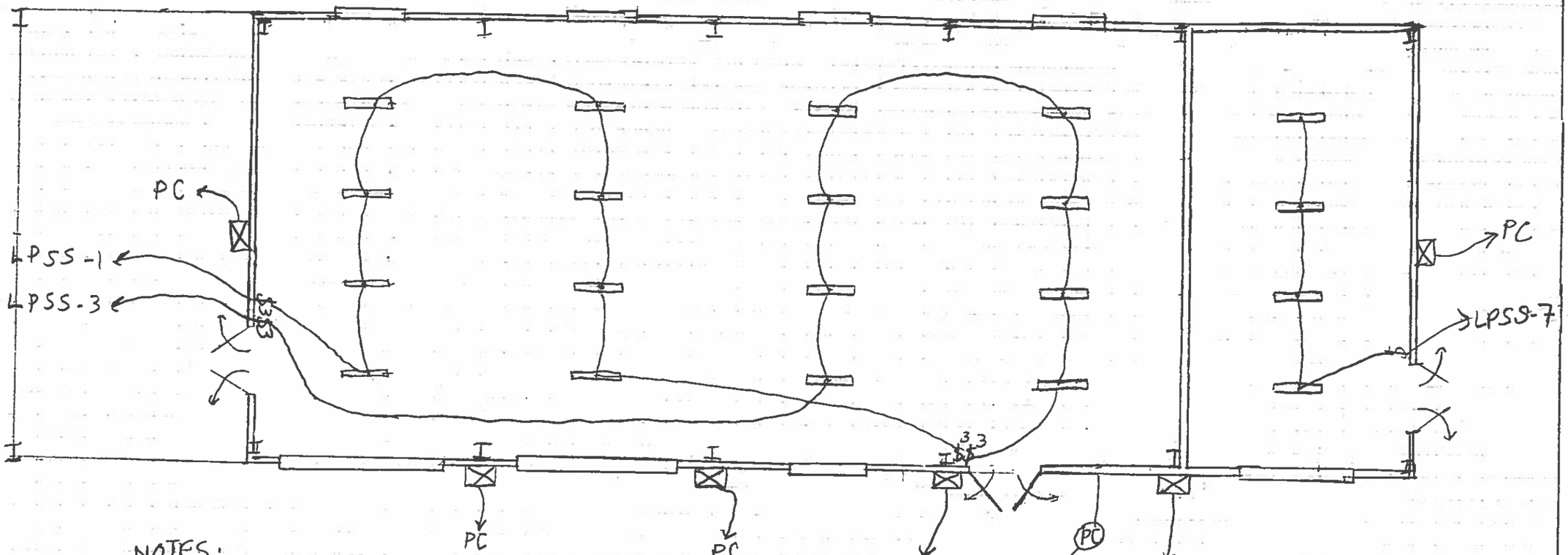
② BOLLARDS TO BE FIELD LOCATED AROUND BUILDING PER COORDINATED LOCATIONS WITH OWNER. THEREFORE, LOCATIONS ARE NOT SHOWN ON DRAWINGS.

SAN JACINTO RIVER AUTHORITY

STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER
1-15-2020

EMERGENCY REPAIR SERVICE CENTER

BUILDING LAYOUT



NOTES:

① LIGHTING DEVICES SHOWN ONLY FOR ILLUSTRATION OF APPROXIMATE LOCATION. FIELD LOCATE EXACT LOCATIONS WITH COORDINATION WITH SJRA PERSONNEL.

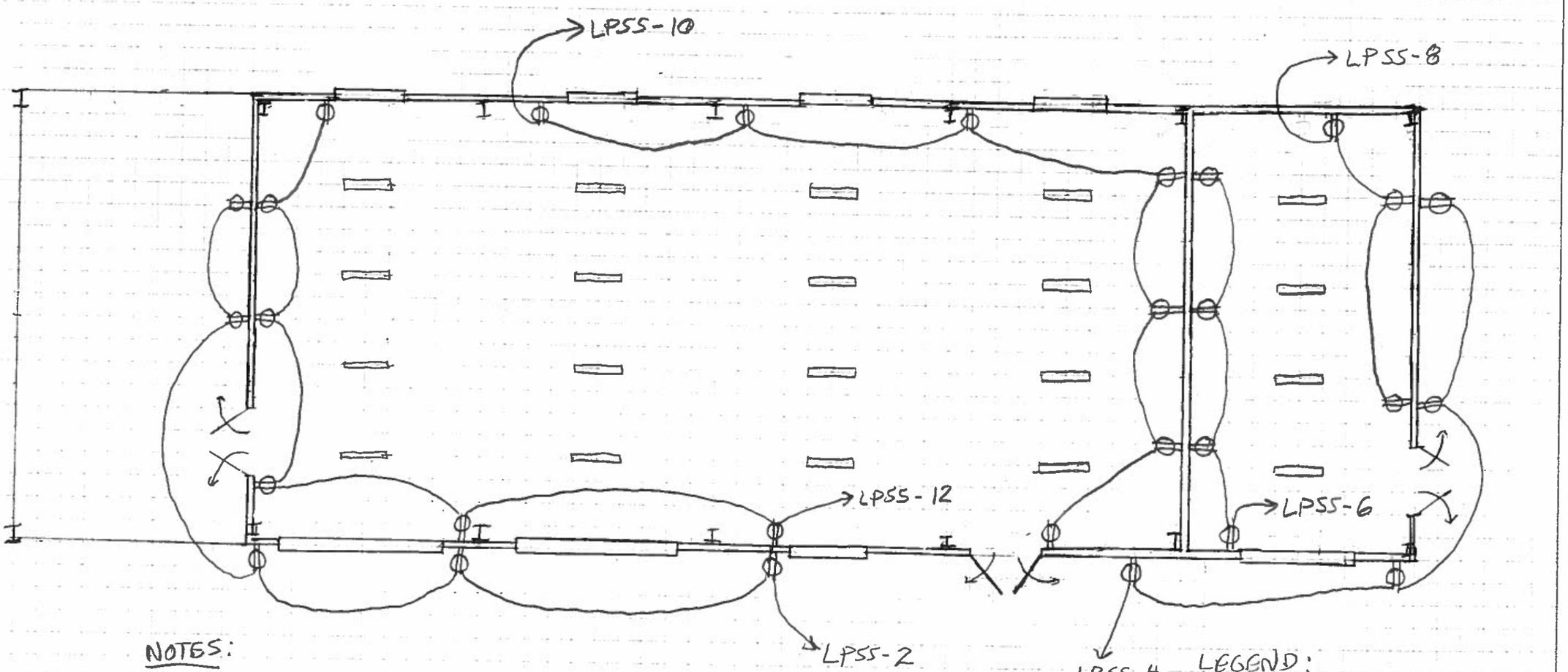
LEGEND:

- ⊠ EXTERIOR LIGHT
- (PC) PHOTO-CELL
- ▭ SUSPENDED FIXTURE (SEE GENERAL ELECTRICAL SPEC)
- $ SINGLE-POLE SWITCH
- $3 THREE-POLE SWITCH

SAN JACINTO RIVER AUTHORITY

STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER
1-15-2020

EMERGENCY REPAIR SERVICE CENTER | LIGHTING LAYOUT | SHEET 6 OF 19



NOTES:

(1) POWER DEVICES SHOWN ONLY FOR ILLUSTRATION OF APPROXIMATE LOCATION. FIELD LOCATE EXACT LOCATIONS WITH COORDINATION WITH SJRA PERSONNEL.

LEGEND:

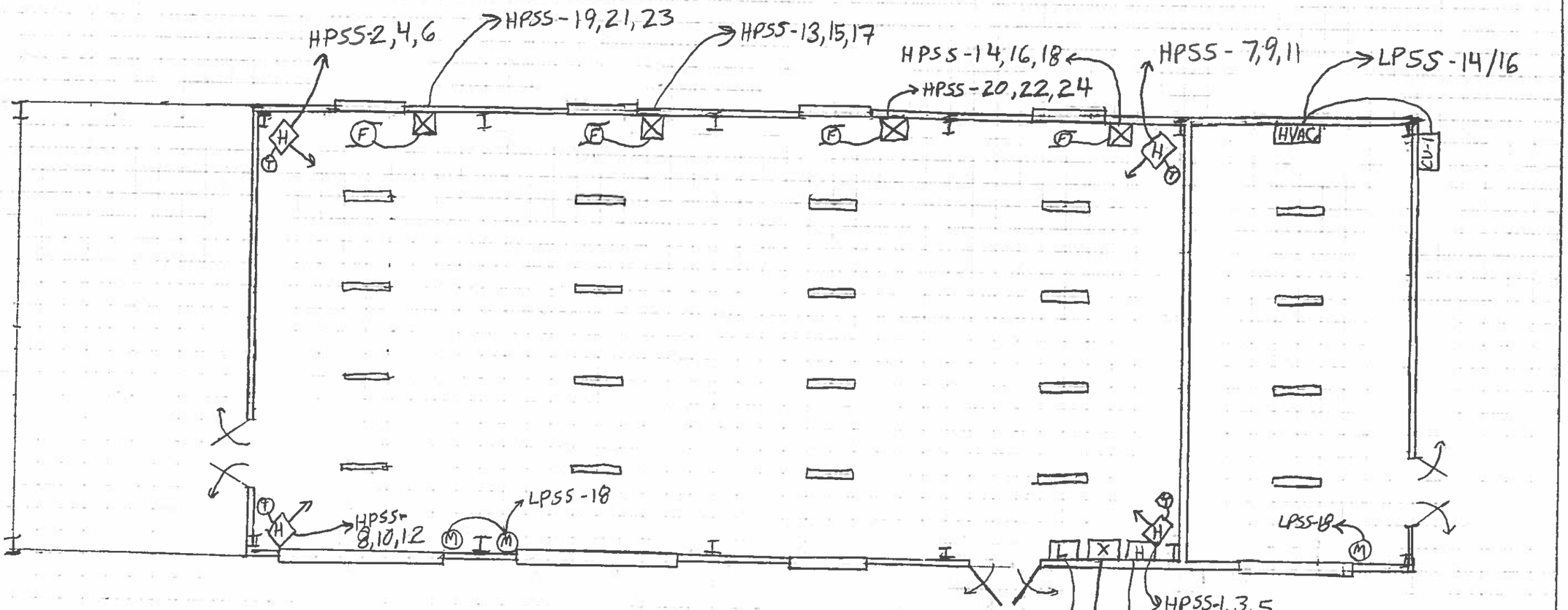
⏀ 20A, 120 V RECEPTACLE (GFCI, BROWN)

SAN JACINTO RIVER AUTHORITY

STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER

1-15-2020

EMERGENCY REPAIR SERVICE CENTER | POWER LAYOUT | SHEET 7 OF 18



NOTES:

1. EQUIPMENT SHOWN ONLY FOR ILLUSTRATION OF APPROXIMATE LOCATION. FIELD LOCATE EXACT LOCATIONS WITH COORDINATION WITH SJRA PERSONNEL.
2. SJRA WILL PROVIDE LPSS AND HPSS PANELS, 25 kVA XFMR, AND COMBINATION STARTERS.
3. SJRA WILL PROVIDE AND TERMINATE MAIN WIRE TO HPSS.

LEGEND:

- (T) THERMOSTAT FOR HEATER
- (H) HEATER - 7.5 kW, 48 V, 3PH
- [X] TRANSFORMER - 480 - 120/240 V 1PH
- [L] LPSS
- [H] HPSS
- [X] COMBINATION STARTER
- (M) ROLL-UP MOTOR
- (F) POSITIVE DISPLACEMENT FAN

SAN JACINTO RIVER AUTHORITY

STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER
1-15-2020

EMERGENCY REPAIR SERVICE CENTER

EQUIPMENT LAYOUT

SHEET 8 OF 18

San Jacinto River Authority
Conduit Schedule
Emergency Repair Service Center

CONDUIT NUMBER	CONDUIT SIZE	CONDUIT QUANTITY	FROM	TO	CONDUCTORS	REMARKS
100	3"	1	Existing Pull box PB1	Proposed HPSS Panel	SJRA will provide,install and terminate	Install pull string
101	1 1/4"	1	HPSS, 26,28	Proposed 25KVA XFMR PRI.	2- # 4 & 1- # 8 GND	Pri. 480V power, Flexible metal conduit
102	1 1/2"	1	25KVA XFMR SEC.	Proposed LPSS Main Bkr.	2-# 2, 1-#2 neut, 1-# 8 gnd.	Sec. 240V power, Flexible Metal Conduit
103	1 1/4"	1	LPSS, 13	Proposed Pole Light	2 - #10, 1-#12 gnd	via proposed PB2 (Brooks PB36)
104	1 1/4"	1	LPSS, 11	Proposed Gate Operator	2-#10, 1-#12 gnd	via proposed PB2 (Brooks PB36)
105	1 1/4"	1	LPSS,	Proposed PB2	Pullstring	spare
106	1 1/4"	1	Building - SCADA Storage	Proposed PB2	Pullstring	Future Security
107	2"	1	Building - SCADA Storage	Proposed communications PB	Pullstring	fiber-optic cable

SAN JACINTO RIVER AUTHORITY

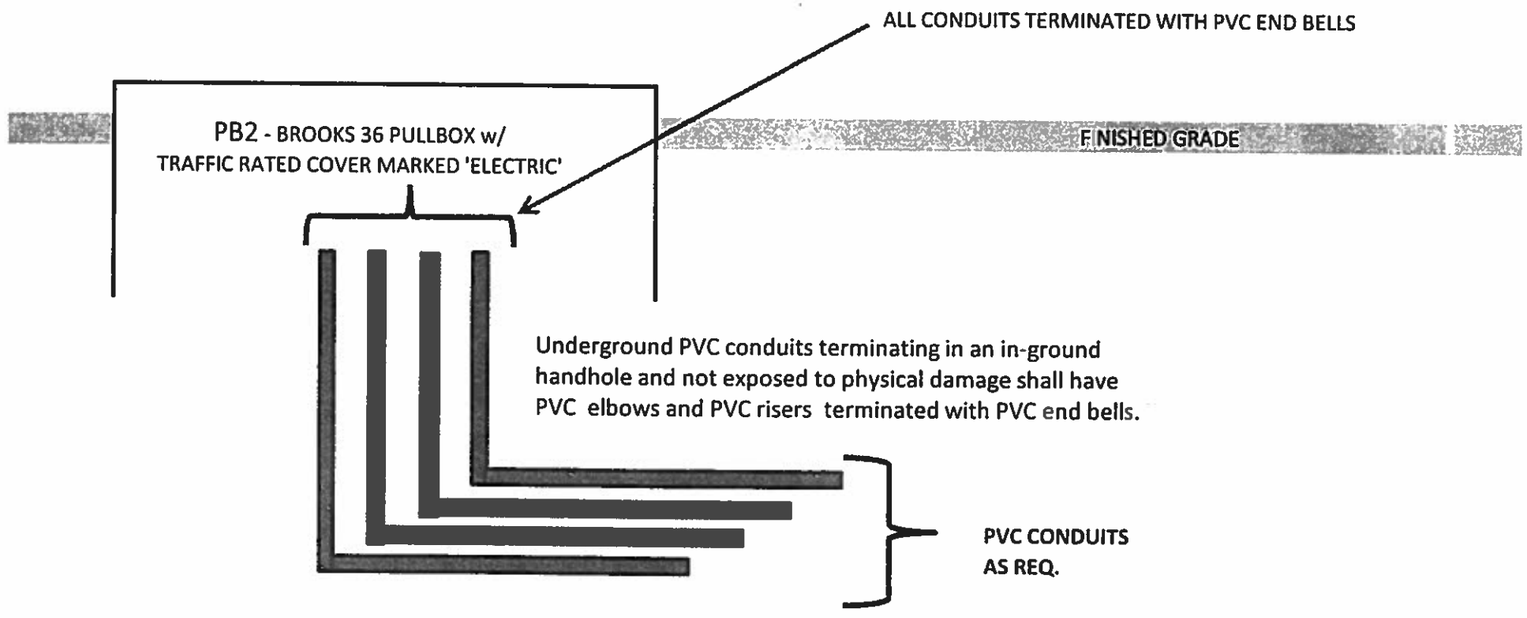
STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER
1-15-2020

EMERGENCY REPAIR SERVICE CENTER	CONDUIT SCHEDULE

San Jacinto River Authority

Electrical Details

PB2 Conduit Riser Terminations



SAN JACINTO RIVER AUTHORITY

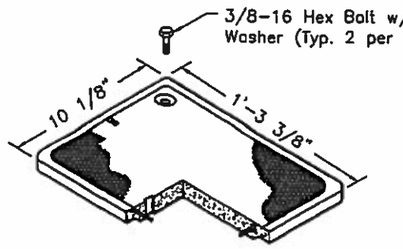
STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED
PROFESSIONAL ENGINEER

1-15-2020

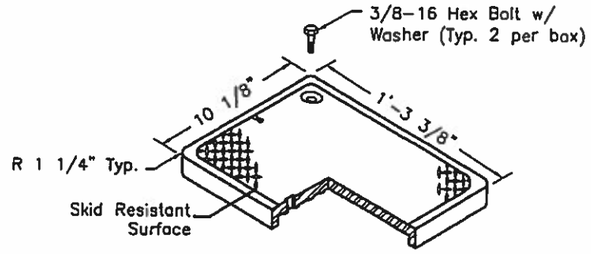
EMERGENCY REPAIR SERVICE CENTER	CONDUIT RISER DETAILS	1/2/2020

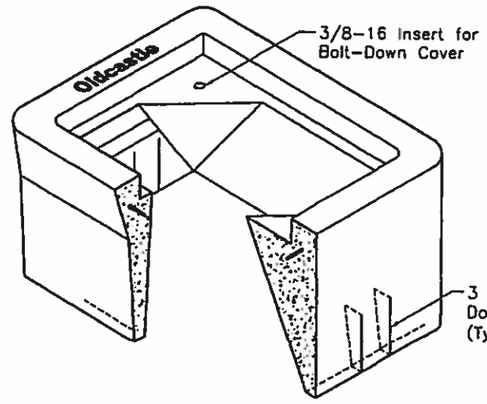
PB2

No. 36-PB Concrete Cover
Weight: 19 Lbs.



No. 36-PB Cast Iron Heavy Duty Cover
Weight: 26 Lbs.





No. 36 Body
Weight: 104 Lbs.

Iso View
For Reference Only

SCALE: N.T.S.

Notes:
1. Standard marked with "Electrical". Others available upon request.
2. Steel: Reinforcing to be 8 Ga. wire.
3. Concrete: Minimum 28 day concrete compressive strength = 4500 psi.
4. All dimensions are Approximate.

Oldcastle Precast 13600 S. Wayside Dr., Houston, TX 77048 Phone: 713-991-2400 Fax: 713-991-0815	**PB 36** FILE NAME: 264UEP1017A.DWG ISSUE DATE: JANUARY, 2007 www.oldcastlehouston.com	**10 " x 17" x 12"** **Series 36 Pull Box**

SAN JACINTO
RIVER AUTHORITY

STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED
PROFESSIONAL ENGINEER
1-15-2020

EMERGENCY
REPAIR
SERVICE
CENTER

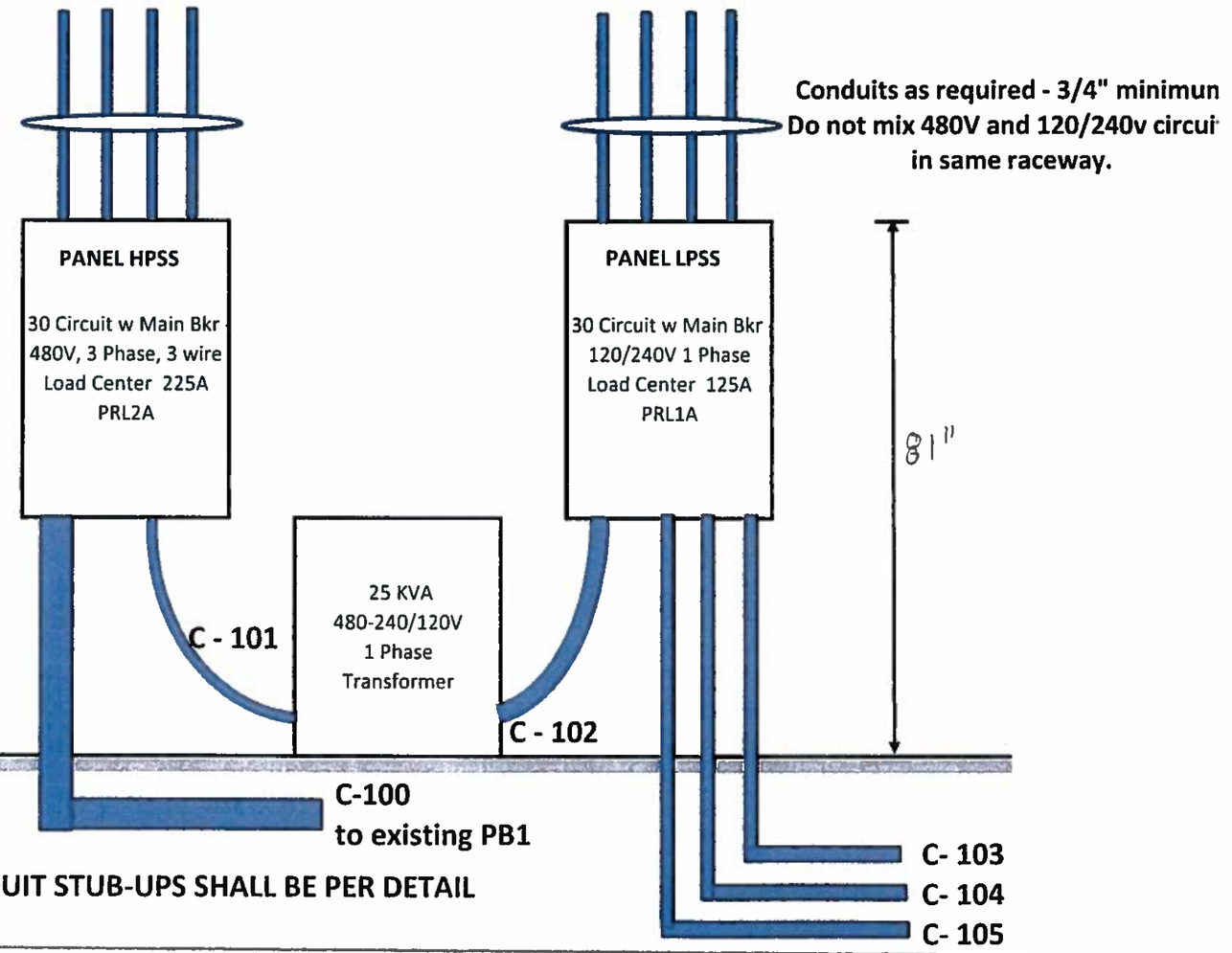
PULL BOX
DETAIL

San Jacinto River Authority

Emergency Repair Service Center

Low Voltage Equipment Layout

Conduits as required - 3/4" minimum
Do not mix 480V and 120/240v circuits
in same raceway.



Conduits as required - 3/4" minimun
Do not mix 480V and 120/240v circui
in same raceway.

ALL ABOVE GROUND CONDUIT STUB-UPS SHALL BE PER DETAIL

SAN JACINTO RIVER AUTHORITY

STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED
PROFESSIONAL ENGINEER

1-15-2020

EMERGENCY REPAIR SERVICE CENTER	LOW VOLTAGE EQUIPMENT LAYOUT

1/2/2020

SHT 12 OF 18

Panel LPSS

240/120V 1 phase

CKT	DESCRIPTION	CKT	DESCRIPTION
1	Shop Lighting	2	Ext. Bldg. Recepts.
3	Shop Lighting	4	Ext. Bldg. Recepts.
5	Ext. Bldg. Llighting	6	Recpts. SCADA Storage
7	Lighting - SCADA Storage	8	Recpts. SCADA Storage
9	spare	10	Recpts. Shop Storage
11	Gate Operator	12	Recpts. Shop Storage
13	Pole Light	14	HVAC Mini-Split
15	spare	16	HVAC Mini-Split
17	spare	18	Overhead Door Openers
19	spare	20	spare
21	spare	22	spare
23	future space	24	future space
25	future space	26	future space
27	future space	28	future space
29	future space	30	future space

Panel HPSS

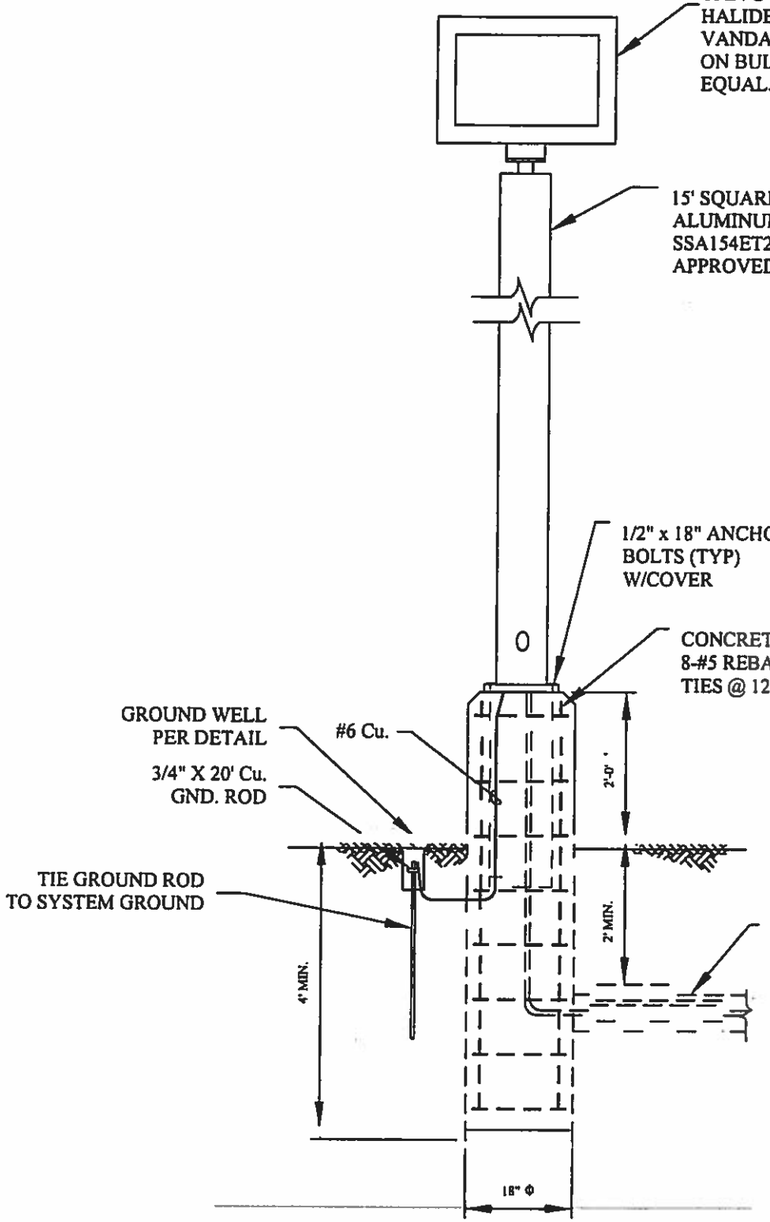
480V, 3 Phase

CKT	DESCRIPTION	CKT	DESCRIPTION
1	Unit Heater No. 1	2	Unit Heater No. 3
3	Unit Heater No. 1	4	Unit Heater No. 3
5	Unit Heater No. 1	6	Unit Heater No. 3
7	Unit Heater No. 2	8	Unit Heater No. 4
9	Unit Heater No. 2	10	Unit Heater No. 4
11	Unit Heater No. 2	12	Unit Heater No. 4
13	Vent Fan No. 3	14	Vent Fan No. 1
15	Vent Fan No. 3	16	Vent Fan No. 1
17	Vent Fan No. 3	18	Vent Fan No. 1
19	Vent Fan No. 4	20	Vent Fan No. 2
21	Vent Fan No. 4	22	Vent Fan No. 2
23	Vent Fan No. 4	24	Vent Fan No. 2
25	Future Space	26	25KVA XFMR
27	Future Space	28	25KVA XFMR
29	Future Space	30	Future Space

SAN JACINTO RIVER AUTHORITY

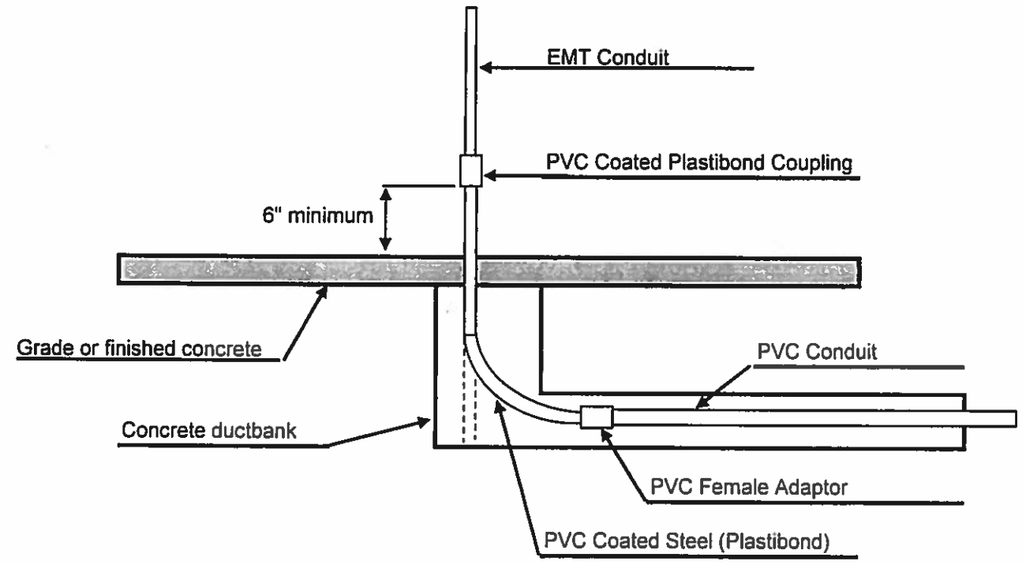
STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER
1-15-2020

EMERGENCY REPAIR SERVICE CENTER | PANEL BREAKER LAYOUT



FLOODLIGHT POLE DETAIL
NTS

San Jacinto River Authority
Standard Detail
Conduit Riser Stub-Up



INSTALL PVC COATED, RIDID STEEL CONDUIT (PLASTIBOND) FOR ALL STUB-UPS AND 90 DEGREE STUB-UPS. MINIMUM LENGTH OF STUB-UP FROM GRADE TO END OF PIPE SHALL BE 6 INCHES. COUPLING BETWEEN STUB-UP AND EMT CONDUIT SHALL BE PVC COATED RIGID STEEL.

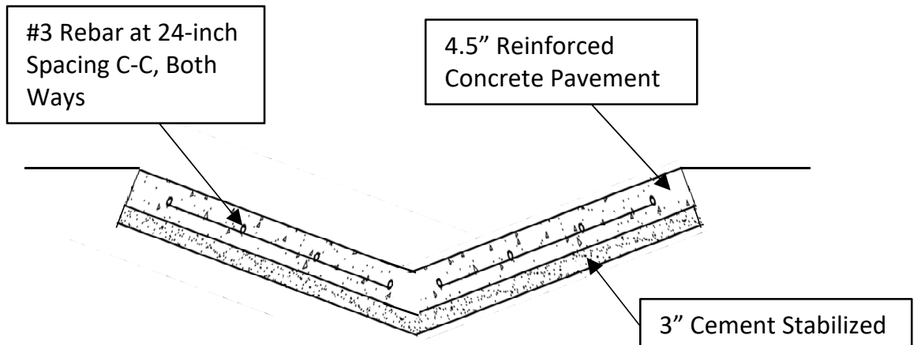
SAN JACINTO RIVER AUTHORITY

STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER
1-15-2020

EMERGENCY REPAIR SERVICE CENTER	ELECTRICAL DETAILS

SHT 14 OF 18

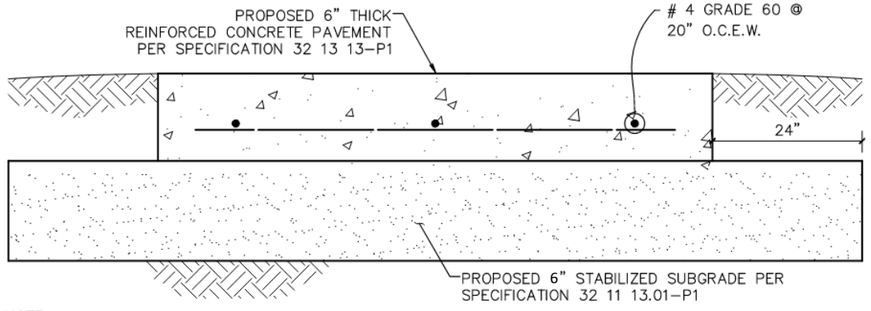
1/2/2020



REINFORCED CONCRETE CHANNEL DETAIL

NOT TO SCALE

SLOPE VARIES

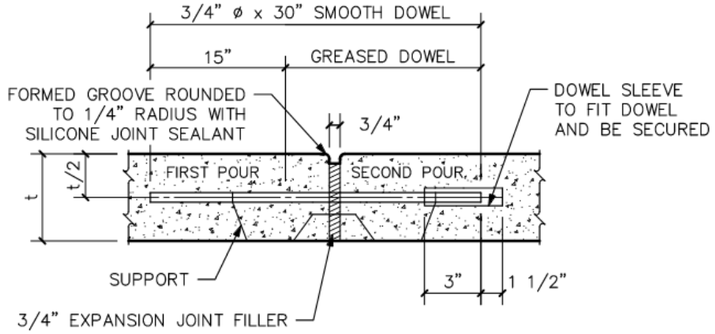


NOTE:

1. REFER TO REPORT #G107–17 TITLED "GEOTECHNICAL INVESTIGATION –SJRA LIFT STATION #4 REPLACEMENT CRYSTAL LAKE LANE AT GROGRAN'S MILL ROAD THE WOODLANDS, TEXAS" BY AVILES ENGINEERING CORPORATION DATED MAY 2017

4 / C1.6 Concrete Driveway SECTION

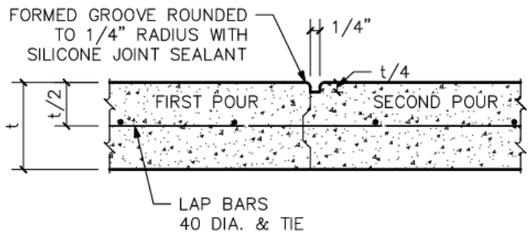
SCALE: NOT TO SCALE



EXPANSION JOINT

NOTES:

1. ALL DOWEL BARS SHALL BE INSTALLED PERPENDICULAR TO JOINT @ 18" SPACING.
2. SILICONE JOINT SEALANT SHALL BE DOW CORNING 890 SL, OR APPROVED EQUAL.
3. HOT–POURED RUBBER MAY BE USED AS A SUBSTITUTE FOR SILICONE JOINT SEALANT WITH THE APPROVAL OF THE CITY ENGINEER.



CONSTRUCTION JOINT

Expansion Joint DETAIL

2 / C1.6

SCALE: NOT TO SCALE

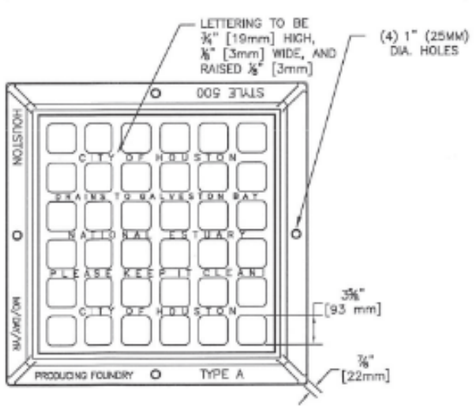
SAN JACINTO RIVER AUTHORITY

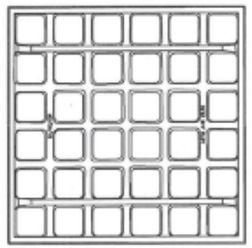
STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER
1-15-2020

EMERGENCY REPAIR SERVICE CENTER

PAVING DETAILS

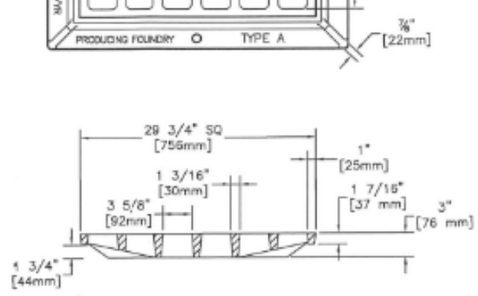
SHT 15 OF 18



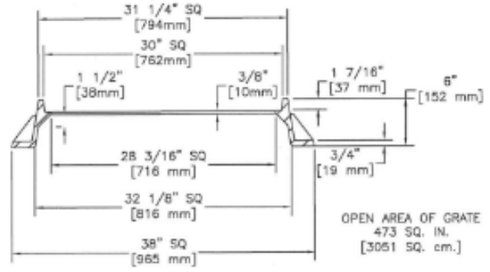


BOTTOM VIEW
OF GRATE

1) NOTE: APPROXIMATE WEIGHTS.
GRATE – 190 LBS 68kg
FRAME – 235 LBS 107kg
UNIT – 425 LBS 193kg
2) MATERIAL– GRAY IRON ASTM A48 CL35B
3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4) EJIW V–4880 ASY OR APPROVED EQUAL

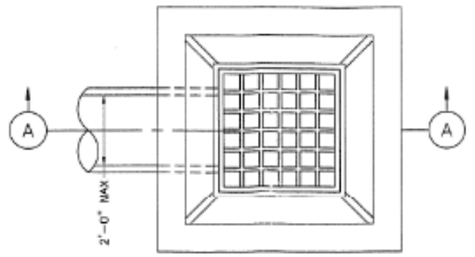


GRATE SECTION

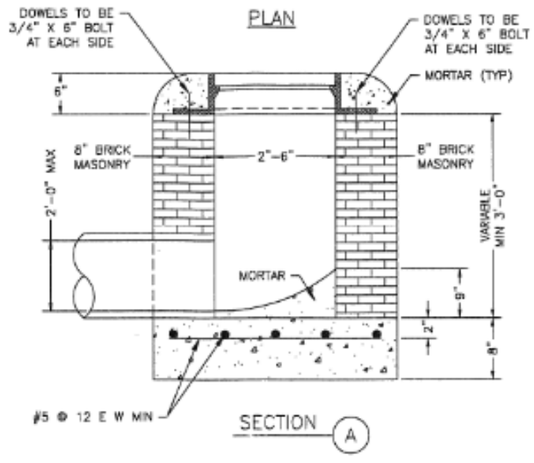


FRAME SECTION

STORM SEWER TYPE "A"
INLET GRATE AND FRAME
NTS



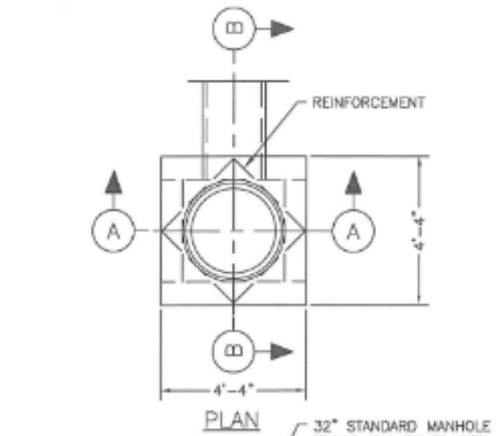
PLAN



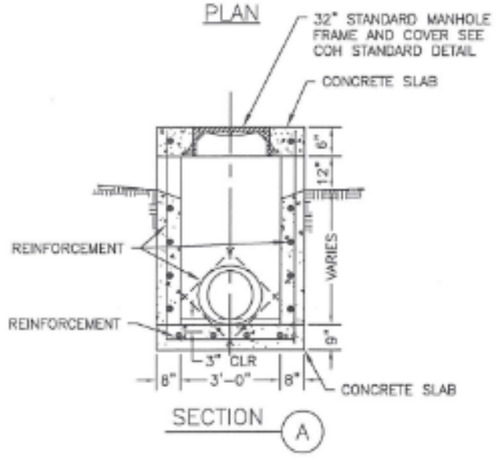
STORM SEWER TYPE "A" GRATE INLET
NTS

SAN JACINTO
RIVER AUTHORITY

EMERGENCY REPAIR SERVICE CENTER	STORM SEWER DETAILS (1 of 2)	SHT 16 OF 18



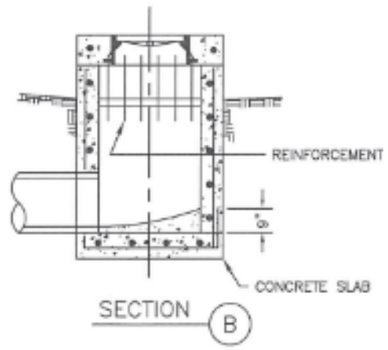
PLAN



SECTION A

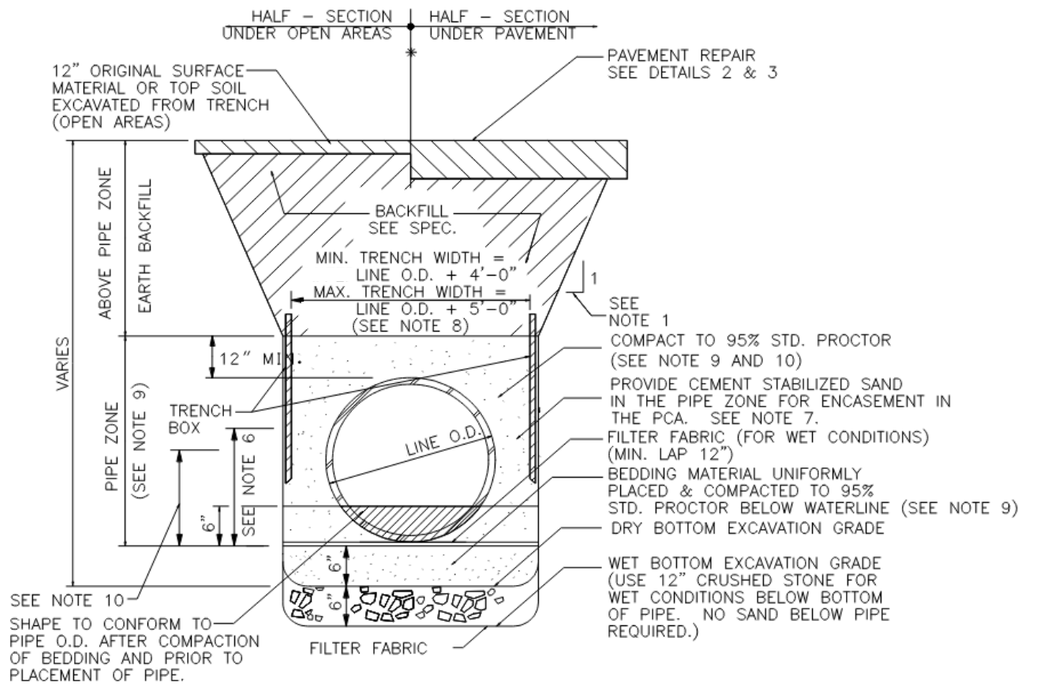
NOTE:

1. TYPE "E" INLET TOP CAN BE CONSTRUCTED ON A STANDARD "C" MANHOLE.



SECTION B

STORM SEWER TYPE "E" INLET
NTS



1 EXCAVATION & BACKFILL DETAIL

NOTES:

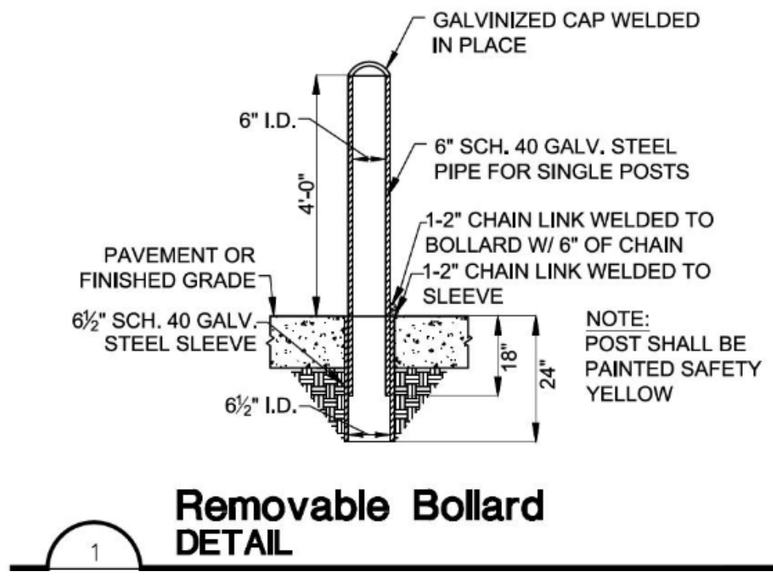
1. SEE TRENCH SAFETY SYSTEM SPECIFICATIONS FOR MAXIMUM ALLOWABLE SLOPES.
2. FOR WET BOTTOM EXCAVATION LIMITS OF CRUSHED STONE, EXTEND AS SHOWN.
3. KEY CONCRETE TRENCH DAM MINIMUM OF 6 INCHES INTO TRENCH BOTTOM AND WALLS.
4. TRENCH DAM MAY BE FORMED OR UNFORMED. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING 6–INCH MINIMUM THICKNESS AND 6–INCH KEY DEPTH REQUIREMENTS.
5. TRENCH DAM SHALL BE PLACED AT LEAST 5 FT. AWAY FROM ANY PIPELINE STRUCTURE (EACH SIDE). SEE SPECIFICATIONS FOR OTHER REQUIREMENTS.
6. THIS PORTION OF PIPE EMBEDMENT ZONE MUST BE RECOMPACTED TO PROPER DENSITIES AFTER MOVING SUPPORT SYSTEM FORWARD.
7. USE POLYETHYLENE WRAP AS A BOND BREAKER BETWEEN CEMENT STABILIZED SAND AND PIPE.
8. FOR LINE DIAMETER LESS THAN 24–INCH, MIN. TRENCH WIDTH = O.D. + 2'–0". MAX. TRENCH WIDTH = O.D. + 3'–0".
9. USE BANK SAND MATERIAL FOR DEPTH OF COVER 4 TO 16 FEET. USE FLOWABLE FILL FOR DEPTH OF COVER GREATER THAN 16 FEET. SEE SPECIFICATIONS FOR PLACEMENT.
10. USE CEMENT STABILIZED SAND TO SPRING LINE OF PIPE FOR DEPTH OF COVER GREATER THAN 16 FEET.

SAN JACINTO
RIVER AUTHORITY

EMERGENCY REPAIR SERVICE CENTER

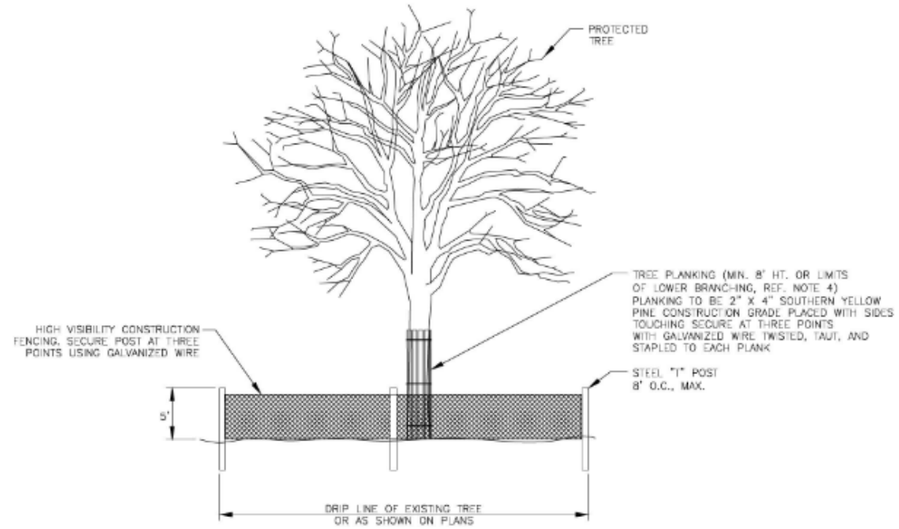
STORM SEWER DETAILS (2 of 2)

SHT 17 OF 18

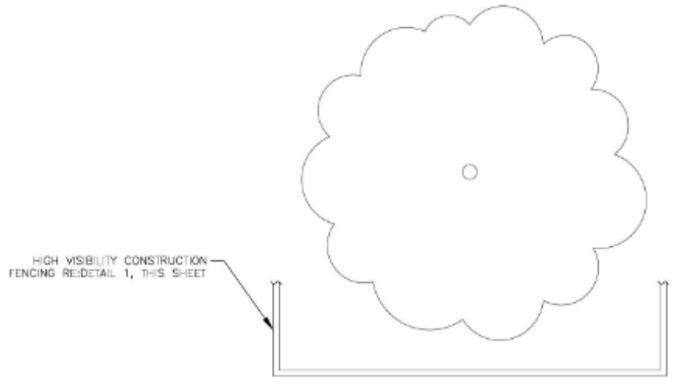


Removable Bollard DETAIL

1



1 TREE PROTECTION DETAIL



2 TREE PROTECTION DETAIL

SAN JACINTO RIVER AUTHORITY

STATE OF TEXAS
AARON K. SCHINDEWOLF
102379
LICENSED PROFESSIONAL ENGINEER
1-15-2020

Removable Bollard Detail

EMERGENCY REPAIR SERVICE CENTER	GENERAL DETAILS	SHT 18 OF 18

GEOTECHNICAL REPORT

AVILES
ENGINEERING CORP.

GEOTECHNICAL INVESTIGATION

SAN JACINTO RIVER AUTHORITY
EMERGENCY REPAIR SERVICE CENTER AT WWTF NO. 1
2436 SAWDUST ROAD
THE WOODLANDS, TEXAS

Reported to:
San Jacinto River Authority
The Woodlands, Texas

by

Aviles Engineering Corporation
5790 Windfern
Houston, Texas 77041
713-895-7645

REPORT NO. G151-19

January 2020

AVILES
ENGINEERING CORP.

January 7, 2020

Mr. Sina Arjmand, P.E.
San Jacinto River Authority
2436 Sawdust Road
The Woodlands, TX 77380

Reference: Geotechnical Investigation
San Jacinto River Authority
Emergency Repair Service Center at WWTF No. 1
2436 Sawdust Road
The Woodlands, Texas
AEC Report No. G151-19

Dear Mr. Arjmand,

Aviles Engineering Corporation (AEC) is pleased to present this report of the results of our geotechnical investigation for the above referenced project. Notice to Proceed for the project was provided by the San Jacinto River Authority (SJRA) on September 30, 2019. The project terms and conditions were in accordance with the Professional Services Agreement between SJRA and AEC, dated March 26, 2018 and Work Order No. 3, dated September 16, 2019, based on AEC proposal G2019-08-02R, dated August 15, 2019.

AEC appreciates the opportunity to be of service to you. Please call us if you have any questions or comments concerning this report or when we can be of further assistance.

Respectfully submitted,
Aviles Engineering Corporation
(TBPE Firm Registration No. F-42)

1/7/2020
STATE OF TEXAS
WILBER L. WANG
99226
LICENSED
PROFESSIONAL ENGINEER

Wilber L. Wang, P.E.
Senior Engineer

Hanie Joodat, Ph.D., E.I.T.
Staff Engineer

Reports Submitted: 1 San Jacinto River Authority (electronic)
1 File (electronic)

Z:\ENGINEERING\REPORTS\2019\G151-19 SJRA EMERGENCY REPAIR CENTER AT WWTF NO. 1 - SJRA\G151-19 FINAL.DOCX

AVLES
ENGINEERING CORP.

TABLE OF CONTENTS

ATTACHMENTS

AVILES
ENGINEERING CORP.

GEOTECHNICAL INVESTIGATION

SAN JACINTO RIVER AUTHORITY
EMERGENCY REPAIR SERVICE CENTER AT WWTF NO. 1
2436 SAWDUST ROAD
THE WOODLANDS, TEXAS

1.0 INTRODUCTION

1.1 Project Description

The report submitted herein presents the results of Aviles Engineering Corporation's (AEC) geotechnical investigation for construction of an emergency repair service center at the San Jacinto River Authority (SJRA) Wastewater Treatment Facility (WWTF) No. 1, located at 2436 Sawdust Road in The Woodlands, Texas (Montgomery County Key Map No.: 251U). A vicinity map is presented on Plate 1, in the Attachments. According to the information provided by SJRA, the proposed improvements include: (i) construction of a metal building (40 feet wide by 100 feet long) with an attached 20 foot by 40 foot awning, supported on a concrete foundation with a footprint of 140 feet by 40 feet; and (ii) concrete pavement driveways and additional parking areas to the north and west of the proposed building.

SJRA provided AEC with a preliminary topographic plan that shows elevations at the metal building site relative to a generator pad that is located to the west of the building. Based on the provided plan, the building site is approximately 10 feet higher than the ground surface at existing clarifiers that are located to the west of the proposed building footprint. As of December 2019, there is an existing building located to the west of the proposed building footprint; this building will be demolished before construction of the proposed building.

1.2 Purpose and Scope

The purpose of this geotechnical investigation is to evaluate the subsurface soil and groundwater conditions at the project site and to develop geotechnical engineering recommendations for design and construction of the building foundations, driveways, and parking areas. The scope of this geotechnical investigation is summarized below:

1. Drilling and sampling two soil borings ranging from 20 to 30 feet below existing grade;
2. Performing soil laboratory testing on selected soil samples;
3. Engineering analyses and recommendations for foundation types, bearing depth, allowable bearing capacity, floor slab, and subgrade preparation for the metal building;
4. Engineering analyses and recommendations for concrete pavement, including pavement thickness design and subgrade preparation;
5. Construction recommendations and dewatering guidelines for the building foundations, floor slab, and concrete pavement.

2.0 SUBSURFACE EXPLORATION

Subsurface conditions at the site were investigated by drilling two borings ranging from 20 to 30 feet below existing grade at the project site. The total drilling footage is 50 feet. Boring locations were marked in the field as directed by SJRA personnel. The approximate boring locations are shown on the Boring Location Plan on Plate 2, in the Attachments.

The borings were drilled using a truck-mounted drilling rig and were advanced using dry auger method. Undisturbed samples of cohesive soils were obtained from the borings by pushing 3-inch diameter thin-wall, seamless steel Shelby tube samplers in general accordance with ASTM D 1587. Granular soils were sampled with a 2-inch split-barrel sampler in accordance with ASTM D 1586. Standard Penetration Test resistance (N) values were recorded for the granular soils as "Blows per Foot" and are shown on the boring logs. Strength of the cohesive soils was estimated in the field using a hand penetrometer. The undisturbed samples of cohesive soils were extruded mechanically from the core barrels in the field and wrapped in aluminum foil; all samples were sealed in plastic bags to reduce moisture loss and disturbance. The samples were then placed in core boxes and transported to the AEC laboratory for testing and further study. Groundwater readings were obtained during drilling, upon completion of drilling, and 24 hours after completion of drilling. After the final groundwater readings were obtained, the boreholes were backfilled with bentonite chips.

3.0 LABORATORY TESTING

Soil laboratory testing was performed by AEC personnel. Samples from the borings were examined and classified in the laboratory by a technician under the supervision of a geotechnical engineer. Laboratory tests were performed on selected soil samples in order to evaluate the engineering properties of the soils in accordance with applicable ASTM Standards. Atterberg limits, moisture contents, percent passing a No.

200 sieve, and dry unit weight tests were performed on selected samples to establish the index properties and confirm field classification of the subsurface soils. Strength properties of cohesive soils were determined by means of unconfined compression (UC) and unconsolidated-undrained (UU) triaxial tests performed on undisturbed samples. The test results are presented on their representative boring logs. Details of the soils encountered in the borings are presented on Plates 3 and 4, in the Attachments. A key to the boring logs, classification of soils for engineering purposes, terms used on boring logs, and reference ASTM Standards for laboratory testing are presented on Plates 5 through 8, in the Attachments.

4.0 SITE CONDITIONS

Based on AEC's site visit and the topographic plan provided by SJRA showing relative elevations (with respect to the corner of generator pad located downslope to the west), AEC understands that the building site is approximately 10 feet higher than the ground surface at the existing clarifiers. As of December 2019, there is an existing building located to the west of the proposed building footprint; this building will be demolished before construction of the proposed building.

4.1 Subsurface Conditions

Details of the soils encountered during drilling are presented in the boring logs (see Plates 3 and 4, in the Attachments). Soil strata encountered in our borings are summarized below.

Boring	Depth (ft)	Description of Stratum
B-1	0 - 2	Clayey Sand (SC), with ferrous nodules
	2 - 6	Firm to hard, Sandy Fat Clay (CH), with ferrous stains
	6 - 18	Medium dense, Clayey Sand (SC)
	18 - 27	Medium dense, Silty Sand (SM)
	27 - 30	Very stiff to hard, Fat Clay (CH), with ferrous stains
B-2	0 - 6	Fill: firm to hard, Sandy Lean Clay (CL)
	6 - 18	Very dense, Clayey Sand (SC)
	18 - 20	Very stiff to hard, Fat Clay (CH)

Subsurface Soil Properties: The subsurface clayey soils (including fill, but excluding clayey sand) encountered in the borings have medium to high plasticity, with liquid limits (LL) ranging from 24 to 50, and plasticity indices (PI) ranging from 13 to 33. The cohesive soils (including fill) encountered at the site are classified as "CH" and "CL" type soils and granular soils are classified as "SC" and "SM" type soils in

accordance with ASTM D 2487. "CH" soils undergo significant volume changes due to seasonal changes in soil moisture contents. "CL" type soils with lower LL (less than 40) and PI (less than 20) generally do not undergo significant volume changes with changes in moisture content. However, "CL" soils with LL approaching 50 and PI greater than 20 essentially behave as "CH" soils and could undergo significant volume changes.

Groundwater Conditions: Groundwater levels and boring cave-in depths encountered in Borings B-1 and B-2 are summarized in Table 1.

Table 1. Groundwater Depths below Existing Ground Surface in AEC Borings

Boring No.	Date Drilled	Boring Depth (ft)	Groundwater Depth (ft)	Boring Cave-in Depth (ft)
B-1	10/16/19	30	28 (Drilling) 14.2 (25 min.) 11.7 (10/17/19)	15.7 (10/17/19)
B-2	10/16/19	20	Dry (Drilling)	-

The information in this report summarizes conditions found on the date the borings were drilled. However, it should be noted that our groundwater observations are short-term; groundwater depths and subsurface soil moisture contents will vary with environmental variations such as frequency and magnitude of rainfall and the time of year when construction is in progress.

4.2 Hazardous Materials

No signs of visual staining or odors were encountered during field drilling or during processing of the soil samples in the laboratory. However, AEC notes that the presence of potential hazardous material at other locations within the project area cannot be discounted based upon the very small and limited number of samples taken.

4.3 Subsurface Variations

It should be emphasized that: (i) at any given time, groundwater depths can vary from location to location, and (ii) at any given location, groundwater depths can change with time. Groundwater depths will vary

with seasonal rainfall and other climatic/environmental events. Subsurface conditions may vary away from and in between borings.

Clay soils in the Greater Houston area typically have secondary features such as slickensides, ferrous nodules, and contain sand/silt seams/lenses/layers/pockets. It should be noted that the information in the boring logs is based on 3-inch diameter soil samples which were continuously obtained at intervals of 2 feet in the top 20 feet of Borings B-1 and B-2, then at 5 foot intervals thereafter to the boring termination depth of 30 feet below grade in Boring B-1. A detailed description of the soil secondary features may not have been obtained due to the small sample size and sampling interval between the samples. Therefore, while a boring log shows some soil secondary features, it should not be assumed that the features are absent where not indicated on the logs.

5.0 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

According to the information provided by SJRA, the proposed improvements include: (i) a 100 foot long by 40 foot wide metal building with an attached 40 foot long by 20 foot wide awning on a concrete foundation with a footprint that is 40 feet wide by 140 feet long; and (ii) concrete pavement driveways and additional parking areas to the north and west of the proposed building.

AEC notes that a site grading plan drawing was not available at the time this report was prepared. According to the information provided by SJRA, AEC understands that the finished floor elevation (FFE) of the proposed building will be at least approximately 4 inches above existing grade. AEC should be notified if the FFE of the proposed building will be more than 6 inches above or below existing grade, so that our report recommendations can be adjusted if necessary.

5.1 Demolition of Existing Building

AEC understands that the existing building adjacent to the proposed building will be demolished. AEC recommends that the existing building foundations be demolished and properly backfilled prior to construction of the new proposed building. Improperly demolished/backfilled foundations can cause long term issues to the foundations and floor slab of the proposed building (if there is overlap), as well as driveways and parking areas.

Details regarding the existing building foundations were not available to AEC when this report was prepared. In general, post-tensioned slabs, spread footings, or drilled footings are typically used for building foundations in the Greater Houston area. If a post-tensioned slab or spread footings are encountered during demolition, the spread footing/post tensioned grade beam excavations should be backfilled with compacted select fill or lime stabilized soil. If drilled footings are encountered during demolition, the drilled footings should either be: (i) over-excavated (not pulled from the ground); or (ii) cut off at a depth of 4 feet below grade and the bottom portion abandoned in place. All abandoned footings should be documented and/or surveyed beforehand to make sure they do not conflict with new foundations. The excavations should be backfilled from the bottom of the excavation to 4 feet below grade with either flowable fill or compacted cement-stabilized sand (CSS); compacted select fill shall then be used to the ground surface. Loose soil or concrete still present within the foundation excavations shall be removed prior to backfilling. Select fill requirements are presented on Section 5.4.2 of this report. Flowable fill should be in general accordance with Section 02322 of the 2019 City of Houston Standard Construction Specification (COHSCS), or the corresponding SJRA Construction Specifications, whichever is more stringent. Compacted CSS should be in general accordance with Section 31 32 13.16 of the SJRA Construction Specifications. AEC recommends that an Owner's Representative be on site during demolition to ensure that all existing foundations are properly removed and backfilled.

5.2 Metal Building

Soil Conditions: The top 10 feet of the existing soils encountered in Borings B-1 and B-2 generally consist of clayey sand (SC). Approximately 4 feet of firm to hard sandy fat clay (CH) was encountered at a depth of 2 to 6 feet in Boring B-1. Approximately 6 feet of sandy lean clay (CL) fill material was encountered at the ground surface in Boring B-2. Based on the soil conditions encountered, AEC recommends that the metal building be supported on shallow spread footings, founded at least 5 feet below existing grade.

5.2.1 Shallow Spread Footings

Footing Depth and Allowable Bearing Capacity: AEC recommends that shallow spread footings be founded at a depth of at least 5 feet below existing grade. Based on SJRA's topographic plan showing relative elevations (with respect to the corner of generator pad located downslope to the west), and considering a

relative boring elevation of +6.3 to +6.7 feet, AEC assumes that the resulting relative footing bearing elevation would be approximately +1.5 feet. Since the ground slopes down to the west at an approximate 6 to 10 degree angle from the proposed building, this will have an impact on the net allowable bearing capacity of the westernmost row of footings. The westernmost row of footings closest to the slope (i.e. at the building perimeter) can be designed for a net allowable bearing capacity of 1,200 psf for sustained loads and 1,800 psf for total loads. Other spread footings away from the slope edge can be designed for a net allowable bearing capacity of 2,200 psf for sustained loads and 3,300 psf for total loads. The sustained load net allowable bearing capacity has a factor of safety (FS) of 3 applied, while the total load net allowable bearing capacity has a FS of 2 applied; whichever net allowable bearing capacity is more-critical should be used for design.

Backfill above Footings: Backfill (if any) placed on top of footings should consist of compacted lime-stabilized clay or select clay fill. Lime-stabilized clay or select clay fill should be in accordance with Sections 5.4.1 and 5.4.2, of this report, respectively.

Footing Spacing: AEC recommends that the minimum edge-to-edge clear spacing between spread footings should not be less than one times the width of the larger footing to reduce stress overlap from adjacent footings and potential construction problems.

Footing Settlements: Based on the soil conditions encountered in Borings B-1 and B-2, we estimate that spread footings, designed and constructed as recommended in this report will experience total settlements on the order of 1 inch.

5.2.2 Floor Slab

AEC notes that a site grading plan drawing was not available at the time this report was prepared. According to the information provided by SJRA, AEC understands that the FFE of the proposed building will be at least approximately 4 inches above existing grade. AEC should be notified if the FFE of the proposed building will be more than 6 inches above or below existing grade, so that our report recommendations can be adjusted if necessary.

AVLES
ENGINEERING CORP.

Estimated Soil Movements: Expansive clays exhibit a potential to shrink and swell with changes in their moisture contents. The changes in the soil moisture content are usually caused by variations in the seasonal amount of rainfall and evaporation rates or other localized factors like the moisture withdrawal by nearby trees. The seasonal moisture active zone generally extends to about 10 feet below ground in the Greater Houston area, and will be deeper if trees with deep root zones exist adjacent to the structure.

Potential Vertical Rise (PVR) is an estimate of the potential of an expansive soil to swell from its current state. For the top 10 feet of the existing soils encountered in Borings B-1 and B-2, the total PVR at the building varies from approximately 0.4 inches at Boring B-2 (the southern portion of the proposed building footprint) to 1.6 inches at Boring B-1 (the northern portion of the proposed building footprint). PVR was computed using the Texas Department of Transportation (TxDOT) test method Tex-124-E.

Additional movements can occur in areas if water is allowed to pond during or after construction on soils with high plasticity, or if highly plastic soils are allowed to dry out prior to fill or concrete placement. High plasticity clay may also experience shrinkage during periods of dry weather as moisture evaporation occurs at the ground surface and the groundwater table drops. The actual PVR of the site will be highly dependent upon the actual PI and moisture regime of the clayey soils at the time of construction. Therefore, uniformity and preservation of the moisture contents of the near surface clays during construction and during the life of the structure is critical to reducing potential shrink-swell movement of the floor slab. The relation between PVR and thickness of fill replacement below existing grade is presented in Table 2.

Table 2. Estimated PVR vs. Thickness of Replacement Fill within Proposed Building Footprint

Thickness of Replacement Fill Beneath the Existing Ground Surface (ft)	Estimated PVR (in), Based on Boring B-1	Estimated PVR (in), Based on Boring B-2
0 (~EL = +6.5')	1.6	0.4
1 (~EL = +5.5')	1.5	0.3
2 (~EL = +4.5')	1.5	0.3
3 (~EL = +3.5')	1.1	0.2
4 (~EL = +2.5')	0.7	0.1

Floor Slab: In general, the tolerable differential vertical movement for a common building slab is about 1 inch. Based on the PVR at the proposed building footprint and to limit the PVR to 1 inch or less, AEC

recommends that the building floor slab be a subgrade supported floor slab, with a minimum of 3 feet of existing soils excavated, and replaced with stabilized soil or low-expansive select fill (which does not include any fill required to raise existing grade to achieve FFE).

5.2.2.1 Subgrade Supported Floor Slab

A concrete slab-on-grade in conjunction with *limited* (i.e. 3 feet) fill replacement can be considered, if the Owner is willing to take some risk of floor slab movement. This option assumes that uniformity and preservation of the moisture contents of the near surface clays during construction and during the life of the structure are maintained adequately, and that any resultant movements can be adequately sustained by the subgrade soils and foundation system.

In accordance with Table 2 in Section 5.2.2 of this report and based on Borings B-1 and B-2, the soil conditions encountered in the borings are not uniform. The soil conditions in Boring B-1 (the northern portion of the proposed building) generally consist of two feet of clayey sand (SC) at the ground surface with low expansive potential, underlain by 4 feet of firm to hard sandy fat clay (CH) with high expansive potential; however the soil conditions in Boring B-2 (the southern portion of the proposed building) generally consist of 6 feet of firm to hard sandy lean clay (CL) fill materials with moderate expansive potential, underlain by very dense clayey sand (SC) with moderate expansive potential. AEC has therefore provided separate subgrade preparation recommendations and excavation depths for the northern and southern portions of building footprint.

Based on Table 2 in Section 5.2.2 of this report, AEC recommends that 3 feet of existing soil be excavated for only the northern portion of the proposed building footprint. The excavated clayey sand (SC) and sandy fat clay (CH) soils should be stockpiled separately. The clayey sand (SC) excavated from a depth of 0 to 2 feet in Boring B-1 does not require stabilization to reduce PVR and can be re-used and re-compacted in place as-is. However if desired for additional stability, this clayey sand material can also be stabilized with a minimum of 5 percent hydrated lime (by dry soil weight) and then re-used. The highly expansive layer of fat clay (CH) encountered in Boring B-1 should be excavated from a depth of 2 to 3 feet, treated with a minimum of 6 percent hydrated lime, and then re-compacted in place. For the southern portion of proposed building and considering the low PVR values based on Boring B-2, lime treatment of the existing sandy lean clay (CL) layer with moderate expansive potential observed at a depth of 0 to 6 feet in Boring B-2 will

not be necessary and the existing sandy lean clay (CL) layer can be left in place. AEC recommends that a competent soils technician and SJRA Inspector be onsite during construction and monitor the exposed soil type to determine if it should be removed or not.

Subgrade Preparation: Subgrade preparation should extend a minimum of 5 feet beyond the floor slab perimeter. A minimum of 6 inches of surface soils, existing vegetation, trees, roots, and other deleterious materials shall be removed and wasted in accordance with Section 31 10 00 of the SJRA Construction Specifications. The excavation depth should be increased when inspection indicates the presence of organics or otherwise deleterious materials to greater depths.

An additional 2.5 feet [total depth of 3 feet (to an approximate elevation of +3.5 feet), which includes the 6 inches of surface removal] of existing soils at the ground surface should be removed (in the vicinity of Boring B-1, see discussion above) after surface stripping. After the overburden is excavated, the exposed subgrade should be proof-rolled in accordance with Item 216 of the 2014 TxDOT Standard Specifications to identify and remove any weak, compressible, or other unsuitable materials; such materials should be replaced with compacted structural fill (either select fill or lime-stabilized clay) as necessary. After proof rolling is performed, compacted lime-stabilized soil should then be used to achieve the original pre-excavation grade within the building footprint. Once the 3 feet of lime-stabilized soil is compacted and the building pad is restored to original grade, compacted select clay fill or additional lime-stabilized soil should be used to fill the area to achieve the design FFE of the building. Lime-stabilized soil or select clay fill should be in accordance with Sections 5.4.1 and 5.4.2 of this report, respectively.

The Owner should be aware that some risk of floor slab movement is still present if this floor slab option is selected. If a lower PVR risk is desired, then the depth of excavation should be increased beyond 3 feet (in accordance with Table 2 in Section 5.2.2 of this report); however, AEC recommends that this should be determined by the Owner prior to construction. If conditions which exacerbate moisture variations such as the presence of trees, poor drainage, excessive drying/wetting of subsurface soils, or leaking underground utilities are located nearby, the floor slab total vertical movements and net differential vertical movements could be higher than estimated.

Grade Beams: We recommend that foundation grade beams be founded at least 30 inches below FFE. We recommend that tensile reinforcement be placed in both top and bottom of the beams. The footings and grade beams should be tied together.

Moisture Barrier: We recommend that a horizontal moisture barrier (minimum 10-mil thick) be placed below the concrete slab to move edge effects away from the slab and mitigate seasonal fluctuations of water content directly below the structure.

5.3 Pavement

AEC notes that a site plan was not available at the time this report was prepared. According to the information provided by SJRA, onsite concrete pavement will consist of driveways and parking areas to the north and west of the proposed building. Traffic volume and vehicle loads were not available at the time this report was prepared; however, AEC assumes that the site traffic will be light. A site grading plan was not available at the time this report was prepared, but AEC assumes that the pavement will be constructed at or near existing grade. AEC should be notified once traffic volume and vehicle loads are available, or if the final grade in the paved areas will be more than 6 inches above existing grade, so that the recommendations can be updated as necessary.

The pavement design recommendations developed below are in accordance with the "AASHTO Guide for Design of Pavement Structures," 1993 edition.

5.3.1 Rigid Pavement

Rigid pavement design is based on the anticipated design number of 18-kip Equivalent Single Axle Loads (ESALs) the pavement is subjected to during its design life. The parameters that were used in computing the rigid pavement section are as follows:

Overall Standard Deviation (S_0)	0.35
Initial Serviceability (P_0)	4.5
Terminal Serviceability (P_t)	2.2
Reliability Level (R)	75%
Overall Drainage Coefficient (C_d)	1.0
Load Transfer Coefficient (J)	3.2
Loss of Support Category (LS)	1.0

Roadbed Soil Resilient Modulus (M_R)	4,500 psi
Elastic Modulus (E_{sb}) of Stabilized Soils	30,000 psi
Effective Modulus of Subgrade Reaction (k)	91 pci
Concrete Compressive Strength (f'c)	4,000 psi (at 28 days)
Mean Concrete Modulus of Rupture (S'_c)	600 psi (at 28 days)
Concrete Elastic Modulus (E_c)	3.6 x 10^6 psi

AEC should be notified if different parameters are required for concrete pavement design. Recommended rigid pavement sections are provided on Table 3 below.

Table 3. Recommended Concrete Pavement Sections

Pavement Layer	Parking	Driveways
Portland Cement Concrete (in)	5	6
Stabilized Subgrade [(a)] (in)	6	6
Estimated 18-kip ESAL Load Capacity	205,668	562,496

Note: (a) Subgrade stabilization recommendations are presented in Section 5.3.3 of this report.

AEC used the DARWin v3.0 computer program to perform pavement design. According to the DARWin program, the parking area and driveways pavement sections will have an estimated load capacity of 205,668 and 562,496 18-kip ESALs, respectively. The design engineer should verify whether the proposed pavement sections will provide enough ESALs for the anticipated amount of site traffic. AEC should be notified if different standards or constants are required for pavement design at the site, so that our recommendations can be updated accordingly.

Concrete Pavement: Portland Cement Concrete (PCC) pavement should be constructed in accordance with Section 03 09 00 of the SJRA Construction Specifications. Based on Section 03 09 00, AEC performed pavement design based on a concrete allowable compressive strength of 4,000 psi at 28 days and a concrete flexural strength of 600 psi at 28 days. AEC recommends that the project specifications require a concrete mix design that will achieve a concrete allowable compressive strength of 4,000 psi at 28 days and a concrete flexural strength of 600 psi at 28 days. AEC should be notified if a different concrete mix design will be used, so that our recommendations can be revised as necessary.

AVILES
ENGINEERING CORP.

5.3.2 Reinforcing Steel

Reinforcing steel should be in accordance with Section 03 21 00 of SJRA Construction Specifications. Reinforcing steel is required to control pavement cracks, deflections across pavement joints and resist warping stresses in rigid pavements. The cross-sectional area of steel (A_s) required per foot of slab width can be calculated with Equation (1) for both longitudinal and transverse steel.

$$A_s = FLW/(2f_s) \quad \text{.....Equation (1)}$$

where:
- A_s = Required cross-sectional area of reinforcing steel per foot width of pavement, in^2
- F = Coefficient of resistance between slab and subgrade, F = 1.8 for stabilized soil
- L = Distance between free transverse joints or between free longitudinal edges, ft.
- W = Weight of pavement slab per foot of width, lbs/ft
- f_s = Allowable working stress in steel, 0.75 x (yield strength), psi
  i.e. f_s = 45,000 psi for Grade 60 steel

5.3.3 Pavement Subgrade

The soils at the ground surface of Boring B-1 consist of clayey sand (SC) material with low expansive potential. The soils at the ground surface of Boring B-2 consist of sandy lean clay (CL) fill material with moderate expansive potential. Since the exposed material will have a low to moderate expansive potential, AEC recommends that the pavement subgrade be stabilized to a depth of 6 inches with a minimum of 5 percent hydrated lime.

Subgrade Preparation: Subgrade preparation should extend a minimum of 2 feet beyond the paved area perimeters. A minimum of 6 inches of surface soils, existing vegetation, trees, roots, and other deleterious materials should be removed and wasted. The excavation depth should be increased when inspection indicates the presence of organics and deleterious materials to greater depths. The exposed soils should be proof-rolled in accordance with Item 216 of the 2014 TxDOT Standard Specifications to identify and remove any weak, compressible, or other unsuitable materials; such materials should be replaced with clean, compacted general fill. General fill recommendations are presented in Section 5.4.3 of this report.

After proof-rolling, scarify the top 6 inches of the exposed subgrade and stabilize with a minimum of 5 percent hydrated lime (by dry soil weight). Lime stabilization shall be performed in accordance with

Section 32 11 13.13 of the SJRA Construction Specifications. The percentage of lime required for stabilization is a preliminary estimate for planning purposes only; laboratory testing should be performed to determine optimum contents for stabilization prior to construction. The stabilized soils should be compacted to 95 percent of their ASTM D 698 (Standard Proctor) dry density at a moisture content ranging from optimum to 3 percent above optimum.

5.4 Fill Requirements

5.4.1 Lime Stabilized Clay

Soils Stabilized with Hydrated Lime: AEC recommends that lime-stabilized clay be used as structural fill wherever possible. Either: (i) imported lime-stabilized clay soils (stabilized offsite before delivery to the project site); or (ii) clay soils excavated onsite and treated with hydrated lime can be used. Clay soils excavated onsite that are to be re-used as select fill should first be stabilized with a minimum of 6 percent hydrated lime (by dry soil weight). The amount of hydrated lime provided in this report is for estimation purposes only. The actual amount of lime required for stabilization should be determined by lime-series curve or pH method in a laboratory prior to construction. Lime stabilization should be done in general accordance with Section 32 11 13.13 of the SJRA Construction Specifications. AEC prefers using stabilized soil as structural fill since compacted stabilized soil generally has high strength, low compressibility, and relatively low permeability.

Onsite Soils Stabilized with Hydrated Lime: AEC recommends that stabilized soil be used as structural fill. The highly expansive fat clay (CH) and clayey sand (SC) soils excavated on-site should be treated with a minimum of 6 percent hydrated lime, and then re-compacted in place. The amount of lime provided in this report is for estimation purposes only. The actual amount of lime required for stabilization should be determined by a laboratory prior to construction. Lime stabilization should be done in general accordance with Section 32 11 13.13 of the SJRA Construction Specifications. AEC prefers using stabilized soil as select fill since compacted stabilized soil generally has high strength and low compressibility.

Lifts and Compaction: Lime-stabilized clay fill should be placed in loose lifts not exceeding 8 inches in thickness. Backfill within 3 feet of walls or columns should be placed in loose lifts no more than 4-inches thick and compacted using hand tampers, or small self-propelled compactors.

Lime-stabilized clay should be compacted to a minimum of 95 percent of the ASTM D 698 (Standard Proctor) maximum dry unit weight at a moisture content ranging between optimum and 3 percent above optimum.

5.4.2 Select Clay Fill

Imported 'Select' Clay Fill: It is AEC's experience that 'select' fill material imported from sand and clay pits in the Greater Houston area is generally non-homogenous (i.e. composed of a mixture of sands, silts, and clays, instead of a homogenous sandy clay material) and of poor quality, and either contains too much sand or has large clay clods with high expansive potential. Use of this non-homogenous soil can result in poor long term performance of structures and pavements placed on top of the fill.

Precautions: Prior to construction, the Contractor should determine if they can obtain qualified select clay fill meeting the below select fill criteria. The closest sand and clay pit to the project site may not be able to deliver fill material that meets the requirements below. The Contractor should also be aware that testing of select clay fill (see below) typically takes a minimum of 1.5 days to complete and they should accommodate testing in their fill placement in their project schedule. In addition, imported fill that is delivered to the project site may vary from day to day; material delivered to the site may pass one day but fail the next.

AEC notes that although lime-stabilized clay (see Section 5.4.1 of this report) may have a higher material and/or labor cost compared to select clay fill; the delays associated with locating, testing, and approving qualified select clay fill may exceed the costs of using lime-stabilized clay instead. Potential risks associated with importing poor quality fill material to the site include: (i) accepting delivery of fill material that does not meet specifications, which could end up as wasted material if there is no use for it in other applications; (ii) removal of already placed lifts of compacted soil prior to laboratory testing results becoming available, resulting in schedule delays; and (iii) bringing additional equipment onsite to further manipulate the fill, such as a pulvimixer.

Select Clay Fill Requirements: Select clay fill (whether imported from offsite or excavated onsite) should consist of *uniform*, non-active inorganic lean clays with a PI between 10 and 20 percent, and more than 50 percent passing a No. 200 sieve. Any clay soil intended for use as select fill (whether imported from offsite

or excavated onsite) shall not have clay clods with PI greater than 20, clay clods greater than 2 inches in diameter, or contain sands/silts with PI less than 10. Sand and clay mixtures/blends are unacceptable for use as select fill. Sand/silt with clay clods is unacceptable for use as select fill. Mixing sand into clay or mixing clay into sand/silt is also unacceptable for use as select fill. **The testing lab shall *reject* any imported material delivered to the project site that does not meet the PI, sieve, and clay clod requirements above, without exceptions.**

Lifts and Compaction: All material intended for use as select clay fill should be tested prior to use to confirm that it meets select fill criteria. The fill should be placed in loose lifts not exceeding 8 inches in thickness. Backfill within 3 feet of walls or columns should be placed in loose lifts no more than 4-inches thick and compacted using hand tampers, or small self-propelled compactors.

Select clay fill should be compacted to a minimum of 95 percent of the ASTM D 698 (Standard Proctor) maximum dry unit weight at a moisture content ranging between optimum and 3 percent above optimum.

Testing: **If select clay fill will be used, at least one Atterberg Limits and one percent passing a No. 200 sieve test shall be performed for each 10,000 square feet (sf) of placed fill, per lift (with a minimum of one set of tests per lift), to determine whether it meets select clay fill requirements.** Prior to placement of pavement or concrete, the moisture contents of the top 2 lifts of compacted select clay fill shall be re-tested (if there is an extended period of time between fill placement and concrete placement) to determine if the in-place moisture content of the lifts have been maintained at the required moisture requirements.

5.4.3 General Clay Fill

General clay fill can be used beneath structural floor slabs or for fill areas that will not support proposed (or future) structures or pavements. AEC recommends that general fill consist of a clean, cohesive soil (USCS Classification “CL” or “CH”). Granular soils (i.e. sands, silts, and gravel; not more than 50 percent retained on No. 200 sieve) should not be used as general fill.

General fill should be placed in loose lifts not exceeding 8 inches in thickness. General fill should be compacted to 95 percent of the ASTM D 698 (Standard Proctor) maximum dry unit weight at a moisture content ranging between optimum and 3 percent above optimum.

AVLES
ENGINEERING CORP.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 Site Preparation and Grading

To mitigate site problems that may develop following prolonged periods of rainfall, it is essential to have adequate drainage to maintain a relatively dry and firm surface prior to starting any work at the site. Adequate drainage should be maintained throughout the construction period. Methods for controlling surface runoff and ponding include proper site grading, berm construction around exposed areas, and installation of sump pits with pumps.

In addition to the recommended subgrade preparation, measures should be taken to reduce the potential for moisture changes in the subsurface soils under the proposed structure, which will in turn mitigate the potential for shrink and swell movements to occur. Measures recommended for consideration include:

- Maintain uniform compaction and moisture content for fill/subgrade soils during construction;
- Do not allow water to pond or allow the soils to dry out prior to constructing floor slabs;
- Locate landscaping away from floor slabs; trees should be located no closer than their mature canopy radius to the structure; even so, the tree roots influence zone can extend beyond their mature canopy radius;
- Design roof drains to discharge into paved areas or into a subsurface drainage system;
- Design final grading to provide site drainage away from the structure.

6.2 Foundation Construction

6.2.1 Shallow Spread Footings

The Contractor should be responsible for designing, constructing and maintaining safe excavations and protecting existing structures/utilities in the vicinity from adverse effects resulting from construction. We recommend that excavations required for structure foundations and floor slabs be scheduled to minimize the period of time that the subgrade soils are exposed. The intent is to reduce disturbance of the subgrade, and more importantly to reduce desiccation of the high shrink/swell subsurface fat clays.

AEC recommends that the exposed walls of the shallow spread footing excavations be covered by a polyethylene membrane. The excavation bottom must also be protected to prevent loss of moisture. The exposed subgrade of the foundation and floor slab excavation should be covered by a minimum 2-inch thick

lean concrete seal slab if the foundations and/or slab will not be poured within 24 hours. Central to this recommendation is the importance of preserving the moisture regime that exists in the expansive clays at the site. Maintaining a stable moisture condition is essential in minimizing swelling of the expansive clays at the site

6.3 Groundwater Control

The need for groundwater control will depend on the depth of excavation relative to the groundwater depth at the time of construction. In the event that there is heavy rain prior to or during construction, the groundwater table may be higher than indicated in this report; higher seepage is also likely and may require a more extensive groundwater control program. In addition, groundwater may be pressurized in certain areas of the site, requiring further evaluation and consideration of the excess hydrostatic pressures. Groundwater control should be in general accordance with Section 01 57 23.02 of the SJRA Construction Specifications.

The Contractor should be responsible for selecting, designing, constructing, maintaining, and monitoring a groundwater control system and adapt his operations to ensure the stability of the excavations. Groundwater information presented in Section 4.1 and elsewhere in this report, along with consideration for potential environmental and site variation between the time of our field exploration and construction, should be incorporated in evaluating groundwater depths. The following recommendations are intended to guide the Contractor during design and construction of the dewatering system.

Groundwater control methods typically can be classified into three categories: (i) open pumping, where water is allowed to flow into an excavation and is collected in ditches or sumps and pumped away; (ii) predrainage, where the water table is lowered before excavation using wellpoints, ejector/eductor systems, deep wells, etc.; and (iii) cut off or exclusion, where the groundwater is prevented from entering the excavation by an impermeable barrier, such as by sheet piling, grouting, deep soil mixing, ground freezing, slurry shields, etc.

Cohesive Soils: Groundwater control in cohesive soils can typically be performed using open pumping methods. Seepage rates are lower than in granular soils and groundwater is usually collected in sumps and/or channeled by gravity flow to storm sewers. If cohesive soils contain significant secondary features,

seepage rates will be higher. This may require larger sumps and drainage channels, or if significant granular layers are interbedded within the cohesive soils, methods used for granular soils may be required. Where it is present, pressurized groundwater will also yield higher seepage rates.

Granular Soils: Groundwater control in granular soils will typically require predrainage methods or cutoff/exclusion methods. For excavations that are less than 15 feet deep that will occur within saturated sands, a predrainage method such as wellpoints can be considered. For excavations that are greater than 15 feet deep, other predrainage methods that can be considered include multiple staged wellpoints, ejectors/eductors (primarily for use when silty soils are present), or deep wells with submersible pumps. Generally with predrainage methods, the groundwater depth should be lowered at least 3 feet below the excavation bottom to be able to work on a firm surface when water-bearing granular soils are encountered.

Extended Dewatering: Extended and/or excessive dewatering can result in settlement of existing structures in the vicinity of the dewatering operations; the Contractor should take the necessary precautions to minimize the effect on existing structures in the vicinity of the dewatering operation. We recommend that the Contractor verify the groundwater depths and seepage rates prior to and during construction and retain the services of a dewatering expert (if necessary) to assist them in identifying, implementing, and monitoring the most suitable and cost-effective method of controlling groundwater.

Bottom Heave or Boiling: For excavation in cohesive soils, the possibility of bottom heave must be considered due to the removal of the weight of excavated soil. In lean and fat clays, heave normally does not occur unless the ratio of Critical Height to Depth of Cut approaches one. In silty clays, heave does not typically occur unless an artificially large head of water is created through the use of impervious sheeting in bracing the cut. If the excavation extends below groundwater and the soils at or near the bottom of the excavation are mainly sands or silts, the bottom can fail by blow-out (boiling) when a sufficient hydraulic head exists. The potential for boiling or in-flow of granular soils increases where the groundwater is pressurized. To reduce the potential for boiling of excavations terminating in granular soils below pressurized groundwater, the groundwater table should be lowered at least 3 feet below the excavation.

6.4 Construction Monitoring

Site preparation (including clearing and proof-rolling), foundation and pavement construction, and subgrade preparation should be monitored by qualified geotechnical professionals to check for compliance with project documents and changed conditions, if encountered. AEC should be allowed to review the design and construction plans and specifications prior to release to check that the geotechnical recommendations and design criteria presented herein are properly interpreted.

7.0 GENERAL

AEC should be allowed to review construction documents and specifications prior to release to check that the geotechnical recommendations and design criteria presented herein are properly interpreted.

The information contained in this report summarizes conditions found on the date the borings were drilled. The attached boring logs are true representations of the soils encountered at the specific boring locations on the date of drilling. Due to variations encountered in the subsurface conditions across the site, changes in soil conditions from those presented in this report should be anticipated. AEC should be notified immediately when conditions encountered during construction are significantly different from those presented in this report.

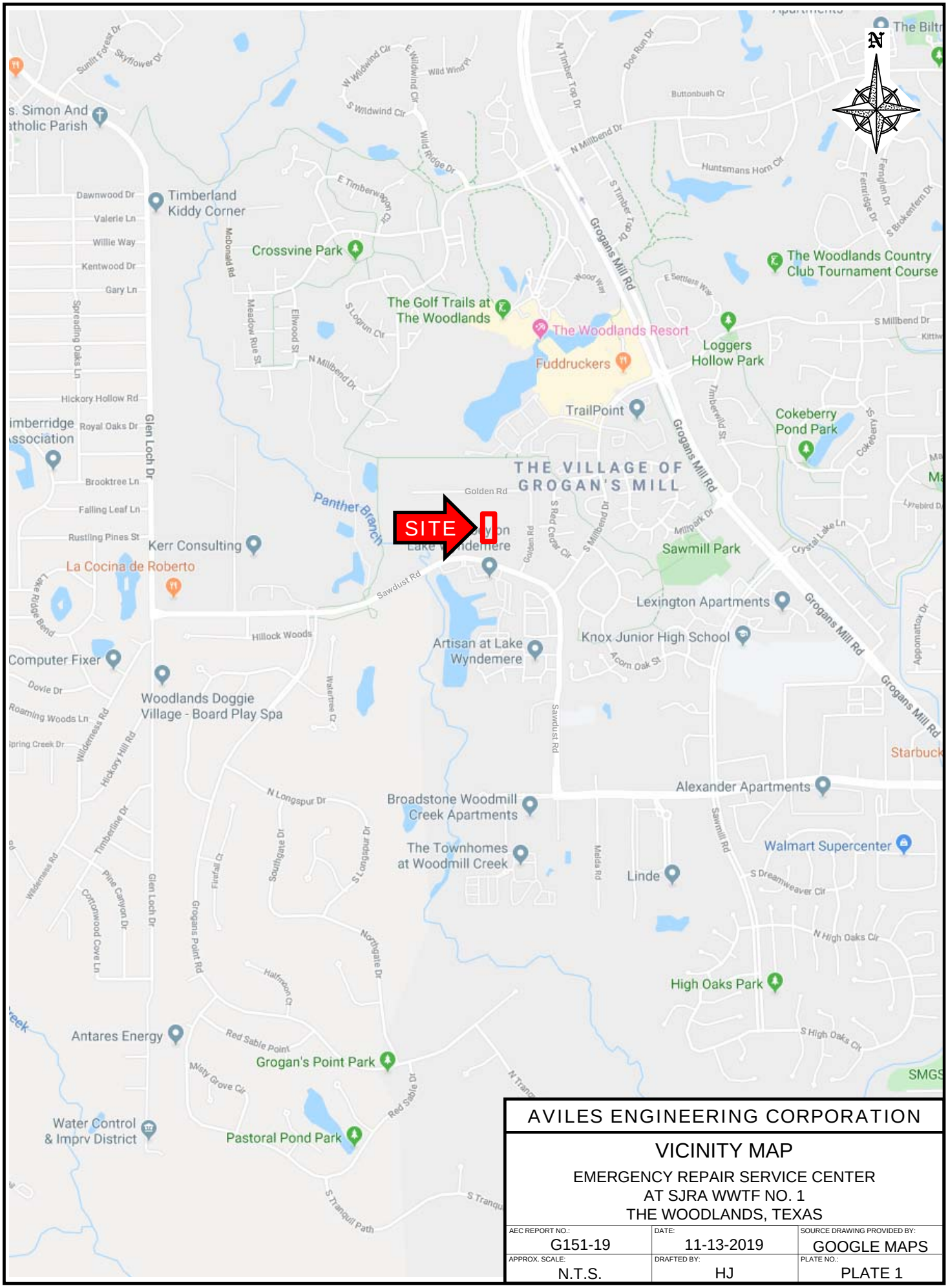
8.0 LIMITATIONS

The investigation was performed using the standard level of care and diligence normally practiced by recognized geotechnical engineering firms in this area, presently performing similar services under similar circumstances. The report has been prepared exclusively for the project and location described in this report, and is intended to be used in its entirety. If pertinent project details change or otherwise differ from those described herein, AEC should be notified immediately and retained to evaluate the effect of the changes on the recommendations presented in this report, and revise the recommendations if necessary. The scope of services does not include a fault investigation. The recommendations presented in this report should not be used for other structures located at this site or similar structures located at other sites, without additional evaluation and/or investigation.

AVLES
ENGINEERING CORP.

ATTACHMENTS

Plate 1	Vicinity Map
Plate 2	Boring Location Plan
Plates 3 and 4	Boring Logs
Plate 5	Key to Symbols
Plate 6	Classification of Soils for Engineering Purposes
Plate 7	Terms Used on Boring Logs
Plate 8	ASTM & TXDOT Designation for Soil Laboratory Tests

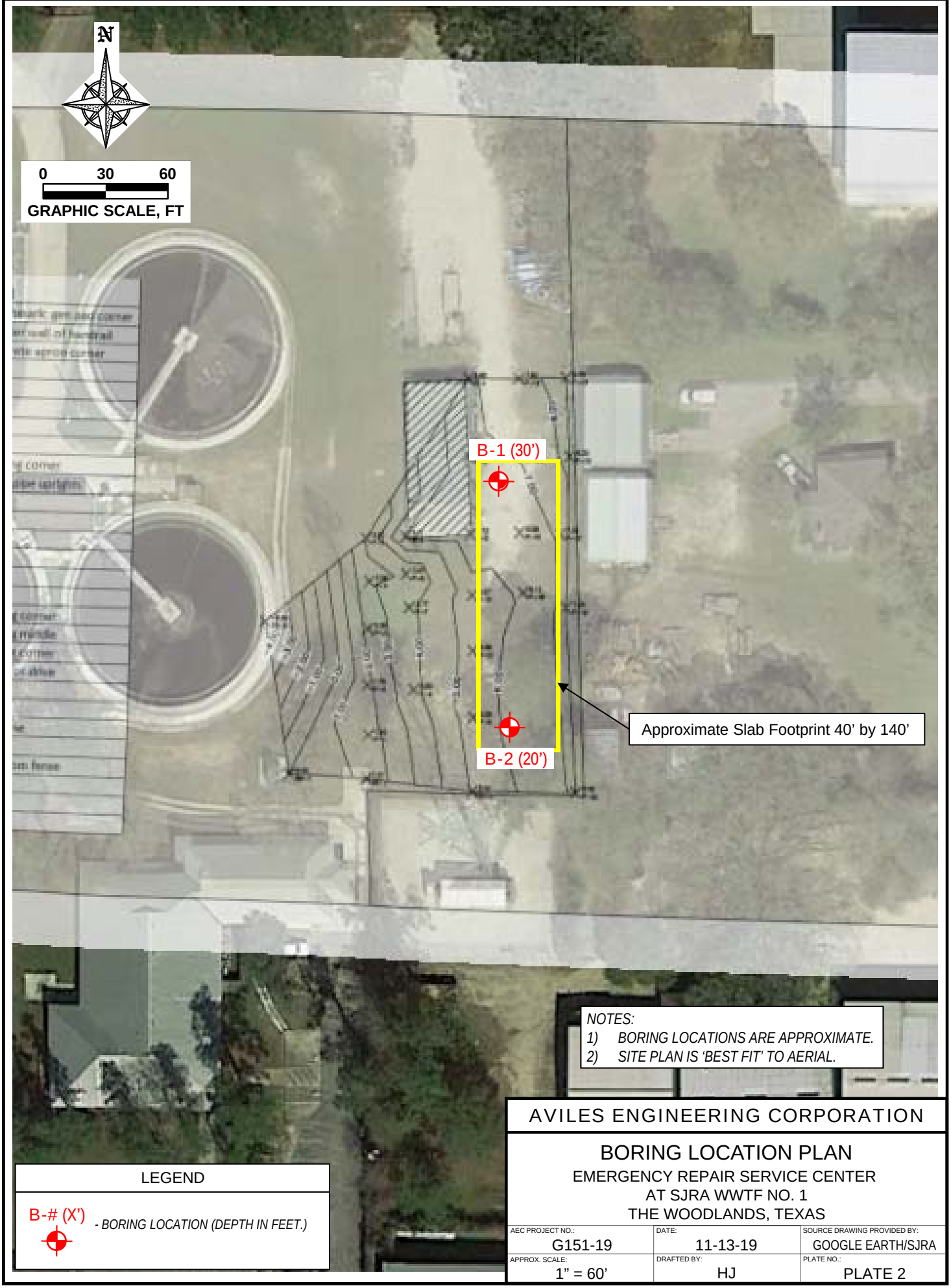


AVILES ENGINEERING CORPORATION

VICINITY MAP

EMERGENCY REPAIR SERVICE CENTER
AT SJRA WWTF NO. 1
THE WOODLANDS, TEXAS

AEC REPORT NO.:	DATE:	SOURCE DRAWING PROVIDED BY:
G151-19	11-13-2019	GOOGLE MAPS
APPROX. SCALE:	DRAFTED BY:	PLATE NO.:
N.T.S.	HJ	PLATE 1



NOTES:

1) *BORING LOCATIONS ARE APPROXIMATE.*
2) *SITE PLAN IS 'BEST FIT' TO AERIAL.*

LEGEND

B-# (X') - *BORING LOCATION (DEPTH IN FEET.)*

AVILES ENGINEERING CORPORATION

BORING LOCATION PLAN

EMERGENCY REPAIR SERVICE CENTER
AT SJRA WWTF NO. 1
THE WOODLANDS, TEXAS

AEC PROJECT NO.:	DATE:	SOURCE DRAWING PROVIDED BY:
G151-19	11-13-19	GOOGLE EARTH/SJRA
APPROX. SCALE:	DRAFTED BY:	PLATE NO.:
1" = 60'	HJ	PLATE 2

AVLES
ENGINEERING CORP.
GEOTECHNICAL ENGINEERS

PROJECT: **SJRA Emergency Repair Center at WWTF No. 1** BORING **B-1**

DATE **10/16/19** TYPE **4" Dry Auger** LOCATION **See Boring Location Plan**

DEPTH IN FEET	SYMBOL	SAMPLE INTERVAL	DESCRIPTION Relative Surface Elevation (feet): +6.7*	S.P.T. BLOWS / FT.	MOISTURE CONTENT, %	DRY DENSITY, PCF	SHEAR STRENGTH, TSF △ Confined Compression ● Unconfined Compression ○ Pocket Penetrometer □ Torvane	-200 MESH	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
0			Tan and dark brown Clayey Sand (SC), with ferrous nodules		10			46	21	12	9
			Firm to hard, gray and tan Sandy Fat Clay (CH), with ferrous stains -with clayey sand seams 2'-4' -gray 4'-6'		15	117.2					
5					15			56	50	17	33
			Medium dense, gray and red Clayey Sand (SC)		16	117.9	3.38				
					15			42	35	15	20
10			-gray and reddish tan 10'-12'		14	113.8					
			-gray, with fat clay seams 12'-14'	27	16						
			-gray and tan 14'-18', with silty clay seams 14'-16'		15				32	13	19
15			-groundwater at 14.2' approx. 25 min. after initial encounter -boring cave-in at 15.7' on 10/17/19		15	119.5					
			-with silty clayey sand pockets 16'-18'								
			Medium dense, gray and tannish gray Silty Sand (SM)	24	15			38			
20											
			-gray and tan, with silty clayey sand pockets 23'-25'	26	16				19	17	2
25											
			Very stiff to hard, gray Fat Clay (CH), with ferrous stains								
				18	25						
30			Termination depth = 30 feet *: Elevation relative to the corner of generator slab.								
35											

BORING DRILLED TO **30** FEET WITHOUT DRILLING FLUID

WATER ENCOUNTERED AT **28** FEET WHILE DRILLING ▽

WATER LEVEL AT **11.7** FEET AFTER **10/17/19** ▽

DRILLED BY **Van and Sons** DRAFTED BY **MRH** LOGGED BY **BTC**

PROJECT NO. G151-19

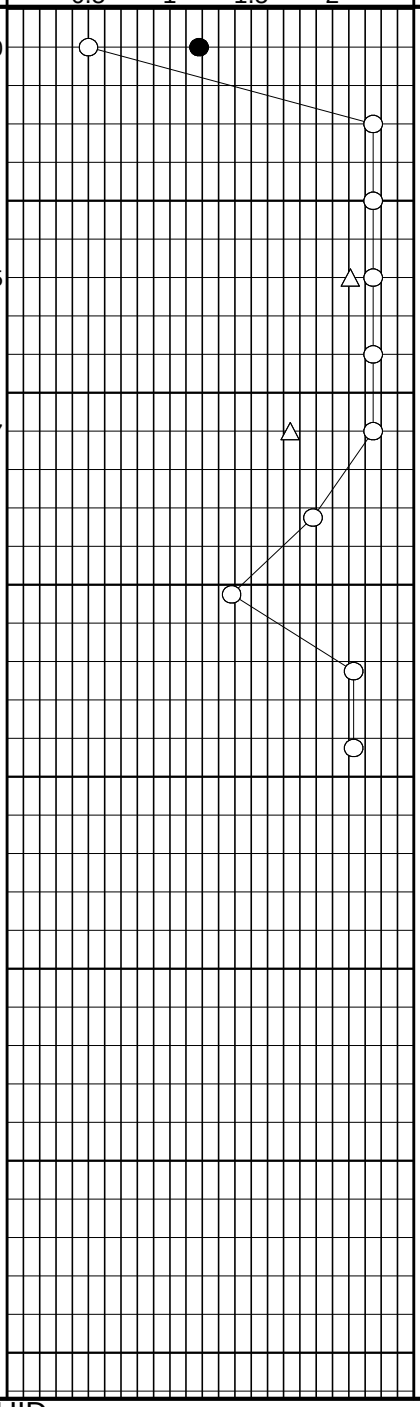
PLATE 3

AVLES ENGINEERING CORP. GEOTECHNICAL ENGINEERS

PROJECT: **SJRA Emergency Repair Center at WWTF No. 1** BORING **B-2**

DATE **10/16/19** TYPE **4" Dry Auger** LOCATION **See Boring Location Plan**

DEPTH IN FEET	SYMBOL	SAMPLE INTERVAL	DESCRIPTION Relative Surface Elevation (feet): +6.3*	S.P.T. BLOWS / FT.	MOISTURE CONTENT, %	DRY DENSITY, PCF	-200 MESH	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
0			Fill: firm to hard, tan and brown Sandy Lean Clay (CL)		19	106.0				
			-with organics and roots 0'-2'		7		51	24	11	13
			-reddish tan and gray, with clayey sand pockets and ferrous nodules 2'-4'							
5			-reddish tan and light gray 4'-6'		7					
			Very dense, gray and red Clayey Sand (SC)		11	121.5	31	28	13	15
					11					
10					11	119.7	26	29	15	14
			-gray 12'-16', with silty sand seams and lean clay pockets 12'-14'	99/ 11"	12					
15			-with silty clayey sand pockets 14'-16'	54	13					
			-gray and light red, with silty sand seams 16'-18'	53	13			25	13	12
			Very stiff to hard, gray Fat Clay (CH)	22	22		99			
20			Termination depth = 20 feet							
			*: Elevation relative to the corner of generator slab.							
25										
30										
35										



BORING DRILLED TO **20** FEET WITHOUT DRILLING FLUID

WATER ENCOUNTERED AT **N/A** FEET WHILE DRILLING

WATER LEVEL AT **N/A** FEET AFTER **COMPLETE**

DRILLED BY **Van and Sons** DRAFTED BY **MRH** LOGGED BY **BTC**

PROJECT NO. G151-19

PLATE 4

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Clayey sand
	High plasticity clay
	Silty sand
	Fill
Misc. Symbols	
	Water table depth during drilling
	Subsequent water table depth
○	Pocket Penetrometer
●	Unconfined Compression
△	Confined Compression
Soil Samplers	
	Undisturbed thin wall Shelby tube
	Standard penetration test
	Auger

AYLES ENGINEERING CORP.

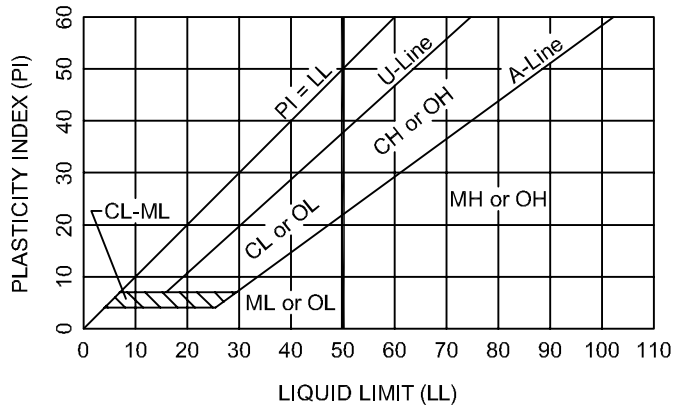
CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

ASTM Designation D-2487

MAJOR DIVISIONS				GROUP SYMBOL	TYPICAL NAMES
COARSE-GRAINED SOILS (Less than 50% passes No. 200 sieve)	GRAVELS (Less than 50% of coarse fraction passes No. 4 sieve)	CLEAN GRAVELS (Less than 5% passes No. 200 sieve)		GW	Well-graded gravel, well-graded gravel with sand
				GP	Poorly-graded gravel, poorly-graded gravel with sand
		GRAVELS WITH FINES (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on plasticity chart	GM	Silty gravel, silty gravel with sand
			Limits plot above "A" line & hatched zone on plasticity chart	GC	Clayey gravel, clayey gravel with sand
	SANDS (50% or more of coarse fraction passes No. 4 sieve)	CLEAN SANDS (Less than 5% passes No. 200 sieve)		SW	Well-graded sand, well-graded sand with gravel
				SP	Poorly-graded sand, poorly-graded sand with gravel
		SANDS WITH FINES (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on plasticity chart	SM	Silty sand, silty sand with gravel
			Limits plot above "A" line & hatched zone on plasticity chart	SC	Clayey sand, clayey sand with gravel
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)		SILTS AND CLAYS (Liquid Limit Less Than 50%)		ML	Silt, silt with sand, silt with gravel, sandy silt, gravelly silt
				CL	Lean clay, lean clay with sand, lean clay with gravel, sandy lean clay, gravelly lean clay
				OL	Organic clay, organic clay with sand, sandy organic clay, organic silt, sandy organic silt
		SILTS AND CLAYS (Liquid Limit 50% or More)		MH	Elastic silt, elastic silt with sand, sandy elastic silt, gravelly elastic silt
				CH	Fat clay, fat clay with sand, fat clay with gravel, sandy fat clay, gravelly fat clay
				OH	Organic clay, organic clay with sand, sandy organic clay, organic silt, sandy organic silt

NOTE: Coarse soils between 5% and 12% passing the No. 200 sieve and fine-grained soils with limits plotting in the hatched zone of the plasticity chart are to have dual symbols.

PLASTICITY CHART



Equation of A-Line: Horizontal at PI=4 to LL=25.5, then PI=0.73(LL-20)

Equation of U-Line: Vertical at LL=16 to PI=7, then PI=0.9(LL-8)

DEGREE OF PLASTICITY OF COHESIVE SOILS

Degree of Plasticity	Plasticity Index
None	0 - 4
Slight	5 - 10
Medium	11 - 20
High	21 - 40
Very High	>40

SOIL SYMBOLS

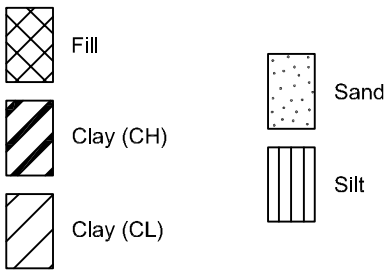


PLATE 6

AYLES ENGINEERING CORP.

TERMS USED ON BORING LOGS

SOIL GRAIN SIZE

U.S. STANDARD SIEVE

6"	3"	3/4"	#4	#10	#40	#200		
BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		
152	76.2	19.1	4.76	2.00	0.420	0.074	0.002	

SOIL GRAIN SIZE IN MILLIMETERS

STRENGTH OF COHESIVE SOILS

Consistency	Undrained Shear Strength, Kips per Sq. ft.	SPT Blowcount
Very Soft	less than 0.25	< 2 bpf
Soft	0.25 to 0.50	2-4 bpf
Firm	0.50 to 1.00	4-8 bpf
Stiff	1.00 to 2.00	8-16 bpf
Very Stiff	2.00 to 4.00	16-32 bpf
Hard	greater than 4.00	>32 bpf

RELATIVE DENSITY OF COHESIONLESS SOILS FROM STANDARD PENETRATION TEST

Very Loose	<4 bpf
Loose	5-10 bpf
Medium Dense	11-30 bpf
Dense	31-50 bpf
Very Dense	>50 bpf

SPLIT-BARREL SAMPLER DRIVING RECORD

Blows per Foot	Description
25	25 blows driving sampler 12 inches, after initial 6 inches of seating.
50/7"	50 blows driving sampler 7 inches, after initial 6 inches of seating.
Ref/3"	50 blows driving sampler 3 inches, during initial 6-inches seating interval.

NOTE: To avoid change to sampling tools, driving is limited to 50 blows during or after seating interval.

DRY STRENGTH ASTM D2488

None	Dry specimen crumbles into powder with mere pressure of handling
Low	Dry specimen crumbles into powder with some finger pressure
Medium	Dry specimen breaks into pieces or crumbles with considerable pressure
High	Dry specimen cannot be broken with finger pressure, it can be broken between thumb and hard surface
Very High	Dry specimen cannot be broken between thumb and hard surface

MOISTURE CONDITION ASTM D2488

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water

SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the easiness of breaking along these planes.
Fissured	Containing shrinkage or relief cracks, often filled with fine sand or silt; usually more or less vertical.
Friable	Crumbly, can be easily crushed with light pressure.
Blocky	Clays that have a block-like or polyhedral structure.
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 types.
Interlayered	Soil sample composed of alternating layers of different soil types.
Intermixed	Soil sample composed of pockets of different soil types and layered or laminated structure is not evident.
Calcareous	Having appreciable quantities of calcium material.

AVILES
ENGINEERING CORP.

ASTM & TXDOT DESIGNATION FOR SOIL LABORATORY TESTS

SOIL TEST	ASTM TEST DESIGNATION	TXDOT TEST DESIGNATION
Unified Soil Classification System	D 2487	Tex-142-E
Moisture Content	D 2216	Tex-103-E
Specific Gravity	D 854	Tex-108-E
Sieve Analysis	D 6913	Tex-110-E (Part 1)
Hydrometer Analysis	D 7928	Tex-110-E (Part 2)
Minus No. 200 Sieve	D 1140	Tex-111-E
Liquid Limit	D 4318	Tex-104-E
Plastic Limit	D 4318	Tex-105-E
Standard Proctor Compaction	D 698	Tex-114-E
Modified Proctor Compaction	D 1557	Tex-113-E
California Bearing Ratio	D 1883	-
Swell	D 4546	-
Consolidation	D 2435	-
Unconfined Compression	D 2166	-
Unconsolidated-Undrained Triaxial	D 2850	Tex-118-E
Consolidated-Undrained Triaxial	D 4767	Tex-131-E
Permeability (constant head)	D 5084	-
Pinhole	D 4647	-
Crumb	D 6572	-
Double Hydrometer	D 4221	-
pH of Soil	D 4972	Tex-128-E
Soil Suction	D 5298	-
Soil Sulfate	C 1580	Tex-145-E
Organics	D 2974	Tex-148-E

G151-19 SJRA Emergency Repair Service Center at WWTF No. 1
Lateral Earth Pressure Parameters for Spread Footing Sliding Resistance Design

Boring	Depth (ft)	Soil Type	γ (pcf)	γ' (pcf)	Short-Term						Long-Term					
					C (psf)	Cα (psf)	φ (deg)	K_a	K_0	K_p	C' (psf)	C'α (psf)	φ' (deg)	K_a	K_0	K_p
varies	varies	Lime-Stabilized Clay Backfill	120	58	4000	2400	0	1.00	1.00	1.00	300	240	22	0.45	0.63	2.20
varies	varies	Select Clay Fill	120	58	1600	900	0	1.00	1.00	1.00	180	125	22	0.45	0.63	2.20
B-1	0 to 2	SC	115	53	2000	1200	0	1.00	1.00	1.00	125	75	21	0.47	0.64	2.12
	2 to 6	Firm to hard CH	135	73	700	420	0	1.00	1.00	1.00	50	30	16	0.57	0.72	1.76
B-2	0 to 2	Fill: firm to very stiff CL	126	64	1700	1020	0	1.00	1.00	1.00	150	90	18	0.53	0.69	1.89
	2 to 6	Fill: hard CL	125	63	3000	1800	0	1.00	1.00	1.00	300	180	18	0.53	0.69	1.89

(1) γ = Unit weight for soil above water level, γ' = Buoyant unit weight for soil below water level;

(2) C = Soil ultimate cohesion for short term (upper limit of 3,000 psf for design purposes), φ = Soil friction angle for short term.

(3) C' = Soil ultimate cohesion for long term (upper limit of 300 psf for design purposes), φ' = Soil friction angle for long term.

(4) Cα = Soil ultimate adhesion for short term, C'α = Soil ultimate adhesion for long term.

(5) δ = angle of friction between soil and footing for short term=2/3 of φ, δ' = angle of friction between soil and footing for long term=2/3 of φ'.

(6) Ka = coefficient of active earth pressure, Ko = coefficient of at-rest earth pressure, Kp = coefficient of passive earth pressure, for level backfill.

(7) AEC recommends the use of FS = 2 for passive pressure if it is to be used in the design.

(8) CL = Lean Clay, CH = Fat Clay, SC = Clayey Sand.

Sliding Resistance: The resistance of a footing against sliding due to lateral loads is a combination of soil friction resistance, soil adhesion resistance (on the footing), plus passive pressure resistance in front of the footing (if any). Sliding resistance can be determined using Equation (1). Footing design should consider short-term and long-term conditions. Whichever case is critical should be used for design. Passive pressure resistance can conservatively be omitted from design. If passive earth pressure resistance is considered in the design, a FS of 2 should be applied to the passive pressure component. Passive earth pressure resistance can be determined using Equation (2).

$$\Sigma F_r = \Sigma V \times \tan(\delta) + B_f \times C_\alpha + P_p \quad \text{.....Equation (1)}$$

where: ΣF_r = Sum of horizontal resisting forces
ΣV = Sum of vertical forces
δ = 2/3 ϕ
ϕ = angle of internal friction
B_f = width of footing (ft)
C_α = soil adhesion (psf)
P_p = passive pressure resistance.

$$p_p = \gamma z K_p + 2c(K_p)^{1/2} \quad \text{.....Equation (2)}$$

where, p_p = passive earth pressure (psf);
γ = wet unit weight of soil (pcf);
z = depth below ground surface for the point under consideration (ft);
K_p = coefficient of passive earth pressure;
c = cohesion of clayey soils (psf).