CONTRACT DOCUMENTS
FOR

PLEASURE BEND WATER SYSTEM

AUGUST 2017

ST. JOHN THE BAPTIST PARISH,
LOUISIANA

STATE OF LOUISIANA
OSCAR J. BOUDREAUX, JR.
License No. 18859
PROFESSIONAL
ENGINEER
IN
CIVIL & ENVIRONMENTAL ENGINEERING

8/29/17

EES PROJECT NO. 1520

PREPARED BY:

ENVIRONMENTAL ENGINEERING SERVICES, INC.
610 BELLE TERRE BOULEVARD
LAPLACE, LOUISIANA 70068
PHONE (985) 653-0185
FAX (985) 653-0182

TABLE OF CONTENTS

		Sheet
Title Page		
Table of Contents		1 to 3

ADMINISTRATIVE SECTION

00010	Advertisement for Bids	1 to 3
00100	Instruction to Bidders	1 to 8

BIDDING FORMS

Section Number	Description	
00300	Bid Form *(Yellow Sheets)*	1
00320	Corporate Resolution *(Yellow Sheets)*	1
00360	Bid Bond *(Yellow Sheets)*	1 to 2
00390	Bid Qualifications *(White Sheets)*	1

CONTRACT FORMS

Section Number	Description	
00500(ls)	Agreement	1 to 5
00510	Construction Performance Bond	1 to 2
00520	Construction Payment Bond	1 to 2
00530	Corporate Resolution	1
00540	Affidavit	1
00541	Bond Certificate as to Corporate Principal	1
00550	Hold Harmless Agreement	1
00560	Certificate of Owner's Attorney	1
00600	Notice of Award	1 to 2
00610	Notice to Proceed	1
00620	Application for Payment	1 to 2
00630	Recommendation for Payment	1
00640	Change Order	1 to 2
00650	Work Change Directive	1 to 2
00660	Certificate of Substantial Completion	1 to 2

CONTRACT CONDITIONS

Section Number	Description	
00700	General Conditions of the Construction Contract *(Blue Sheets)*	1 to 39
00800	Supplementary Conditions *(Pink Sheets)*	1 to 8

DRAWINGS AND DETAILS

Section Number	Description	
00850	Drawings and Details	1

TECHNICAL SECTION

DIVISION 1 - GENERAL REQUIREMENTS

Section Number	Description	Sheet
01010	Summary of Work	1 to 6
01025	Measurement and Payment	1 to 2
01030	Alternates/Alternatives	1
01035	Modification Procedures	1 to 3
01041	Project Coordination	1 to 7
01046	Modifications to Existing Structures, Piping, and Equipment	1 to 3
01048	Utilities Coordination	1 to 5
01060	Regulatory Requirements	1 to 2
01091	Reference Standards	1
01092	Abbreviations	1 to 17
01300	Submittals	1 to 2
01310	Progress Schedules	1 to 2
01340	Shop Drawings, Project Data, and Samples	1 to 8
01370	Schedule of Values	1 to 2
01400	Quality Control	1
01410	Testing Laboratory Services	1 to 2
01420	Inspection Services	1 to 4
01435	Geotechnical Investigation Report	1
01505	Mobilization	1 to 2
01510	Temporary Utilities	1 to 3
01570	Traffic Regulation	1 to 3
01600	Material and Equipment	1 to 10
01700	Contract Closeout	1 to 5
01710	Cleaning	1 to 2
01720	Project Record Documents	1 to 3
01730	Operating and Maintenance Data	1 to 5
01740	Warranties and Bonds	1 to 2

DIVISION 2 – SITE CONDITIONS

Section Number	Description	
02020	Concrete Roads, Parking Areas, and Walks	1 to 3
02224	Pipe Jacking and Boring	1 to 4
02376	Geotextile Fabric	1 to 2
02463	Timber Piles	1 to 6
02521	Potable Water Bolted Steel Ground Storage Tank	1 to 3
02527	Water Supply Well Completion	1 to 4
02980	Directional Drilling	1 to 4

DIVISION 3 – CONCRETE

Section Number	Description	
03010	Cast-In-Place Concrete	1 to 19
03200	Concrete Reinforcement	1 to 4

DIVISION 5 – METALS

Section Number	Description

05010	Structural Steel	1 to 4
05020	Miscellaneous Steel Items, Fabrication, and Erection	1 to 2
05501	Miscellaneous Metals – Steel and Aluminum	1 to 11

DIVISION 9 – FINISHES

Section Number	Description	
09010	Painting	1 to 10
09015	Piles and Structures Protective Coatings	1 to 2

DIVISION 11 – EQUIPMENT

Section Number	Description	
11000	General	1
11011	Chlorination Equipment and Accessories	1 to 4
11049	Vertical Multi-Stage Pumps	1 to 10
11635	Fiberglass Pump Building	1 to 2
11640	Reverse Osmosis Equipment and Accessories	1 to 20

DIVISION 15 – MECHANICAL

Section Number	Description	
15010	Piping	1 to 28
15020	Valves & Apparatus	1 to 16

DIVISION 16 – ELECTRICAL

Section Number	Description	
16010	General Specifications for Electrical Installation	1 to 21
16020	Detail Specifications for Electrical Installation	1 to 12

APPENDIX

Section Number	Description	
A	Geotechnical Report dated January 24, 2017	1 to 25
B	Laboratory Analysis	1 to 60

ADMINISTRATIVE SECTION

ADVERTISEMENT FOR BIDS

St. John the Baptist Parish Council (herein referred to as the "Owner")

Sealed bids shall be received by the Owner for the construction of the project described as follows:

Pleasure Bend Water System

This WORK includes the installation of a 50 gpm water treatment plant with storage.

Bids shall be addressed to the St. John the Baptist Parish Council and delivered to the receptionist at the Parish President's Office in the Percy Hebert Building, 1801 West Airline Hwy., LaPlace, LA not later than **2:45 o'clock P. M. on September 26, 2017**. **Bid envelope shall be marked:**

"Sealed Bid – Pleasure Bend Water System"

Any bids received after the specified time and date will not be considered. The sealed bids will be publicly opened and read aloud at 3:00 o'clock P. M. that same date in the St. John the Baptist Parish Joel S. McTopy Council Chambers located at 1801 West Airline Hwy. LaPlace, LA.

The Information for Bidders, Form of Bid Proposal, Form of Contract, Plans, Specifications and Forms of Bid Bond, Performance Bond, insurance and other contract documents may be examined at the Office of Environmental Engineering Services, Inc., 610 Belle Terre Boulevard, Laplace, Louisiana 70068, Phone: (985) 653-0185. Hard copies may be obtained upon payment of $175.00 dollars per set. In lieu of, or in addition, an electronic version (via USB flash drive) may be obtained upon payment of $50.00 dollars. Deposits will be fully refunded upon return of the documents and/or USB flash drive in original condition and no later than ten (10) days after receipt of Bids. Details may be viewed and electronic bids are being accepted at www.centralbidding.com. Bid documents are also available for viewing on www.sjbparish.com.

The Owner reserves the right to accept or reject any and all bids and to waive any irregularities or informalities incidental thereto, and to accept any bid, which the Owner feels, serves their best interest. Such action will be in accordance with Title 38 of the Louisiana Revised Statues.

Bids shall be received from Bidders only on the Bid Form in the Bidding Documents which is issued to him in his name, as provided in the Louisiana Revised Statutes R.S. 37:2162(b). A single bid shall be submitted for all portions of the Contract Work.

Each Bidder must deposit with his/her bid, security in the amount equal to five percent (5%) of the total bid in the form of a certified check, cashier's check or bid bond.

All bidders must show proof that he/she is licensed in the State of Louisiana under the classification of "Municipal and Public Works Construction". ***Contractor's license number must appear on the face of the sealed envelope containing the bid.***

St. John the Baptist Parish Council, being a government agency, is exempt from all sales tax. The vendor awarded the contract will be provided documentation to support their tax free purchases for this project. Therefore, ***the amount you bid should contain no sales tax.***

The successful bidder will be required to furnish a Performance and Payment Bond written by a company licensed to do business in Louisiana, in the amount equal to one hundred percent (100%) of the contract price. Certificates of Insurance will also be required as specified in the bid package.

No bidder may withdraw his/her bid within forty-five (45) days after the actual date of opening thereof.

The Contractor shall begin mobilization and procurement of necessary materials within ten (10) working days of the receipt of the Notice to Proceed.

Any person with disabilities requiring Special Accommodation must contact The St. John the Baptist Parish Council Office at (985) 652-9569 no later than seven (7) days prior to bid opening. Participation by minority and female owned business, as well as businesses located in this Parish is encouraged.

Any contract or contracts awarded under this invitation for bids are expected to be funded in part by a grant from the United States Environmental Protection Agency. Neither the United States nor any of its departments, agencies, or employees is or will be party to this invitation for bids or any resulting contact. This procurement will be subject to regulations contained in 40 CFR Part 31 excluding the Davis-Bacon Act requirements and the Buy American provisions.

Equal Opportunity in Employment: All qualified applicants will receive consideration for employment without regard for race, color, religion, sex, or national origin. Bidders on this work will be required to comply with the President's Executive Order No. 11246, as amended. The requirements for bidders and contractors under this order are explained in the specifications.

If the contract is to be awarded, it will be awarded to the lowest, responsive, and responsible Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project.

A pre-bid conference will be held at **10:00 AM on September 19, 2017**, at the St. John the Baptist Parish Joel S. McTopy Council Chambers located at 1801 W. Airline Hwy, Laplace, LA 70068. All bidders and other interested parties are invited to attend.

ST. JOHN THE BAPTIST PARISH COUNCIL

Publish:
August 30, 2017
September 6, 2017
September 13, 2017

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS

Terms used in these Instructions to Bidders that are defined in the Standard General Conditions of the Construction Contract (No. 1910-8, 1996 Edition) have the meanings assigned to them in the General Conditions.

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

1.1 Bidder - one who submits a Bid directly to Owner, as distinct from a sub-bidder, who submits a Bid to a Bidder.

1.2 Issuing Office - the office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

1.3 Successful Bidder - the lowest, qualified, responsible and responsive Bidder to whom Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award.

2. COPIES OF BIDDING DOCUMENTS

2.1 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement may be obtained from the Engineer. The deposit will be refunded to each document holder of record who returns a complete set of Bidding Documents in good condition within ten (10) days after opening of Bids. No refunds will be made to non-bidders or sub-bidders.

2.2 Complete sets of bidding Documents must be used in preparing Bids; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS

To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit within five days of Owner's request written evidence, such as financial data, previous experience, present commitments and other such data as may be called for below (or in the Supplementary Instructions). Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or convenient to obtain such qualification prior to award of the Contract.

4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

4.1 It is the responsibility of each Bidder before submitting a Bid:

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

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

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

4.1.4 To study and carefully correlate Bidder's knowledge and observations with the Contract Documents and such other related data; and

4.1.5 To promptly notify Engineer of all conflicts, errors, ambiguities or discrepancies, which Bidder has discovered in or between the Contract Documents and such other, related documents.

4.2 Reference is made to the Supplementary Conditions for identification of:

4.2.1 The reports of explorations and tests of subsurface conditions at or contiguous to the site which have been utilized by Engineer in preparation of the Contract Documents. Bidder may rely upon the general accuracy of the "technical data" contained in such reports but not 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 bidding or construction.

4.2.2 Those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities) which are at or contiguous to the site that have been utilized by Engineer in preparation of the Contract Documents. Bidder may rely upon the general accuracy of the "technical data" contained in such drawings but not upon other data, interpretations, opinions or information shown or indicated in such drawings or otherwise relating to such structures, nor upon the completeness thereof for the purposes of bidding or construction.

Copies of such reports and drawings will be made available by Owner to any Bidder upon request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraphs 4.02 of the General Conditions has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion drawn from any "technical data" or any such data, interpretations, opinions, or information.

4.3 Information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.

4.4 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders 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 Paragraphs 4.02, 4.03 and 4.04 of the General Conditions.

4.5 Before submitting a Bid, each Bidder will be responsible to obtain 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 employed by Bidder and safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing of the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.

4.6 On request, Owner will provide each Bidder access to the site to conduct such examinations, investigations, explorations, tests and studies, as each Bidder deems necessary for submission of a Bid. Bidder must fill all holes, clean up and restore the site to its former condition upon completion of such explorations, investigations, tests and studies.

4.7 Reference is made to the Supplementary Conditions for the identification of the general nature of work that is to be performed at the site by Owner or others (such as utilities and other prime contractors) that relates to the Work for which a Bid is to be submitted. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such Work.

4.8 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and such means, methods, techniques, sequences or procedures of construction (if any) that may be shown or indicated or expressly required by the Contract Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in the Contract Documents and the written resolutions thereof by Engineer is acceptable to Bidder, and that the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

4.9 The provisions of I-4.2 through 4.8, inclusive, do not apply to Asbestos, Polychlorinated biphenyls (PCB's), Petroleum, Hazardous Waste or Radioactive Material covered by Paragraph 4.06 of the General Conditions.

5. AVAILABILITY OF LANDS FOR WORK, ETC.

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 or storage of materials and equipment are to be incorporated in the Work are to be obtained and paid for by Contractor. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

6. INTERPRETATIONS AND ADDENDA

6.1 All addendums will be issued electronically via the Internet. All bidders must provide the Engineer an e-mail address when plans and specifications are issued. When the addendum is completed and issued, the Engineer will e-mail copies to all plan holders. The addendum will be a PDF file readable via Adobe Acrobat Reader, the latest version thereof. If the bidder does not have Adobe Acrobat Reader, the program can be downloaded free from the Internet at www.adobe.com. After the Engineer Emails all plan holders, a formal notification will be faxed to the plan holder's office notifying the plan holders that the Addenda has been posted to the Internet. Once the Addenda has been posted, the addenda can be downloaded from the website at www.eesinc.net. Hard copies will be mailed in accordance with Public Bid Law. However, consider the receipt of the fax notice of posting the addenda to the web as your official notice of the issuance of an addendum.

6.2 The time and date of the issuance of the fax notification shall constitute the official notification to comply with state law with regards to issuance of the addendum.

6.3 All questions about the meaning or intent of the Bidding Documents are to be directed to Engineer. Interpretation or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6.4 Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner or Engineer.

7. BID SECURITY

7.1 Each Bid must be accompanied by Bid security made payable to Owner in an amount of five percent of the Bidders maximum Bid price and in the form of a certified or bank check or a Bid Bond (on form attached, if a form is prescribed) issued by a surety meeting the requirements of Paragraph 5.01 of the General Conditions.

7.2 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnishes the required contract security within fifteen days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders 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 Agreement or the thirty-sixth day after the Bid opening, whereupon Bid security furnished by such Bidders will be returned. Bid security with Bids which are not competitive will be returned within seven days after the Bid opening.

8. CONTRACT TIME

The numbers of days within which, or the dates by which, the Work is to be substantially completed and also completed and ready for final payment (the term "Contract Times" is defined in paragraph 1.01(A) 14 of the General Conditions) are set forth in the Agreement (or incorporated therein by reference to the attached Bid Form).

9. LIQUIDATED DAMAGES

Provisions for liquidated damages, if any, are set forth in the Agreement.

10. SUBSTITUTE OR "OR-EQUAL" ITEMS

The Contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement. The procedure for submission of any such application by Contractor and consideration by Engineer is set forth in paragraph 6.05 of the General Conditions and are supplemented in the General Requirements.

For pre-approved equipment or material, submission of alternate equipment or material is required fifteen (15) calendar days before the Bid Opening. Refer to General Requirements for additional information on pre-approved alternates. Any materials or equipment requiring pre-approval by the Engineer and not approval by addendum or listed in the Technical Specifications will not be accepted on this project.

11. SUBCONTRACTORS, SUPPLIERS AND OWNERS

11.1 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers and other persons and organization (including those who are to furnish the principal items of material and equipment) to be submitted to Owner in advance of the specified date prior to the Effective Date of the Agreement, apparent Successful Bidder, and any other Bidder so requested, shall within five days after the Bid opening submit to Owner a list of all such Subcontractors, Suppliers and other persons and organization proposed for those portions of the Work for which such identification is required. An experience statement shall accompany such list with pertinent information regarding similar projects and other evidence of qualification for each Subcontractor, Supplier, person or organization if requested by Owner. An Owner or Engineer who after due investigation has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, may before the Notice of Award is given request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price.

If apparent Successful Bidder declines to make any such substitution, Owner may award the contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, and other persons and organizations. The declining to make requested substitutions will not constitutes grounds for sacrificing the Bid security of any Bidder. Any Subcontractor, Supplier, other person or organization listed and to whom Owner or Engineer does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.

11.2 In contracts where the Contract Price is on the basis of Cost-Of-The-Work Plus a Fee, the apparent Successful Bidder, prior to the Notice of Award shall identify in writing to Owner those portions of the Work that such Bidder proposed to subcontract and after the Notice of Award may only subcontract other portions of the Work with Owner's written consent.

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

12. BID FORM

12.1 The Bid Form is included with the Bidding Documents; additional copies may be obtained from Engineer.

12.2 All blanks on the Bid Form must be completed by printing in black ink or by typewriter.

12.3 Bids 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.

12.4 Bids 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.

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

12.6 The Bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).

12.7 The address and telephone number for communications regarding the Bid must be shown.

12.8 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 Paragraph 3 above. State contractor license number, if any, must also be shown.

13. SUBMISSION OF BIDS

Bids shall be submitted at the time and place indicated in the Advertisement for Bid and shall be enclosed in an opaque sealed envelope, marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and name and address of the Bidder and accompanied by the Bid security and other required documents. If the Bid is sent through the mail or other delivery system the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it.

Each prospective Bidder is furnished one copy of the Bidding Documents with one separate unbound copy each of the Bid Form and the Bid Bond. The Bidder may retain the Bidding Documents. The unbound copy of the Bid Form (Section 00300) is to be completed and submitted with the Bid Bond (Section 00360) with the attached Power of Attorney. To be submitted with the bid are as follows:

Louisiana Uniform Public Work Bid Form
Corporate Resolution (or written evidence of the authority of the person signing the bid)
Bid Bond with Power of Attorney

Within 10 days after the Bid, the low Bidder will be required to submit the following and documents listed within these specifications, Federal or State Agency requirements, and/or as called for by the Engineer.

Bid Qualifications

14. MODIFICATION AND WITHDRAWAL OF BIDS

14.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

14.2 If within forty-eight hours after Bids are opened, the Bidder because of “patently obvious, unintentional and substantial mechanical, clerical, or mathematical errors, or errors of unintentional omission of a substantial of work, labor, materials or services…” may withdraw its Bid and the Bid Security will be returned but only if done by affidavit within 48 hours of bid opening. Thereafter, that Bidder will be disqualified from further bidding on the Work to be provided under the Contract Documents.

15. OPENING OF BIDS

Bids will be opened and (unless obviously non-responsive) read aloud publicly at the place where Bids are to be submitted. An abstract of the amounts of the base Bids and major alternates (if any) will be made available to Bidders after the opening of Bids.

16. BIDS TO REMAIN SUBJECT TO ACCEPTANCE

All Bids will remain subject to acceptance for forty-five days after the day of the Bid opening, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to that date.

17. AWARD OF CONTRACT

17.1 Owner reserves the right to reject any and all Bids, including without limitation the rights to reject any or all nonconforming, non-responsive, unbalanced or conditional Bids and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest to the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. 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 Successful Bidder. 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.

17.2 In evaluating Bids, Owner will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

17.3 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 Supplementary Conditions. Owner also may 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 the Notice of Award.

17.4 Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, 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.

17.5 If the contract is to be awarded, it will be awarded to the lowest Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project.

17.6 If the contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within forty-five days after the day of the Bid opening.

18. CONTRACT SECURITY

Paragraph 5.01 of the General Conditions and the Supplementary Conditions set forth Owner's requirements as to performance and payment bonds. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by the required Performance and Payment Bonds.

19. SIGNING OF AGREEMENT

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within fifteen days thereafter Contractor shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required bonds. Within ten days thereafter Owner shall deliver one fully signed counterpart to Contractor. Each counterpart is to be accompanied by a complete set of the drawings with appropriate identification.

20. PRE-BID CONFERENCE

Refer to the Advertisement for Bids for pre-bid conference. If no information is provided in the advertisement, a pre-bid conference will not be held.

21. PRE-BID ORAL DISCUSSIONS

During the pre-bid period, many items are discussed as it relates to this Project. Only items addressed in written addendum will be binding. Oral interpretation of the plans and specifications will be without legal effect and may only represent the Owner or Engineer's interpretation of the Contract Documents. If a Bidder wishes to have a clarification binding, the Bidder should make a formal request to have the clarification stated in the Addendum. Refer to paragraph I 6 for "Interpretation and Addenda".

22. SALES AND USE TAXES

The Contractor shall be exempt from Sales and Use Tax provided the Contractor complies with all provisions of R.S. 47:301 (8) and all regulations and rules promulgated by the Department of Revenue for Contractor to qualify for exclusion from Sales and Use Tax. Failure by Contractor to comply with these provisions including the execution of all documentation required by these Statues and the Department of Revenue shall result in the Contractor being responsible for all sales and use taxes.

23. RETAINAGE

Provisions concerning retainage and Contractor's rights to deposit securities in lieu of retainage are set forth in the Agreement.

24. CONTRACTOR'S LICENSING LAW

Federal regulations for procurement under assistance Agreements prohibit the employment of state or local laws, ordinances, regulations or procedures that give local or in-state Bidders or proposers preference over other Bidders or proposers. Contractors that do not possess a Louisiana Contractors License may Bid on this Project by placing the following statement on the Bid envelope "This Bid is submitted in accordance with Louisiana R.S. 37-2157.D".

Any successful Bidder who does not have a Louisiana Contractor's License must submit an application for a license complete and in its entirety and pay the fee prior to commencement of Work, and must comply with any additional requirements of the Louisiana State Licensing Board for Contractors.

25. LOCATION OF PROJECT

The site and address for this project is:
1200 Highway 693
Vacherie, LA 70090

END OF SECTION

BIDDING FORMS

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: St. John the Baptist Parish
1801 West Airline Highway
LaPlace, Louisiana 70068

BID FOR: Pleasure Bend Water System
EES Project No. 1520

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: **Environmental Engineering Services, Inc.** and dated: **August 2017**.

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:**

(Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging)**:**

Addendum No. ____	**Addendum Date:**_____	**Addendum No.** ____	**Addendum Date:** _____
Addendum No. ____	**Addendum Date:** _____	**Addendum No.** ____	**Addendum Date:** _____
Addendum No. ____	**Addendum Date:** _____	**Addendum No.** ____	**Addendum Date:** _____

TOTAL BASE BID: For all work required by the Bidding Documents, the lump sum of:

_____

_____Dollars ($ _____)
(price in words) (price in numbers)

ALTERNATES: None.

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

_____

TELEPHONE NUMBER AND E-MAIL ADDRESS: _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(A)(1)(c) or RS 38:2212(O) .

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38:2218.A is attached to and made a part of this bid.

CORPORATE RESOLUTION

A meeting of the Board of Directors of _____
a corporation organized under the laws of the State of _____
and domiciled _____ was held this ___ day of _____,
20__ and was attended by a quorum of the members of the Board of Directors.

The following resolution was offered, duly seconded and, after discussion, was unanimously adopted by said quorum:

BE IT RESOLVED, that _____ is hereby authorized to submit bid proposals and execute agreements on behalf of this corporation with the Parish of St. John the Baptist for the construction of public improvements for the Parish of St. John the Baptist and/or any City within the Parish of St. John the Baptist.

BE IT FURTHER RESOLVED that said authorization and appointment shall remain in full force and effect, unless revoked by resolution of this Board of Directors and that said revocation will not take effect until the purchasing agency of the Parish of St. John the Baptist, shall have been furnished a copy of said resolution, duly certified.

I, _____ hereby certify that I am the Secretary of _____ a corporation created under the laws of the State of Louisiana domiciled in _____; that the foregoing is a true and exact copy of a resolution adopted by a quorum of the Board of Directors of said corporation at a meeting legally called and held on the _____day of _____ 20__, as said resolution appears of record in the Official minutes of the Board of Directors in my possession this _____ day of _____ 20__.

_____
Secretary

END OF SECTION

BID BOND

BIDDER (Name and Address)

_____

_____

_____

SURETY (Name and Address of Principal Place of Business)

_____

_____

_____

OWNER (Name and Address)

St. John the Baptist Parish
1801 West Airline Highway
LaPlace, Louisiana 70068

BID

BID DUE DATE:_____

PROJECT (Brief Description including Location): Pleasure Bend Water System
St. John the Baptist Parish, Louisiana

BOND

BOND NUMBER:_____

DATE: (Not later than Bid Due Date):_____

PENAL SUM:_____

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (SEAL)	_____ (SEAL)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By:_____	By:_____
Signature and Title	Signature and Title (Attach Power of Attorney)
Attest:_____	Attest:_____
Signature and Title	Signature and Title

==========

==========

Note: 1) Above addresses are to be used for giving required notice.
2) Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

==========

==========

EJCDC NO. 1910.28-C (1990 Edition)

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assign to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Documents.

3. This obligation shall be null and void if:

   3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Documents, or
   3.2 All bids are rejected by Owner, or
   3.3 Owner fails to issue a notice of award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of and any all defenses based on or arising out of any time extension to issue notice of award agreed to in writing by Owner and Bidder, provided that the time for issuing notice of award, including extensions shall not in the aggregate exceed 120 days from Bid Due Date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in paragraph 4 above is received by Bidder and Surety, and in no case later than one year after Bid Due Date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notice required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United State Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond, a current and effective Power of Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set for at length. If any provision of any applicable statute, then the provision of said statue shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "bid" as used herein includes a bid, offer or proposal as applicable.

END OF SECTION

BID QUALIFICATIONS

This attachment shall be submitted by Low Bidder before Contract is awarded.

I. CONTRACTORS EXPERIENCE

The Contractor's five (5) most recent comparable type projects are as follows:

Project	Engineer	Owner	Contract Amount
1.			
2.			
3.			
4.			
5.			

II. PROPOSED SUBCONTRACTORS

The following is a list of proposed Contractor's who will work on this Project:

Name of Subcontractor	Type of Work	Address
1.		
2.		
3.		
4.		
5.		

III. MATERIAL

The following is a list of manufacturers of major equipment or supplies upon which this bid is based:

Component	Manufacturer and Trade Name
1. RO Unit	
2. Ground Storage Tank	
3. High Service Pumps	
4.	
5.	

END OF SECTION

CONTRACT FORMS

EJCDC
STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR
ON THE BASIS OF A STIPULATED PRICE

THIS AGREEMENT is dated as of the _____ day of _____ in the year 20___ by and between St. John the Baptist Parish (hereinafter called OWNER) and _____ (hereinafter called CONTRACTOR).

OWNER and CONTRACTOR, in consideration of the mutual 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:

Pleasure Bend Water System

The Project for which the Work under Contract Documents may be the whole or only a part is generally described as follows:

Pleasure Bend Water System

Article 2 - ENGINEER

The Project has been designed by: Environmental Engineering Services, Inc.
610 Belle Terre Boulevard, LaPlace, Louisiana 70068

who is hereinafter called ENGINEER and who is to act as OWNER's representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

Article 3 - CONTRACT TIMES

3.1 The Work will be substantially completed within 300 days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions within 345 days after the date when the Contract Times commence to run.

3.2 Liquidated Damages - 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 paragraph 3.1 above, 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 such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER Five Hundred Dollars ($500.00) for each day that expires after the time specified in paragraph 3.1 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR shall neglect, refuse, or fail to complete the remaining Work within time specified in paragraph 3.1 for completion and readiness for final payment or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER Two Hundred Fifty Dollars ($250.00) for each day that expires after the time specified in paragraph 3.1 for completion and readiness for final payment.

Article 4 - CONTRACT PRICE

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 pursuant to paragraph 4.1 below:

4.1 for all Work, a Lump Sum of:

_____

_____ ($_____)

(Price in Words) (Price in number)

All specific cash allowances are included in the above price and have been computed in accordance with paragraph 11.02 of the General Conditions.

Article 5 - PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. ENGINEER will process applications for Payment as provided in the General Conditions.

5.1 Progress payments; Retainage - OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment as recommended by ENGINEER, on or about the 25th day of each month during construction as provided in paragraphs 5.1.1 and 5.1.2 below. All such payments will be measured by the schedule of values established in paragraph 2.07 of the General Conditions (and in case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

5.1.1 Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below, but, in each case, less the aggregate of payments previously made and less such amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with paragraph 14.02 of the General Conditions:

95% of Work completed (with the balance being retainage). If Work has been 50% completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage on account of Work completed, in which case of the remaining progress payments prior to Substantial Completion will be in an amount equal to 100% of the Work completed.

95% (with balance being retainage) of materials and equipment not incorporated in the Work (but delivered, suitably stored and accompanied by documentation satisfactory to Owner as provided in paragraph 14.02 of the General Conditions).

5.1.2 Upon Substantial Completion, in an amount sufficient to increase total payments to Contractor to 95% of the Contract Price (with the balance being retainage), less such amounts as Engineer shall determine, or Owner may withhold, in accordance with paragraph 14.02 of the General Conditions.

5.2 Final Payment - Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 14.07.

Article 6 - INTEREST

No interest will be paid on this Project.

Article 7 - CONTRACTOR'S REPRESENTATIVE

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

7.1 CONTRACTOR has examined and carefully studied the Contract Documents (including the Addenda listed in article 8) and the other related data identified in the Bidding Documents including "technical data".

7.2 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 furnishings of the Work.

7.3 CONTRACTOR 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.

7.4 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 (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions. CONTRACTOR accepts the determination set forth in paragraph SC-4.02 of the Supplementary Conditions of the extent of the "technical data" contained in such reports and drawings upon which CONTRACTOR is entitled to rely as provided in paragraph 4.02 of the General Conditions. CONTRACTOR acknowledges that such reports and drawings are not Contract Documents and may not be complete for CONTRACTOR's purposes. CONTRACTOR acknowledges that OWNER and ENGINEER do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the site. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all such additional 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 finishing 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 Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

7.5 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.

7.6 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.

7.7 CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that CONTRACTOR has discovered in the Contract Documents and the written resolution thereof by 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.

Article 8 - CONTRACT DOCUMENTS

The Contract Documents, which comprise the entire agreement between OWNER and CONTRACTOR concerning the Work, consist of the following:

8.1 This Agreement, pages 00500-1 to 00500-6, inclusive.
8.2 Construction Performance Bond, pages 00510-1 to 00510-2 and Construction Payment Bond, pages 00520-1 to 00520-2
8.3 Corporate Resolution, page 00530-1 and Affidavit, pages 00540-1 to 00540-2.
8.4 Hold Harmless Agreement, page 00550-1.
8.5 Notice to Proceed, page 00610-1.
8.6 General Conditions (Blue pages), pages 00700-1 to 00700-39.
8.7 Supplementary Pages (Pink Pages), pages 00800-1 to 00800-8.
8.8 Specifications bearing the title Pleasure Bend Water System and consisting of ___ divisions and ___ pages, as listed in the table of contents thereof.
8.9 Drawings consisting of a cover sheet and sheets numbered ____ to ___, inclusive with each sheet bearing the following general title:
Pleasure Bend Water System
8.10 Addenda Numbers __ to __, inclusive.
8.11 CONTRACTOR'S Bid (Copy), inclusive, marked Exhibit A.
8.12 Documentation submitted by CONTRACTOR prior to Notice of Award (Pages N/A to N/A, inclusive).
8.13 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All written amendments and other documents amending, modifying or supplementing the Contract Documents pursuant to paragraphs 3.04 of the General Conditions.

The documents listed in paragraphs 8.2 et seq. above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed above in this Article 8. The Contract Documents may only be amended, modified, or supplemented as provided in paragraph 3.04 of the General Conditions.

Article 9 - MISCELLANEOUS

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

9.2 No assignment by a party hereto of any rights under or interests in the Contract Documents 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 Documents.

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

9.4 Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions 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.

9.5 OTHER PROVISIONS

(State other intentions in this space)

IN WITNESS WHEREOF, OWNER, AND CONTRACTOR have signed this Agreement in triplicate. One counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed, initialed or identified by OWNER and CONTRACTOR or identified by ENGINEER on their behalf.

This Agreement will be effective on _____, 20__
(which is the Effective date of the Agreement).

OWNER	CONTRACTOR
St. John the Baptist Parish	_____
By: _____ Natalie Robottom, Parish President	By: _____
(CORPORATE SEAL)	(CORPORATE SEAL)
Attest _____	Attest _____
Address for giving notices 1801 West Airline Highway LaPlace, Louisiana 70068	Address for giving notices _____ _____
(If OWNER is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Agreement).	License No. _____ Agent for service of Process: _____ (If CONTRACTOR is a corporation, attach evidence of authority to sign).

END OF SECTION

CONSTRUCTION PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address)

SURETY (Name and Principal Place of Business)

OWNER (Name and Address)

St. John the Baptist Parish
1801 West Airline Highway
LaPlace, Louisiana 70068

CONSTRUCTION CONTRACT
Date:
Amount:
Description (Name and Location): **Pleasure Bend Water System**

BOND
Date: (Not Earlier than Construction Contract Date)
Amount:
Modifications to this Bond Form:

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Signature:_____
Name and Title:

SURETY
Company: (Corp. Seal)

Signature:_____
Name and Title:

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Signature:_____
Name and Title:

SURETY
Company: (Corp. Seal)

Signature:_____
Name and Title:

EJCDC No. 1910-28A (1984 Edition)
Prepared through the joint efforts of The Surety Association of American, Engineers' Joint Contract Documents Committee, The Associated General Contractors of America, and the American Institute of Architects.

1. The Contractor and the Surety, jointly and severally bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.1.

3. If there is no Owner Default, the Surety's obligation under this Bond shall arise after:

3.1 The Owner has notified the Contractor and the Surety at its address described in Paragraph 10 below, that the Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Construction Contract. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default; and

3.2 The Owner has declared a Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty days after the Contractor and the Surety have received notice as provided in Subparagraph 3.1; and

3.3 The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Owner.

4. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1 Arrange for the Contractor, with consent of the Owner, to perform and complete the Construction Contract; or

4.2 Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors; or

4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the Contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default; or

4.4 Waive its right to perform and complete, arrange for completion, or obtain a new Contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to the Owner and as soon as practicable after the amount is determined, tender payment therefore to the Owner; or

2. Deny liability in whole or in part and notify the Owner citing reasons therefore.

5. If the Surety does not proceed as provided in Paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Subparagraph 4.4, and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

6. After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under Subparagraph 4.1, 4.2 or 4.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract, the Surety is obligated without duplication for:

6.1 The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

6.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 4; and

6.3 Liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

7. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, or successors.

8. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after Contractor Default or within two years after Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

12.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract.

12.4 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY-Name, Address, and Telephone	
AGENT OR BROKER:	OWNERS' REPRESENTATIVE (Architect, Engineer, or other party): Environmental Engineering Services, Inc. 610 Belle Terre Boulevard, LaPlace, Louisiana 70068 (985) 653-0185

CONSTRUCTION PAYMENT BOND

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address)

SURETY (Name and Principal Place of Business)

OWNER (Name and Address)

St. John the Baptist Parish
1801 West Airline Highway
LaPlace, Louisiana 70068

CONSTRUCTION CONTRACT
Date:
Amount:
Description (Name and Location): **Pleasure Bend Water System**

BOND
Date: (Not Earlier than Construction Contract Date)
Amount:
Modifications to this Bond Form:

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Signature:_____
Name and Title:

SURETY
Company: (Corp. Seal)

Signature:_____
Name and Title:

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Signature:_____
Name and Title:

SURETY
Company: (Corp. Seal)

Signature:_____
Name and Title:

EJCDC No. 1910-28A (1984 Edition)
Prepared through the joint efforts of The Surety Association of America, Engineers' Joint Contract Documents Committee, The Associated General Contractors of America, and the American Institute of Architects, American Subcontractors Association, and the Associated Specialty Contractors.
Reprinted 10/90

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.

2. With respect to the Owner, this obligation shall be null and void if the Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2 Defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2 Claimants who do not have a direct contract with the Contractor:

1. Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed: and

2. Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.

5. If a notice required by Paragraph 4 is given by the Owner to the Contractor or to the Surety, which is sufficient compliance.

6. When the Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1 Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and that basis for challenging any amounts that are disputed.

6.2 Pay or arrange for payment of any undisputed amounts.

7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any under any Construction Performance Bond.

By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

9. The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located of after the expiration of one year form the date (1) on which the Claimant gave the notice required by Subparagraph 4.1 or Clause 4.2(iii) or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in the Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is, that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions:

15.1 Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, material or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY-Name, Address, and Telephone	
AGENT OR BROKER:	OWNERS' REPRESENTATIVE (Architect, Engineer, or other party): Environmental Engineering Services, Inc. 610 Belle Terre Boulevard, LaPlace, Louisiana 70068 (985) 653-0185

CORPORATE RESOLUTION

A meeting of the Board of Directors of _____
a corporation organized under the laws of the State of _____
and domiciled _____ was held this ___ day of _____,
20__ and was attended by a quorum of the members of the Board of Directors.

The following resolution was offered, duly seconded and, after discussion, was unanimously adopted by said quorum:

BE IT RESOLVED, that _____ is hereby authorized to submit bid proposals and execute agreements on behalf of this corporation with the Parish of St. John the Baptist for the construction of public improvements for the Parish of St. John the Baptist and/or any City within the Parish of St. John the Baptist.

BE IT FURTHER RESOLVED that said authorization and appointment shall remain in full force and effect, unless revoked by resolution of this Board of Directors and that said revocation will not take effect until the purchasing agency of the Parish of St. John the Baptist, shall have been furnished a copy of said resolution, duly certified.

I, _____ hereby certify that I am the Secretary of _____ a corporation created under the laws of the State of Louisiana domiciled in _____; that the foregoing is a true and exact copy of a resolution adopted by a quorum of the Board of Directors of said corporation at a meeting legally called and held on the _____day of _____ 20__, as said resolution appears of record in the Official minutes of the Board of Directors in my possession this _____ day of _____ 20__.

_____
Secretary

END OF SECTION

STATE OF LOUISIANA
PARISH OF ST. JOHN THE BAPTIST

PROJECT NAME: **Pleasure Bend Water System**

PROJECT NO.: **1520**

LOCATION: **St. John the Baptist Parish, Louisiana**

AFFIDAVIT

Before me, the undersigned authority, duly commissioned and qualified with and for the state and parish aforesaid, personally came and appeared _____ representing Contractor's Name who, being by me first duly sworn deposed and said that he has read this affidavit and do hereby agree under oath to comply with all provisions herein as follows:

Section 2224 of Chapter 10 of Title 38
of the LA. Revised Statutes
as amended.

(1) That affiant employed no person, corporation, firm, association or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction of the public building or project or in securing the public contract were in the regular course of their duties for affiant; and

(2) That no part of the contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction of the public building or project were in the regular course of their duties for affiant.

Contractor's Name

By: _____

SWORN TO AND SUBSCRIBED BEFORE ME THIS ____ DAY OF _____, 20____.

_____
NOTARY

END OF SECTION

BOND CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the Secretary of the Corporation named as Principal in the within Bond; that_____, who signed the said bond on behalf of the Principal was then_____ of said Corporation; that I know his signature, and his signature thereto is genuine; and that said bond was duly signed, sealed, and attested to for and in behalf of said corporation by authorizing of this governing body.

_____
(Corporate Seal)

_____
(Title)

Power-of-Attorney for person signing, for
Surety Company must be attached to Bond.

END OF SECTION

HOLD HARMLESS AGREEMENT

OWNER: ST. JOHN THE BAPTIST PARISH
1801 West Airline Highway
LaPlace, Louisiana 70068

ENGINEER: ENVIRONMENTAL ENGINEERING SERVICES, INC.
610 Belle Terre Boulevard
LaPlace, Louisiana 70068

The Contractor shall indemnify and hold harmless the Owner and the Engineers and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expense: (a) 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 there from: and (b) is caused in whole or in part by any negligent act or omission of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not is caused in part by a party indemnified hereunder.

In any and all claims against the Owner or the Engineers, or any of their agents or employees by any employee of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may liable, the indemnification obligation under this Agreement shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under Workmen's Compensation acts, disability benefit acts or other employee benefit acts.

The obligations of the Contractor under this Agreement shall not extend to the liability of the Engineers, their agents or employees arising out of: (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications: or (2) the giving of or the failure to give directions or instructions by the Engineers, their agents or employees provided such giving or failure to give its primary cause of the injury or damage.

CONTRACTOR: _____

By: _____

WITNESSES:

_____

_____

END OF SECTION

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly authorized and acting legal representative of _____ do hereby certify as follows:

I have examined the attached contract(s) and surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements have been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

_____
SIGNATURE

_____
TYPE OR PRINT NAME

DATE _____

NOTICE OF AWARD

Dated: _____

TO: _____ (Bidder)

ADDRESS: _____

_____

PROJECT: Pleasure Bend Water System
(Insert name of Contract as it appears in the Bidding Documents)

CONTRACT NO.: EES Project No. 1520

CONTRACT FOR: Pleasure Bend Water System

You are notified that your Bid dated _____ for the above Contract has been considered. You are the apparent Successful Bidder and have been awarded a contract for:

Pleasure Bend Water System
(Indicate total Work, alternates or sections or Work awarded)

The Contract Price of your Contract is _____

_____ Dollars ($ _____)

__6__ Copies of each of the proposed Construction Contracts accompany this Notice of Award.

__3__ sets of the Drawings will be delivered separate or otherwise made available to you immediately.

You must comply with the following conditions precedent within fifteen (15) days of the date of this Notice of Award, that is by:

_____, 20__

1. You must deliver to the Owner 6 fully executed counterparts of the Agreement including all the Contract Documents. This includes the triplicate sets of Drawings. Each of the Contract Documents must bear your signature on cover and all signatory lines within the Agreement.

2. You must deliver with the executed Agreement the Contract Security (Bonds) as specified in the Instructions to Bidders (paragraph 18), General Conditions (paragraph 5.01), and Supplementary Conditions (paragraph SC-5.01).

EJCKD No. 1910-22 (1990 Edition)
Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America.

3. (List Other Conditions Precedents):

Insurance Requirements

Failure to comply with these conditions within the time specified will entitle OWNER to consider your bid in default, to annul this Notice of Award and to declare your Bid Security forfeited.

Within ten (10) days after you comply with the above conditions, OWNER will return to you one (1) fully signed counterpart of the Agreement with the Contract Documents attached.

St. John the Baptist Parish

By:_____
Natalie Robottom, Parish President

ACCEPTANCE OF AWARD

_____
(CONTRACTOR)

By:_____
(AUTHORIZED SIGNATURE)

_____
(PRINT NAME & TITLE)

_____
(DATE)

END OF SECTION

APPLICATION FOR PAYMENT NO.:_____

To:____St. John the Baptist Parish_____ (Owner)
Contract For:___Pleasure Bend Water System_____
Owner's Contract No.:_____ Engineers Project No.:____1520_____
For Work accomplished through the date of_____

Item	CONTRACTOR'S Schedule of Values			Work Completed	
	Unit Price	Quantity	Amount	Quantity	Amount
_____			$ _____		$ _____
Total			$		$
(Original Contract)					
C.O. No. 1					
C.O. No. 2					

Accompanying Documents
_____
_____
_____
_____

GROSS AMOUNT DUE	$_____
LESS_____% RETAINAGE	$_____
AMOUNT DUE TO DATE	$_____
LESS PREVIOUS PAYMENT	$_____
AMOUNT DUE THIS APPLICATION	**$_____**

CONTRACTOR'S Certification:
The undersigned CONTRACTOR certifies that: (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied to discharge in full all obligations of CONTRACTOR incurred in connection with Work covered by **prior Applications for Payment No. ___ through No. ___** inclusive; (2) title to all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all liens, claims, security interest and encumbrances (except such as are covered by Bond acceptable to OWNER indemnifying OWNER against any such lien, claim, security interest or encumbrance); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and not defective as that term is defined in the Contract Documents.

Dated _____, 20__ _____
CONTRACTOR

By: _____
(Authorized Signature)

Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

Dated _____, 20__ ENVIRONMENTAL ENGINEERING SERVICES, INC.
ENGINEER

EJCDC No. 1910-8-E (1990 Edition)
Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America.

APPLICATION FOR PAYMENT

INSTRUCTIONS

A. GENERAL INFORMATION

This standard form is intended to guide only. Many projects require a much more extensive form with space for numerous items, descriptions of Change Orders, identification of variable quantity adjustments, summary of materials and equipment stored at the site and other information. It is expected that a separate form will be developed by Engineer (See next sheet) or Contractor at the time Contractor's Schedule of Values is finalized. Note also that the format for retainage must be changed if the Agreement permits (or the Law provides), and Contractor elects, the deposit of securities in lieu of retainage. Refer to Article 14 of the General Conditions for provisions concerning payments to Contractor.

On any State or Federally funded project, payrolls for the time period of the application for payment must be included with said application for payment before it can be processed. Engineer will then forward the payrolls to the Davis-Bacon Monitor for certification which will then be forwarded to the proper State/Federal Agency.

****Any application for payment submitted for State/Federal projects without proper payrolls will be DEEMED INCOMPLETE and must be RESUBMITTED with all required documents included.****

B. COMPLETING THE FORM

The Schedule of Values, submitted and approved as provided in paragraphs 2.6.3 and 2.9 of the General Conditions should be copied in the space indicated on the Application For Payment Form. Note that the cost of materials and equipment is often listed separately from the cost of their installation. All Change Orders affecting the Contract Price should be identified and include such supplemental Schedules of Values as required for progress payments.

The form is suitable for use in the Final Application for Payment as well as for Progress Payments; however, the required accompanying documentation is usually more extensive for final payment. All accompanying documentation should be identified in the space provided on the form.

C. ENGINEER'S REVIEW

Engineer must review all Applications for Payment with care to avoid recommending any payments not yet earned by Contractor. All accompanying documentation of legal nature, such as lien waivers, should be reviewed by Owner's attorney, the Engineer should so advise Owner.

END OF SECTION

PAYMENT NO.:_____

ENGINEER'S
RECOMMENDATION FOR PAYMENT

OWNER'S Project No.: _____ ENGINEER'S Project No.: 1520

PROJECT: Pleasure Bend Water System

CONTRACTOR:_____

Contract For: Pleasure Bend Water System

Application Date: _____ Notice to Proceed Date: _____

For Period Ending: _____ Contractor's Application Requested Amount: $_____

To: St. John the Baptist Parish

Attached hereto is the CONTRACTOR's Application for Payment for Work accomplished under the Contract through the date indicated above. The Application meets the requirements of the Contract Documents and includes the CONTRACTOR's Certificate stating that all previous payments to him under the Contract have been applied by him to discharge in full all of his obligations in connection with the Work covered by all prior Applications for Payments.

In accordance with the Contract the undersigned recommends payment to the Contractor of the amount due as shown below.

ENVIRONMENTAL ENGINEERING SERVICES, INC.
Engineer

Dated: _____ By:_____
Authorized Signature

STATEMENT OF WORK

CONTRACT PRICE:

Original Contract	$_____	Work to Date:	$_____
Net Change Orders	$_____	Amount Retained:	$_____
Current Contract Price	$_____	Subtotal	$_____
Work to be Done	$_____	Previous Payments Recommended	$_____
		Amount Due this Payment	**$_____**

CONTRACT TIME*:

	CALENDAR DAYS Substantial/Final Completion
CONTRACT TIME (including all change orders)	_____
CONTRACT TIME ELAPSED	_____
CONTRACT TIME REMAINING	_____

*Effective date as of Engineer's Signature

CC: CONTRACTOR
FILE

END OF SECTION

CHANGE ORDER

(Instructions on next sheet) NO._____

PROJECT: Pleasure Bend Water System

DATE OF ISSUANCE: _____ EFFECTIVE DATE: Date of Owner's Signature

OWNER: St. John the Baptist Parish OWNER'S Contract No.:_____

ENGINEER: Environmental Engineering Services, Inc. ENGINEER'S Project No.: 1520

CONTRACTOR: _____

You are directed to make the following changes in the Contract Documents:

Description:

Reason for Change Order:

Attachments (List documents supporting changes):

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price	Original Contract Times Substantial Completion:_____ Ready for Final Payment: _____
Net changes from previous Change Orders No. ____ to No. ____	Net changes from previous Change Orders No. ____ to No. ____ Days _____
Contract Price prior to this Change Order	Contract Times prior to this Change Order Substantial Completion:_____ Ready for Final Payment:_____
Net Increase (Decrease) of this Change Order	Net Increase (Decrease) of this Change Order Days _____
Contract Price with all approved Change Orders	Contract Times with all approved Change Orders Substantial Completion:_____ Ready for Final Payment:_____

RECOMMENDED:	APPROVED:	ACCEPTED:
ENVIRONMENTAL ENGINEERING SERVICES, INC.		**ST. JOHN THE BAPTIST PARISH, LA**
By:_____	By:_____	By:_____
Engineer (Authorized Signature)	Contractor (Authorized Signature)	Owner (Natalie Robottom, Parish President)
Date:_____	Date:_____	Date:_____

EJCDC No. 1910-8-B (1990 Edition)
Prepared by the Engineers Joint Contract Documents and endorsed by the Associated General Contractors of America.

CHANGE ORDER

INSTRUCTION

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Contract Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating change order items to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order may be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner or both.

Once Engineer has completed and signed the form, all copies should be sent to Contractor for approval. After approval by Contractor, all copies should be sent to Owner for approval. Engineer should make distribution of executed copies after approval by Owner.

If a change only applies to Contract Price or to Contract Times, cross out the part of the tabulation that does not apply.

END OF SECTION

WORK CHANGE DIRECTIVE

(Instructions on next sheet) NO. _____

PROJECT: Pleasure Bend Water System

DATE OF ISSUANCE: _____ EFFECTIVE DATE: _____

OWNER: St. John the Baptist Parish OWNER'S Contract No.: _____

ENGINEER: Environmental Engineering Services, Inc. ENGINEER'S Project No.: 1520

CONTRACTOR: _____

You are directed to proceed promptly with the following change(s):

Description:

Purpose of Work Change Directive:

Attachments: (List documents supporting change)

If a claim is made that the above change(s) have affected the Contract Price or Contract Times any claim for a change order based thereon will involve one or more of the following methods of determining the effect of the change(s).

Method of determining change in Contract Price:
Unit Prices
Other _____
Lump Sum

Estimated increase (decrease in Contract Price:
$_____

If the change involves an increase, the estimated amount is not be exceeded without further authorization.

Method of determining change in Contract Times:
Contractor's Records
Other _____
Engineer's Records

Estimated increase (decrease) in Contract Times:
Substantial Completion: _____ days;
Ready for Final Payment: _____days.
If the change involves an increase, the estimated times are not to be exceeded with further authorization.

RECOMMENDED:

ENVIRONMENTAL ENGINEERING SERVICES, INC.
ENGINEER

By: _____
(Authorized Signature)

AUTHORIZED:

ST. JOHN THE BAPTIST PARISH
OWNER

By: _____
Natalie Robottom, Parish President

EJCDC No. 1910-8-F (1990 Edition) Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America.

WORK CHANGE DIRECTIVE

INSTRUCTIONS

A. GENERAL INFORMATION

This document was developed for use in situations involving changes in the Work, which, if not processed expeditiously, might delay the Project. These changes are often initiated in the field and may affect the Contract Price or the Contract Times. This is not a Change Order, but only a directive to proceed with Work that may be included in a subsequent Change Order.

For supplemental instructions and minor changes not involving a possible change in the Contract Price or the Contract Times a Field Order may be used.

B. COMPLETING THE WORK CHANGE DIRECTIVE FORM

Engineer initiates the form, including a description of the items involved and attachments.

Based on conversations between Engineer and Contractor, Engineer completes the following:

> METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT PRICE: Mark the method to be used in determining the final cost of Work involved and the estimated net effect on the Contract Price. If the change involves an increase in the Contract Price and the estimated amount is approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the estimated price or Contractor may stop the change Work when the estimated price is reached. If the Work Change Directive is not likely to change the Contract Price, the space for estimated increase (decrease) should be marked "Not Applicable".
>
> METHOD OF DETERMINING CHANGE, IF ANY IN CONTRACT TIMES: Mark the method to be used in determining the change in Contract Times and the estimated increase or decrease in Contract Times. If the change involves an increase in the Contract Times and the estimated times are approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the times or Contractor may stop the changed Work when the estimated times are reached. If the Work change Directive is not likely to change the Contract Times, the space for the estimated increase (decrease) should be marked "Not Applicable".

Once Engineer has completed and signed the form, all copies should be sent to Owner for authorization because Engineer alone does not have authority to authorize changes in Price or Times. Once authorized by Owner, a copy should be sent by Engineer to Contractor. Price and Times may only be changed by Change Order signed by Owner and Contractor with Engineer's recommendation.

Once the Work covered by this directive is completed or final cost and times are determined, Contractor should submit documentation for inclusion in a Change Order.

THIS IS A DIRECTIVE TO PROCEED WITH A CHANGE THAT MAY AFFECT THE CONTRACT PRICE OR THE CONTRACT TIMES, A CHANGE ORDER, IF ANY, SHOULD BE CONSIDERED PROMPTLY.

END OF SECTION

CERTIFICATE OF SUBSTANTIAL COMPLETION

DATE OF ISSUANCE: _____

PROJECT: Pleasure Bend Water System

OWNER: St. John the Baptist Parish OWNER'S Contract No.: _____

ENGINEER: Environmental Engineering Services, Inc. ENGINEER'S Project No.: 1520

CONTRACTOR: _____

This Certificate of Substantial Completion applies to Work under the Contract Documents or to the following specified parts thereof:

TO: St. John the Baptist Parish
Owner

And TO: _____
Contractor

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

_____
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within 45 days of the above date of Substantial Completion.

EJCEC No. 1910-8-D (1990 Edition)
Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as follows:

RESPONSIBILITIES:

OWNER: As outlined in the Contract Documents

CONTRACTOR: As outlined in the Contract Documents

The following documents are attached to and made a part of this Certificate:

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by **ENGINEER** on _____, 20__

ENVIRONMENTAL ENGINEERING SERVICES, INC.
ENGINEER

BY:_____
Authorized Signature

CONTRACTOR accepts this Certificate of Substantial Completion on _____, 20__

_____
CONTRACTOR

BY:_____
Authorized Signature

OWNER accepts this Certificate of Substantial Completion on _____, 20__

ST. JOHN THE BAPTIST PARISH
OWNER

BY:_____
Natalie Robottom, Parish President

END OF SECTION

CONTRACT CONDITIONS

GENERAL CONDITIONS

STANDARD
GENERAL CONDITONS
OF THE
CONSTRUCTION CONTRACT

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

STANDARD GENERAL CONDITIONS
TABLE OF CONTENTS

PAGE

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY……00700-7

1.01 Defined Terms……00700-7

1.02 Terminology……00700-9

ARTICLE 2 – PRELIMINARY MATTERS……00700-10

2.01 Delivery of Bonds and Evidence of Insurance……00700-10

2.02 Copies of Documents……00700-10

2.03 Commencement of Contract Times; Notice to Proceed……00700-10

2.04 Starting the Work……00700-10

2.05 Before Starting Construction……00700-10

2.06 Preconstruction Conference……00700-10

2.07 Initial Acceptance of Schedules……00700-10

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, AND REUSE ……00700-10

3.01 Intent……00700-10

3.02 Reference Standards……00700-11

3.03 Reporting and Resolving Discrepancies……00700-11

3.04 Amending and Supplementing Contract Documents……00700-11

3.05 Reuse of Documents……00700-11

3.06 Electronic Data……00700-12

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS……00700-12

4.01 Availability of Lands……00700-12

4.02 Subsurface and Physical Conditions……00700-12

4.03 Differing Subsurface or Physical Conditions……00700-12

4.04 Underground Facilities ……00700-13

4.05 Reference Points……00700-14

4.06 Hazardous Environmental Condition at Site……00700-14

ARTICLE 5 – BONDS AND INSURANCE……00700-15

5.01 Performance, Payment, and Other Bonds……00700-15

5.02 Licensed Sureties and Insurers……00700-15

5.03 Certificates of Insurance……00700-15

5.04 CONTRACTOR's Liability Insurance……00700-15

5.05 OWNER's Liability Insurance……00700-16

5.06 Property Insurance……00700-16

5.07 Waiver of Rights……00700-17

5.08 Receipt and Application of Insurance Proceeds……00700-17

5.09 Acceptance of Bonds and Insurance; Option to Replace……00700-17

5.10 Partial Utilization, Acknowledgment of Property Insurer……00700-18

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES 00700-18

6.01 Supervision and Superintendence.....00700-18

6.02 Labor; Working Hours.....00700-18

6.03 Services, Materials, and Equipment.....00700-18

6.04 Progress Schedule.....00700-18

6.05 Substitutes and "Or-Equals" 00700-19

6.06 Concerning Subcontractors, Suppliers, and Others.....00700-20

6.07 Patent Fees and Royalties.....00700-21

6.08 Permits.....00700-21

6.09 Laws and Regulations.....00700-21

6.10 Taxes.....00700-21

6.11 Use of Site and Other Areas.....00700-21

6.12 Record Documents.....00700-22

6.13 Safety and Protection.....00700-22

6.14 Safety Representative.....00700-22

6.15 Hazardous Communication Programs.....00700-22

6.16 Emergencies.....00700-22

6.17 Shop Drawings and Samples.....00700-22

6.18 Continuing the Work.....00700-23

6.19 CONTRACTOR's General Warranty and Guarantee.....00700-24

6.20 Indemnification.....00700-24

6.21 Delegation of Professional Design Services.....00700-24

ARTICLE 7 – OTHER WORK AT THE SITE.....00700-25

7.01 Related Work at Site 00700-25

7.02 Coordination.....00700-25

7.03 Legal Relationships.....00700-25

ARTICLE 8 – OWNER'S RESPONSIBILITIES.....00700-25

8.01 Communications to CONTRACTOR.....00700-25

8.02 Replacement of ENGINEER.....00700-25

8.03 Furnish Data.....00700-25

8.04 Pay When Due.....00700-25

8.05 Lands and Easements; Reports and Tests.....00700-26

8.06 Insurance.....00700-26

8.07 Change Orders.....00700-26

8.08 Inspections, Tests, and Approvals.....00700-26

8.09 Limitations on OWNER's Responsibilities.....00700-26

8.10 Undisclosed Hazardous Environmental Condition.....00700-26

8.11 Evidence of Financial Arrangements.....00700-26

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION……..….....00700-26

9.01 OWNER'S Representative…….....….....00700-26

9.02 Visits to Site…….....….....00700-26

9.03 Project Representative…….....….....00700-26

9.04 Authorized Variations in Work…….....….....00700-26

9.05 Rejecting Defective Work…….....….....00700-27

9.06 Shop Drawings, Change Orders and Payments…….....….....00700-27

9.07 Determinations for Unit Price Work…….....….....00700-27

9.08 Decisions on Requirements of Contract Documents and Acceptability of Work…….....….....00700-27

9.09 Limitations on ENGINEER's Authority and Responsibilities…….....….....00700-27

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS…….....….....00700-28

10.01 Authorized Changes in the Work…….....….....00700-28

10.02 Unauthorized Changes in the Work……...….....00700-28

10.03 Executive of Change Orders…….....….....00700-28

10.04 Notification to Surety…….....….....00700-28

10.05 Claims…….....….....00700-28

ARTICLE 11 – COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK…….....00700-29

11.01 Cost of the Work…….....….....00700-29

11.02 Allowances…….....….....00700-30

11.03 Unit Price Work…….....….....00700-30

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES…….....….....00700-31

12.01 Change of Contract Price…….....….....00700-31

12.02 Change of Contract Times…….....….....00700-31

12.03 Delays…….....….....00700-31

ARTICLE 13 – TESTS & INSPECTION; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK..... 00700 – 32

13.01 Notice of Defects…….....….....00700-32

13.02 Access to Work…….....….....00700-32

13.03 Tests and Inspections…….....….....00700-32

13.04 Uncovering Work…….....….....00700-32

13.05 OWNER May Stop the Work…….....….....00700-33

13.06 Correction or Removal of Defective Work…….....….....00700-33

13.07 Correction Period…….....….....00700-33

13.08 Acceptance of Defective Work…….....….....00700-33

13.09 OWNER May Correct Defective Work…….....….....00700-34

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION…….....….....00700-34

14.01 Schedule of Values…….....….....00700-34

14.02 Progress Payments…….....….....00700-34

14.03 CONTRACTOR's Warranty of Title…….....….....00700-35

14.04 Substantial Completion…….....….....00700-36

14.05 Partial Utilization…….....….....00700-36

14.06 Final Inspection…….....….....00700-36

14.07 Final Payment…….....….....00700-36

14.08 Final Completion Delayed…….....….....00700-37

14.09 Waiver of Claims…….....….....00700-37

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION.....….....….....00700-37

15.01 OWNER May Suspend Work…….....….....00700-38

15.02 OWNER May Terminate for Cause…….....….....00700-38

15.03 OWNER May Terminate for Convenience…….....….....00700-38

15.04 CONTRACTOR May Stop Work or Terminate…….....….....00700-38

ARTICLE 16 – DISPUTE RESOLUTION…….....….....00700-39

16.01 Methods and Procedures…….....….....00700-39

ARTICLE 17 – MISCELLANEOUS…….....….....00700-39

17.01 Giving Notice…….....….....00700-39

17.02 Computation of Times…….....….....00700-39

17.03 Cumulative Remedies…….....….....00700-39

17.04 Survival of Obligations…….....….....00700-39

17.05 Controlling Law…….....….....00700-39

17.06 Headings…….....….....00700-39

END OF SECTION

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

GENERAL CONDITIONS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*– Written or graphic instruments issued prior to the opening of Bids, which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*– The written instrument which is evidence of the agreement between OWNER and CONTRACTOR covering the Work.

3. *Application for Payment*– The form acceptable to ENGINEER which is to be used by CONTRACTOR during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*– Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*– The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*– The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*–The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*– The Advertisement or Invitation to Bid, Instructions to Bidders, bid security acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*– A document recommended by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*– A demand or assertion by OWNER or CONTRACTOR seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*– The entire and integrated written agreement between the OWNER and CONTRACTOR concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*– Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other CONTRACTOR's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*– The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*– The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment.

15. *CONTRACTOR*– The individual or entity with whom OWNER has entered into the Agreement.

16. *Cost of the Work*– See Paragraph 11.01.A for definition.

17. *Drawings*– That part of the Contract Documents prepared or approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other CONTRACTOR submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*– The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *ENGINEER*– The individual or entity named as such in the Agreement.

20. *Field Order*– A written order issued by ENGINEER which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*– Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition*– The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

EJCDC C-700 Standard General Conditions of the Construction Contract
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

23. *Hazardous Waste*– The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*– Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*– Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*– A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*– The written notice by OWNER to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

28. *Notice to Proceed*– A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform the Work under the Contract Documents.

29. *OWNER*– The individual or entity with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs* – Polychlorinated biphenyls.

31. *Petroleum*– Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*– A schedule, prepared and maintained by CONTRACTOR, describing the sequence and duration of the activities comprising the CONTRACTOR's plan to accomplish the Work within the Contract Times.

33. *Project*– The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*– The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*– Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity*– An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*– The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

38. *Samples*– Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Schedule of Submittals*– A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*– A schedule, prepared and maintained by CONTRACTOR, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing CONTRACTOR's Applications for Payment.

41. *Shop Drawings*– All drawings, diagrams, illustrations, schedules, and other data or information, which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

42. *Site*– Lands or areas indicated in the Contract Documents as being furnished by OWNER upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by OWNER which are designated for the use of CONTRACTOR.

43. *Specifications*– That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

44. *Subcontractor*– An individual or entity having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion*– The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder*– The Bidder submitting a responsive Bid to whom OWNER makes an award.

47. *Supplementary Conditions*– That part of the Contract Documents, which amends or supplements these General Conditions.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

48. *Supplier*– A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

49. *Underground Facilities*– All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work*– Work to be paid for on the basis of unit prices.

51. *Work*– The entire completed construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*– A written statement to CONTRACTOR issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. *Intent of Certain Terms or Adjectives*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed," or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of ENGINEER as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*

1. The word "defective", when modifying the word "Work", refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents, or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or

c. has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish", when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install", when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide", when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish", "install", "perform", or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of CONTRACTOR, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases, which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. When CONTRACTOR delivers the executed counterparts of the Agreement to OWNER, CONTRACTOR shall also deliver to OWNER such bonds as CONTRACTOR may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, CONTRACTOR and OWNER shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which CONTRACTOR and OWNER respectively are required to purchase and maintain in accordance with Article 5.

2.02 Copies of Documents

A. OWNER shall furnish to CONTRACTOR up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 Starting the Work

A. CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 Before Starting Construction

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its timely review:

1. a preliminary Progress Schedule; indicating the times (number of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 Preconstruction Conference

A. Before any Work at the is started, a conference attended by OWNER, CONTRACTOR, ENGINEER, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 Initial Acceptance of Schedules

A. At least 10 days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to review for acceptability to ENGINEER as provided below the schedules submitted in accordance with Paragraph 2.05.A. CONTRACTOR shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until acceptable schedules are submitted to ENGINEER.

1. The Progress Schedule will be acceptable to ENGINEER if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on ENGINEER responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefor.

2. CONTRACTOR's Schedule of Submittals will be acceptable to ENGINEER if it provides a workable arrangement for reviewing and processing the required submittals.

3. CONTRACTOR's Schedule of Values will be acceptable to ENGINEER as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 Intent

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to OWNER.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

C. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in Article 9.

3.02 Reference Standards

A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), 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 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.

3.03 Reporting and Resolving Discrepancies

A. *Reporting Discrepancies*

1. *CONTRACTOR's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy, which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby.

2. *CONTRACTOR's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall promptly report it to ENGINEER in writing. CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless CONTRACTOR knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 Amending and Supplementing Contract Documents

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. ENGINEER's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. ENGINEER's written interpretation or clarification.

3.05 Reuse of Documents

A. CONTRACTOR and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR, shall not:

1. 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 ENGINEER or ENGINEER's Consultant, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaption by ENGINEER.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

3.06 Electronic Data

A. Copies of data furnished by OWNER or ENGINEER to CONTRACTOR or CONTRACTOR to OWNER or ENGINEER that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE **4** – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 Availability of Lands

A. OWNER shall furnish the Site. OWNER shall notify CONTRACTOR of any encumbrances or restrictions not of general application but specifically related to use of the Site with which CONTRACTOR must comply in performing the Work. OWNER will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If CONTRACTOR and OWNER are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in OWNER's furnishing the Site or a part thereof, CONTRACTOR may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and OWNER's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 Subsurface and Physical Conditions

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that ENGINEER has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data", CONTRACTOR may not rely upon or make any claim against OWNER or ENGINEER, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 Differing Subsurface of Physical Conditions

A. *Notice*: If CONTRACTOR believes that any subsurface of physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *ENGINEER's Review*: After receipt of written notice as required by Paragraph 4.03.A, ENGINEER will promptly review the pertinent condition, determine the necessity of OWNER's obtaining additional exploration or tests with respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in CONTRACTOR's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR's making such final commitment; or

c. CONTRACTOR failed to give the written notice within the time and as required by Paragraph 4.03.A.

3. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefore as provided in Paragraph 10.05. However, OWNER, ENGINEER, and any of their Related Entities shall not be liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

4.04 Underground Facilities

A. *Shown or Indicated*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities, including OWNER, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and CONTRACTOR shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including OWNER, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility.

2. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price of Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, OWNER or CONTRACTOR may make a Claim therefore as provided in Paragraph 10.05.

4.05 Reference Points

A. OWNER shall provide engineering surveys to establish reference points for construction, which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 Hazardous Environmental Condition at Site

A. *Reports and Drawings*: Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized*: CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data", CONTRACTOR may not rely upon or make any claim against OWNER or ENGINEER, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site, which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

D. If CONTRACTOR encounters a Hazardous Environmental Condition or if CONTRACTOR or anyone for whom CONTRACTOR is responsible creates a Hazardous Environmental Condition, CONTRACTOR shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16A); and (iii) notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. CONTRACTOR shall not be required to resume Work in connection with such condition or in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resume safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work is agreed to be resumed by CONTRACTOR, either party may make a Claim therefore as provided in Paragraph 10.05.

F. If after receipt of such written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this Paragraph 4.06.G shall obligate OWNER to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

H. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this Paragraph 4.06.H shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE **5** – BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

A. CONTRACTOR shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These bonds shall remain in effect at least until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

C. If the surety on any bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, CONTRACTOR shall promptly notify OWNER and ENGINEER and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 Licensed Sureties and Insurers

A. All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 Certificates of Insurance

A. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain.

B. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured), which OWNER is required to purchase and maintain.

5.04 CONTRACTOR's Liability Insurance

A. CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed by CONTRACTOR, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

a. by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or

b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

B. The policies of insurance so required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) OWNER and ENGINEER, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering CONTRACTOR's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 OWNER's Liability Insurance

A. In addition to the insurance required to be provided by CONTRACTOR under Paragraph 5.04, OWNER, at OWNER's option, may purchase and maintain at OWNER's expense OWNER's own liability insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

5.06 Property Insurance

A. Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of OWNER, CONTACTOR, Subcontractors, ENGINEER, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by OWNER prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by ENGINEER;

5. allow for partial utilization of the Work by OWNER;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR, and ENGINEER with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. OWNER shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of CONTRACTOR, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by CONTRACTOR, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order. Prior to commencement of the Work at the Site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

5.07 Waiver of Rights

A. OWNER and CONTRACTOR intend that all policies purchased in accordance with Paragraph 5.06 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies 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 insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all 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, in addition, waive all such rights against Subcontractors, ENGINEER, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each any of them) under such policies for losses and damages so caused. 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 trustee or otherwise payable under any policy so issued.

B. OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to OWNER's property or the Work caused by, arising out of, or resulting from fire or other peril whether or not insured by OWNER; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against CONTRACTOR, Subcontractors, ENGINEER, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 Receipt and Application of Insurance Proceeds

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. OWNER shall deposit in a separate account 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 covered by an appropriate Change Order.

B. OWNER as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to OWNER's exercise of this power. If such objection were made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached. OWNER as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest. OWNER as fiduciary shall give bond for the proper performance of such duties.

5.09 Acceptance of Bonds and Insurance: Option to Replace

A. If either OWNER or CONTRACTOR has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by

EJCDC C-700 Standard General Conditions of the Construction Contract
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 Partial Utilization, Acknowledgment of Property Insurer

A. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 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, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE **6** – CONTRACTOR'S RESPONSIBILITIES

6.01 Supervision and Superintendence

A. 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 Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. CONTRACTOR shall not be responsible for the negligence of OWNER or ENGINEER in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

6.02 Labor; Working Hours

A. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out the Work and perform construction as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. CONTRACTOR will not permit the performance of Work on Saturday, Sunday, or any legal holiday without OWNER's written consent (which will not be unreasonably withheld) given after prior written notice to ENGINEER.

6.03 Services, Materials, and Equipment

A. Unless otherwise specified in the General Requirements, CONTRACTOR shall provide and assume full responsibility for all services, 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 performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 Progress Schedule

A. CONTRACTOR shall adhere to the progress schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

6.05 Substitutes and "Or-Equals"

A. 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 Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances described below.

1. *"Or-Equal" Items:* If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so name if:

a. in the exercise of reasonable judgment ENGINEER determines that:

1) it is at least equal in materials of constructions, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. CONTRACTOR certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the OWNER or increase in Contract Times and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items*

a. If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.

c. The procedure for review by ENGINEER will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

d. CONTRACTOR shall first make written application to ENGINEER for review of a proposed substitute item of material or equipment that CONTRACTOR seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified,

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute item; and

c) whether of not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services;

4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or 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 furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

Documents. The requirements for review by ENGINEER will be similar to that provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation*: ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER's review is complete, which will be evidenced by either a Change Order for a substitute of an approved Shop Drawing for "or equal". ENGINEER will advise CONTRACTOR in writing of any negative determination.

D. *Special Guarantee*: OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.

E. *ENGINEER's Cost Reimbursement*: ENGINEER will record ENGINEER's costs in evaluating substitute proposed or submitted by CONTRACTOR pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER for evaluating each such proposed substitute. CONTRACTOR shall also reimburse OWNER for the charges of ENGINEER for making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER) resulting from the acceptance of each proposed substitute.

F. *CONTRACTOR's Expense*: CONTRACTOR shall provide all data in support of any proposed substitute or "or-equal" at CONTRACTOR's expense.

6.06 Concerning Subcontractors, Suppliers, and Others

A. CONTRACTOR shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to OWNER as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom OWNER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to OWNER in advance for acceptance by OWNER by a specified date prior to the Effective Date of the Agreement, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. CONTRACTOR shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver any right of OWNER or ENGINEER to reject defective Work.

C. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other individual or entity, nor

2. shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR.

E. CONTRACTOR shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with ENGINEER through CONTRACTOR.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier, which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

6.07 Patent Fees and Royalties

A. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, and the officers, directors, partners, employees or agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 Permits

A. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. OWNER shall pay all charges of utility owners for connections providing permanent service to the Work.

6.09 Laws and Regulations

A. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

B. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work may be the subject of an adjustment in Contract Price or Contract Times. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefore as provided in Paragraph 10.05.

6.10 Taxes

A. CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project, which are applicable during the performance of the Work.

6.11 Use of Site and Other Areas

A. *Limitation on Use of Site and Other Areas*

1. CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or area resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of 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.

3. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, ENGINEER, or any other party indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the Work.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work CONTRACTOR shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work CONTRACTOR shall clean the Site and make it ready for utilization by OWNER. At the completion of the Work CONTRACTOR shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures*: CONTRACTOR shall not load nor 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.

6.12 Record Documents

A. CONTRACTOR shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to ENGINEER for OWNER.

6.13 Safety and Protection

A. CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. 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 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 trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property 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 Facilities and other 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.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. CONTRACTOR's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 Safety Representative

A. CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 Hazard Communication Programs

A. 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 Laws or Regulations.

6.16 Emergencies

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, CONTRACTOR is obligated to act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER prompt written notice in CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 Shop Drawings and Samples

A. CONTRACTOR shall submit Shop Drawings and Samples to ENGINEER for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as ENGINEER may require.

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show ENGINEER the services, materials, and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:* CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to ENGINEER's review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR.

C. *Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to CONTRACTOR's responsibilities for means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto; and

d. shall also have 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. Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

3. With each submittal, CONTRACTOR shall give ENGINEER specific written notice of such 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 Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

D. *ENGINEER's Review*

1. ENGINEER will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to ENGINEER. ENGINEER's review and approval will be only to determine if the items covered by the submittals 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.

2. 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.

3. 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 Paragraph 6.17.C.3 and ENGINEER has given written notification thereof incorporated in or accompanying the Shop Drawing or Sample. ENGINEER's review and approval shall not relieve CONTRACTOR from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures*

1. CONTRACTOR shall make corrections required by 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 ENGINEER on previous submittals.

6.18 Continuing the Work

A. CONTRACTOR shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as OWNER and CONTRACTOR may otherwise agree in writing.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

6.19 CONTRACTOR's General Warranty and Guarantee

A. CONTRACTOR warrants and guarantees to OWNER that all Work will be in accordance with the Contract Documents and will not be defective. ENGINEER and its Related Entities shall be entitled to rely on representation of CONTRACTOR's warranty and guarantee.

B. 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, Suppliers, or any other individual or entity for whom CONTRACTOR is responsible; or

2. normal wear and tear under normal usage.

C. CONTRACTOR's obligation to perform and complete the Work 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 ENGINEER;

2. recommendation by ENGINEER or payment by OWNER of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by ENGINEER or any payment related thereto by OWNER;

4. use or occupancy of the Work or any part thereof by OWNER;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by OWNER.

6.20 Indemnification

A. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage 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 but only to the extent caused by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of CONTRACTOR under Paragraph 6.20.A shall not extend to the liability of ENGINEER and ENGINEER's officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 Delegation of Professional Design Services

A. CONTRACTOR will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out CONTRACTOR's responsibilities for construction means, methods, techniques, sequences and procedures. CONTRACTOR shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of CONTRACTOR by the Contract Documents, OWNER and ENGINEER will specify all performance and design criteria that such services must satisfy. CONTRACTOR shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to ENGINEER.

C. OWNER and ENGINEER shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided OWNER and ENGINEER have specified to CONTRACTOR all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, ENGINEER's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept express in the Contract Documents. ENGINEER's review and

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose state in Paragraph 6.17.D.1.

E. CONTRACTOR shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 Related Work at Site

A. OWNER may perform other work related to the Project at the Site by OWNER's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to CONTRACTOR prior to starting any such other work; and

2. if OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefore as provided in Paragraph 10.05.

B. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner and OWNER, if OWNER is performing the other work with OWNER's employees proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. CONTRACTOR shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly 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 written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

C. If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and promptly report to ENGINEER 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 so 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.

7.02 Coordination

A. If OWNER intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility for such coordination.

7.03 Legal Relationships

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of OWNER.

B. Each other direct contract of OWNER and under Paragraph 7.01.A shall provide that the other contractor is liable to OWNER and CONTRACTOR for the reasonable direct delay and disruption costs incurred by CONTRACTOR as a result of the other contractor's actions or inactions.

C. CONTRACTOR shall be liable to OWNER and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of CONTRACTOR's action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 Communications to Contractor

A. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.02 Replacement of ENGINEER

A. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer to whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.03 Furnish Data

A. OWNER shall promptly furnish the data required of OWNER under the Contract Documents.

8.04 Pay When Due

A. OWNER shall make payments to CONTRACTOR promptly when they are due as provided in Paragraphs 14.02.C and 14.07.C.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

8.05 Lands and Easements; Reports and Tests

A. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

8.06 Insurance

A. OWNER's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 Change Orders

A. OWNER is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 Inspections, Tests, and Approvals

A. OWNER's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 Limitations on OWNER's Responsibilities

A. The OWNER shall not supervise, direct, or have control or authority over, nor be responsible for, CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. OWNER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

8.10 Undisclosed Hazardous Environmental Condition

A. OWNER's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 Evidence of Financial Arrangements

A. If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 OWNER's Representative

A. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and will not be changed without written consent of OWNER and ENGINEER.

9.02 Visits to Site

A. ENGINEER will make visits to the Site at intervals appropriate to the various stages of construction, as 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, ENGINEER, for the benefit of OWNER, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. 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 observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work.

B. ENGINEER's visits and observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of ENGINEER's visits or observations of CONTRACTOR's Work 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, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work.

9.03 Project Representative

A. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If OWNER designates another representative or agent to represent OWNER at the Site who is not ENGINEER's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 Authorized Variations in Work

A. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents, which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR, who shall perform the Work involved

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

promptly. If OWNER and CONTRACTOR believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 Rejecting Defective Work

A. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be defective, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 Shop Drawings, Change Orders and Payments

A. In connection with ENGINEER's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with ENGINEER's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with ENGINEER's authority as to Change Orders, see Article 10, 11, and 12.

D. In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

9.07 Determinations for Unit Price Work

A. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decision thereon will be final and binding (except as modified by ENGINEER to reflect changed factual conditions or more accurate data) upon OWNER and CONTRACTOR, subject to the provisions of Paragraph 10.05.

9.08 Decisions on Requirements of Contract Documents and Acceptability of Work

A. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between OWNER and CONTRACTOR arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to ENGINEER in writing within 30 days of the event giving rise to the question.

B. ENGINEER will, with reasonable promptness, render a written decision on the issue referred. If OWNER or CONTRACTOR believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of ENGINEER's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. ENGINEER's written decision on the issue referred will be final and binging on OWNER and CONTRACTOR, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 Limitations on ENGINEER's Authority and Responsibilities

A. Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by ENGINEER shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. 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, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

C. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies 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.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.10 shall also apply to, Resident Project Representative, if any, and assistants, if any.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

10.01 Authorized Changes in the Work

A. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If OWNER and CONTRACTOR are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive; a Claim may be made therefore as provided in Paragraph 10.05.

10.02 Unauthorized Changes in the Work

A. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 Execution of Change Orders

A. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER covering:

1. changes in the Work which are: (i) ordered by OWNER pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or OWNER's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in Paragraph 6.18.A.

10.04 Notification to Surety

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility. The amount of each applicable Bond will be adjusted to reflect the effect of any such change.

10.05 Claims

A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the ENGINEER for decision. A decision by ENGINEER shall be required as a condition precedent to any exercise by OWNER or CONTRACTOR of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to ENGINEER and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the ENGINEER and the other party to the Contract within 60 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

C. *ENGINEER's Action*: ENGINEER will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the ENGINEER is unable to resolve the Claim if, in the ENGINEER's sole discretion, it would be inappropriate for the ENGINEER to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that ENGINEER does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. ENGINEER's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon OWNER and CONTRACTOR, unless OWNER or CONTRACTOR invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE **11** – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 Cost of the Work

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to CONTRACTOR will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitations superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, worker's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by OWNER.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Supplier's field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

3. Payments made by CONTRACTOR to Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER, who will then determine, with the advice of ENGINEER, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as CONTRACTOR's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of CONTRACTOR'S employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of CONTRACTOR.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor, or anyone directly of indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by CONTRACTOR in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages, and expenses shall be included in the Cost of the Work for

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

the purpose of determining CONTRACTOR's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressage, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance CONTRACTOR is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by CONTRACTOR, whether at the Site or in CONTRACTOR's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site.

3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

4. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. *CONTRACTOR's Fee:* When all the Work is performed on the basis of cost-plus, CONTRACTOR's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, CONTRACTOR's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determine pursuant to Paragraphs 11.01.A and 11.01.B, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

11.02 Allowances

A. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums as may be acceptable to OWNER and ENGINEER.

B. *Cash Allowances*

1. CONTRACTOR agrees that:

a. the cash allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. CONTRACTOR's costs for unloading and handling on the Site, labor, installation costs, overhead, profit, and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*

1. CONTRACTOR agrees that a contingency allowance, if any, is for the sole use of OWNER to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

D. OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

1. the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense or OWNER believes that OWNER is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE **12** – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 Change of Contract Price

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the ENGINEER and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a CONTRACTOR's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *CONTRACTOR's Fee*: The CONTRACTOR's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the CONTRACTOR's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the CONTRACTOR's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C2.e, inclusive.

12.02 Change of Contract Times

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or of any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 Delays

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of CONTRACTOR, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefore as provided in Paragraph 12.02.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If OWNER, ENGINEER, or other contractors or utility owners performing other work for OWNER as contemplated by Article 7, or anyone for whom OWNER is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then CONTRACTOR shall be entitled to an equitable adjustment in the Contract Price or the Contract

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

Times, or both. CONTRACTOR's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to CONTRACTOR's ability to complete the Work within the Contract Times.

C. If CONTRACTOR is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of OWNER, or other causes not the fault of and beyond control of OWNER and CONTRACTOR, then CONTRACTOR shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to CONTRACTOR's ability to complete the Work within the Contract Times. Such an adjustment shall be CONTRACTOR's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. OWNER, ENGINEER and the Related Entities of each of them shall not be liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and charges of ENGINEERS, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

E. CONTRACTOR shall not be entitled to an adjustment in Contact Price or Contract Times for delays within the control of CONTRACTOR. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

ARTICLE **13** – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

A. Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

A. OWNER, ENGINEER, their consultants and other representatives and personnel of OWNER, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, 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.

13.03 Tests and Inspections

A. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. OWNER shall employ and pay for the 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 Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C.; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish ENGINEER the required certificates of inspection or approval.

D. CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to OWNER and ENGINEER.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E. shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.04 Uncovering Work

A. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

B. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that such Work is defective, CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection,

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefore as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a Claim therefore as provided in Paragraph 10.05.

13.05 OWNER May Stop the Work

A. If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to 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 on the part of OWNER to exercise this right for the benefit of CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 Correction or Removal of Defective Work

A. Promptly after receipt of notice, CONTRACTOR shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the Project and replace it with Work that is not defective. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, CONTRACTOR shall take no action that would void or otherwise impair OWNER's special warranty and guarantee, if any, on said Work.

13.07 Correction Period

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for CONTRACTOR's use by OWNER or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or,

3. if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective; and,

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. CONTRACTOR's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 Acceptance of Defective Work

A. If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER's recommendation of final payment, ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to OWNER's evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by CONTRACTOR pursuant to this sentence. If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and OWNER shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefore as provided in

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

13.09 OWNER May Correct Defective Work

A. If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with Paragraph 13.06.A, 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 days written notice to CONTRACTOR, correct and remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, OWNER shall proceed expeditiously. In connection with such corrective and 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, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the Site, 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, OWNER's representatives, agents and employees, OWNER's other contractors, and ENGINEER and ENGINEER's consultants access to the Site to enable OWNER to exercise the rights and remedies under this Paragraph.

C. All Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by OWNER in exercising the rights and remedies under this Paragraph 13.09 will be charged against CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, OWNER may make a Claim therefore as provided in Paragraph 10.05. 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.

D. CONTRACTOR shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies under this Paragraph 13.09.

ARTICLE **14** – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values

A. The schedule of values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 Progress Payments

A. *Applications for Payments*

1. At least 20 days before the date established for each progress payment (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and 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 also be accompanied by a bill of sale, invoice, or other documentation warranting that OWNER has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect OWNER's interest therein, all of which must be satisfactory to OWNER.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of CONTRACTOR stating that all previous progress payments received on account of the Work have been applied on account to discharge CONTRACTOR's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. ENGINEER will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application.

2. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's observations on the Site of the executed Work as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules, that to the best of ENGINEER's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. 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

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to CONTRACTOR's being entitled to such payment appear to have been fulfilled in so far as it is ENGINEER's responsibility to observe the Work.

3. By recommending any such payment ENGINEER will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents; or

b. 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 to CONTRACTOR.

4. Neither ENGINEER's review of CONTRACTOR's Work for the purposes of recommending payments nor ENGINEER's recommendation of any payment, including final payment, will impose responsibility on ENGINEER:

a. to supervise, direct, or control the Work or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for CONTRACTOR's failure to comply with Laws and Regulations applicable to CONTRACTOR's performance of the Work, or

d. to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to OWNER free and clear of any Liens.

5. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make the representations to OWNER referred to in Paragraph 14.02.B.2. ENGINEER may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Written Amendment or Change Orders;

c. OWNER has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by OWNER to CONTRACTOR.

D. *Reduction in Payment*

1. OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

a. claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens;

c. there are other items entitling OWNER to a set-off against the amount recommended; or

d. OWNER has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR any amount remaining after deduction of the amount so withheld. OWNER shall promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

3. If it is subsequently determined that OWNER's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 CONTRACTOR's Warranty of Title

A. 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 no later than the time of payment free and clear of all Liens.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

14.04 Substantial Completion

A. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion.

B. Promptly after CONTRACTOR's notification, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor.

C. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion, which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within 14 days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said 14 days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER.

D. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and COTRACTOR with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

E. OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

14.05 Partial Utilization

A. Prior to Substantial Completion of all the Work, OWNER may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which OWNER, ENGINEER, 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, subject to the following conditions.

1. OWNER at any time may request CONTRACTOR in writing 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 and when CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work.

2. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefore. If ENGINEER considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 Final Inspection

A. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will promptly make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing 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.

14.07 Final Payment

A. *Application for Payment*

1. After CONTRACTOR has, in the opinion of ENGINEER, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds,

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against OWNER that CONTRACTOR believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to OWNER) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

B. *ENGINEER's Review of Application and Acceptance:*

1. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application for Payment to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, ENGINEER will return the Application for Payment to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due*

Thirty days after the presentation to OWNER of the Application for Payment and accompanying documentation, the amount recommended by ENGINEER, less any sum OWNER is entitled to set off against ENGINEER's recommendation, including but not limited to liquidated damages, will become due and will be paid by OWNER to CONTRACTOR.

14.08 Final Completion Delayed

A. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment (for Work fully completed and accepted) and recommendation of ENGINEER, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 Waiver of Claims

A. *The making and acceptance of final payment will constitute*:

1. a waiver of all Claims by OWNER against CONTRACTOR, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by CONTRACTOR against OWNER other than those previously made in writing which are still unsettled.

ARTICLE **15** – SUSPENSION OF WORK AND TERMINATION

15.01 OWNER May Suspend Work

A. At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to CONTRACTOR and ENGINEER, which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefore as provided in Paragraph 10.05.

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

15.02 OWNER May Terminate for Cause

A. The occurrence of any one or more of the following events will justify termination for cause:

1. CONTRACTOR's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. CONTRACTOR's disregard of Laws or Regulations of any public body having jurisdiction;

3. CONTRACTOR's disregard of the authority of ENGINEER; or

4. CONTRACTOR's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, OWNER may, after giving CONTRACTOR (and surety) seven days written notice, terminate the services of CONTRACTOR:

1. exclude CONTRACTOR from the Site, and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion),

2. 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

3. complete the Work as OWNER may deem expedient.

C. If OWNER proceeds as provided in Paragraph 15.02.B, CONTRACTOR shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and, when so approved by ENGINEER, incorporated in a Change Order. When exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, CONTRACTOR's services will not be terminated if CONTRACTOR begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

F. If and to the extent that CONTRACTOR has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 OWNER May Terminate For Convenience

A. Upon seven days written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. for all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. for reasonable expenses directly attributable to termination.

B. CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 CONTRACTOR May Stop Work or Terminate

A. If, through no act or fault of CONTRACTOR, (i) the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or (ii) ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or (iii) OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if ENGINEER has failed

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

to act on an Application for Payment within 30 days after it is submitted, or OWNER has failed for 30 days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may, seven days after written notice to OWNER and ENGINEER, stop the Work until payment is made of all such amounts due CONTRACTOR, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude CONTRACTOR from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 Methods and Procedures

A. Either OWNER or CONTRACTOR may request mediation of any Claim submitted to ENGINEER for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. OWNER and CONTRACTOR shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, ENGINEER's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, OWNER or CONTRACTOR:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE **17** – MISCELLANEOUS

17.01 Giving Notice

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 Computation of Times

A. When any period of time is referred to in the Contract Documents by 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 on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 Cumulative Remedies

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 Survival of Obligations

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of CONTRACTOR.

17.05 Controlling Law

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 Headings

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

END OF SECTION

Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

SUPPLEMENTARY CONDITIONS

SUPPLEMENTARY CONDITIONS

GENERAL

These Supplementary Conditions amend or supplement the standard General Conditions of the Construction Contract NSPE/ACEC/ASCE/CSI Publication No. 1910-8, 2002 Edition and other provisions of the Contract Documents as indicated below. All provisions, which are not so amended or supplemented, remain in full force and effect. These Supplementary Conditions are arranged in the same order as the paragraphs in the 2002 Edition of the General Conditions, and the paragraphs bear comparable numbers to those in the General Conditions but with the prefix "SC". Refer to the paragraph number of the General Conditions for the indicated change or amendment.

All applicable Local, State and Federal laws shall take precedence or any provision stated in the Contract Documents. Contractor shall be responsible to (1) determine which laws are applicable, (2) fully understand the intent of the laws, and (3) comply fully with all provisions of the said laws.

SC-1.01 DEFINED TERMS

A. The terms used in these Supplementary Conditions, which are defined in the standard General Conditions of the construction contract (No. 1910-8, 2002 Edition) have the meanings assigned to them in the General Conditions.

B. **Add** the following language to the end of the first sentence of paragraph 19 of the General Conditions:

"The Engineer for this Project is:
Environmental Engineering Services
610 Belle Terre Boulevard
LaPlace, LA 70068"

C. Add the term "Engineer's consultants" in paragraph 19, the following persons, firms, or corporations having a contract with Engineer to furnish services as the Engineer's independent professional associates or consultant with respect to the Project shall include:

"**1**. Structural Engineers
None

2. Electrical Engineers
Dan Fogelsong, PACE

3. Geotechnical Engineers
None"

D. **Add** the following language at the end of the first sentence of paragraph 29:

"The Owner for this Project is:
St. John the Baptist Parish
1801 West Airline Highway
LaPlace, LA 70068"

SC-2.02 COPIES OF DOCUMENTS

Amend the first sentence of paragraph 2.02 of the General Conditions by striking out "ten copies" and replacing it with "three copies" and so amended paragraph 2.02 remains in effect.

SC-2.03 COMMENCEMENT OF CONTRACT TIMES; NOTICE TO PROCEED

Delete paragraph 2.03.A. of the General Conditions in its entirety and insert the following:

> "A. The Contract Times will commence to run on the date indicated in the Notice to Proceed (Form, Sheet 00610-1)."

SC-2.06 PRECONSTRUCTION CONFERENCE

A. **Add** the following phrase after the word "held" and before the word "to" in the first sentence of paragraph 2.06 of the General Conditions:

> "at the Engineer's discretion"

B. In the first sentence **delete** the word "will" and **replace** it with the word "may" in the first sentence of paragraph 2.06 of the General Conditions.

C. **Add** the following sentence after the last sentence of paragraph 2.06:

> "If a pre-construction conference is warranted, the Engineer will set the date which is agreeable to the Owner and Contractor. Attendance by persons representing the Owner, Engineer, Contractor and Resident Project Representative is mandatory."

SC-2.07 INITIAL ACCEPTANCE OF SCHEDULE

Delete the word "will" and **replace** it with the word "may" in the first sentence of paragraph 2.07 of the General Conditions.

SC-4.01 AVAILABILITY OF LANDS

Change the first sentence in paragraph 4.01.A. to read as follows:

> "A. Owner shall furnish the site, including all permanent right-of-ways, and/or easements, temporary construction right-of-ways, and/or easements, and access to all properties both ingress and egress for which work is required." *Owner shall…*

SC-4.02 SUBSURFACE AND PHYSICAL CONDITIONS

In the preparation of Drawings and Specifications, Engineer or Engineer's consultant may have relied upon reports of exploration and test of subsurface conditions at the site of the Work. If reports are prepared for this Project, they are included in the Appendix of these Specifications.

SC-4.04 UNDERGROUND FACILITIES

Add the following to paragraph 4.04 of the General Conditions:

> "C. Damage to an Underground Facility by the Contractor shall be the responsibility of the contractor whether the underground facility was shown or not shown in the drawings or Contract Documents."

SC-4.06 HAZARDOUS ENVIRONMENTAL CONDITION AT SITE

In the preparation of Drawings and Specifications, Engineer or Engineer's consultant may have relied upon reports related to Hazardous Environmental Conditions identified at the site. If reports are prepared for this Project or provide to the Engineer by the Owner or other agencies, they are included in the Appendix of these Specifications.

SC-5.01 PERFORMANCE, PAYMENT, AND OTHER BONDS

Add the following language after the last sentence of paragraph 5.01 of the General Conditions:

> "D. All bonds must be countersigned by a resident agent of the State in which the project is done."

SC-5.03 CERTIFICATES OF INSURANCE

Add two (2) new paragraphs to paragraph 5.03 after the last sentence in paragraph 5.03.A.

> "C. Contractor shall deliver to Owner, with copies of each additional insured identified in the supplementary conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain in accordance with paragraph 5.04.
>
> D. All insurance coverage called for under this agreement shall be primary."

SC-5.04 CONTRACTOR'S LIABILITY INSURANCE

A. **Delete** paragraph 5.04.A.1 of the General Conditions in its entirety and **insert** the following in its place:

> "1. Claims under workers compensation, disability benefits and other similar employee benefits acts, which said policies shall provide for a Written Waiver of Subrogation in favor of Owner;"

B. **Delete** paragraph 5.04.B.7 of the General Conditions in its entirety and **insert** the following in its place:

> "7. With respect to completed operations insurance and all other insurance policies, coverage shall be written on an "occurrence" basis, remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter)."

SC-5.05 OWNER'S LIABILITY INSURANCE

Delete paragraph 5.05 of the General Condition in its entirety and **insert** the following in its place:

> "A. In addition to the insurance required to be provided by the Contractor under paragraph 5.04, the Contractor shall purchase and maintain a Protective Liability coverage. This coverage shall be made in the Owner's name with the Engineer and Engineer's Consultants named as additionally insured. Limits of coverage shall be as specified in paragraph 5.04."

SC-5.06 PROPERTY INSURANCE

A. **Delete** Paragraph 5.06.A. of the General Conditions in its entirety and **insert** the following in its place:

> "A. Contractor shall purchase and maintain property insurance upon

the Work at the site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in these Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1.) include the interests of Owner, Contractor, Subcontractors, Engineer, or Engineer's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2.) be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, false work and Work in transit and shall insure against at least the following perils: fire, lighting, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils as may be specifically required by the Supplementary Conditions;

3.) include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4.) cover materials and equipment in transit for incorporation in the Work or stored at the site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5.) be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor and Engineer with thirty (30) days written notice to each other additional insured to whom a certificate of insurance has been issued.

6.) allow for partial utilization of work by Owner; and

7.) include testing and start-up."

B. **Change** the first word of paragraph 5.06.B. to read from "Owner" to "Contractor". The Contractor shall be responsible for this coverage.

C. **Amend** paragraphs 5.06.B.,C.,D., 5.07 & 5.08 of the General Conditions to provide as amended above in paragraph SC-5.06 that property insurance shall be provided by the CONTRACTOR rather than the OWNER and consequently the duties, rights, and notices between the CONTRACTOR and the OWNER are hereby reverse.

D. **Delete** paragraph 5.06.E. in its entirety.

SC-5.11 SUMMARY INSURANCE REQUIREMENTS

Add a new paragraph (5.11) to Article 5 – Bonds and Insurance immediately after the last sentence of paragraph 5.10 of the General Conditions:

"5.11 Summary Insurance Requirements

A. A summary of the CONTRACTOR'S required insurance types, coverage, and limits of liability shall be as specified in the attached table entitled, "Summary Insurance Requirements." At the end of the Supplementary Conditions."

SC-6.03 SERVICE, MATERIALS, AND EQUIPMENT

Add the following sentence to paragraph 6.03.A.:

> "Refer to the Technical Section of these Specifications for conditions where power, water, sewer, gas, telephone or other utilities as provided by the Owner will be offered to the Contractor."

SC-6.06 CONCERNING SUB-CONTRACTORS, SUPPLIERS, AND OTHERS

Add the following sub-paragraph to paragraph 6.06 of the General Conditions:

> "H. Owner or Engineer may furnish to any such Subcontractor, Supplier or other person or organization, to the extent practicable information about amounts paid to Contractor in accordance with Contractor's Applications for Payment on account of the particular subcontractor's suppliers', other persons' or other organization's Work."

SC-6.09 LAWS AND REGULATIONS

Add the following sub-paragraph to paragraph 6.09 of the General Conditions:

> "D. When projects are being funded by the Environmental Protection Agency (EPA), the Farmer's Home Administration (FmHA), the Housing and Urban Development Agency (HUD) or other Federal or State Agencies, applicable Laws and Regulations required by the granting and/or lending agency applies. Any forms or regulations required of the Contractor by the agency whether listed in these Contract Documents or not shall be Contractor's responsibility to complete and/or comply."

SC-6.11 USE OF SITE AND OTHER AREAS

Add the following sentence after the first sentence of paragraph 6.11.A.1. of the General Conditions:

> *... or other methods or equipment.* "The Contractor shall be bound by the terms and conditions of any permit, right-of-way or easement obtained by the Owner for the Work. A copy of permits, right-of-ways, and/or easements may be obtained from the Owner prior to the start of the Work." *Contractor shall assume full responsibility ...*

SC-6.13 SAFETY & PROTECTION

Add the following subparagraph to paragraph 6.13 of the General Conditions:

> "E. *Safety Standards and Accident Prevention*
>
> With respect to all work performed under this contract, the Contractor shall:
>
> 1. Comply with the safety standards provisions of applicable laws, building and construction codes and the "Manual of accident Prevention in Construction" published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal Regulations, Section 1518 as published in the "Federal Register," Volume 36, No. 75, Saturday, April 17, 1971.
> 2. Exercise every precaution at all times for the prevention of

accidents and the protection of persons (including employees) and property.

3. Maintain at his/her office or other well known place at the job site, all articles necessary for giving first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or a doctor's care of persons (including employees), who may be injured on the job site. In no case shall employees be permitted to work at a job site before the employer has made a standing arrangement for removal of injured persons to a hospital or a doctor's care."

SC-7.01 RELATED WORK AT SITE

Add a new paragraph immediately after paragraph 7.01 of the General Conditions, which is to read as follows:

"D. Should Contractor cause damage to the work or property of any separate contractor at the site, or should any claim arising out of Contractor's performance of the Work at the site be made by any separate contractor against Contractor, Owner, Engineer, Engineer's consultants, the construction coordinator or any other person, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold Owner, Engineer, Engineer's consultants, and the construction coordinator harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequently out of any action, legal or equitable, brought by any separate contractor against Owner, Engineer, Engineer's consultants or the construction coordinator tot he extent based on a claim arising out of Contractor's performance of the Work. Should a separate contractor cause damage to the Work or property of Contractor or should the performance of Work by any separate contractor at the site give rise to any other claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer, Engineer's consultants or the construction coordinator or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner, Engineer, Engineer's consultants or the construction coordinator on account of any such damage or claim.

If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of a separate contractor and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a claim for an extension of times in accordance with Article 12. An extension of the contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, Engineer's consultant and construction coordinator for any delay, disruption, interference or hindrance caused by any separate contractor. This paragraph does not prevent recovery from Owner, Engineer, Engineer's consultant or construction

coordinator for activities that are their respective responsibilities."

SC-9.03 PROJECT REPRESENTATIVE

After the second sentence in paragraph 9.03.A., **add** the following sentence:

> *…in Paragraph 9.09.* "The suggested listing of duties, responsibilities, and limitation of authority of the Resident Project Representative shall be listed in Section 01420 Inspection Services." *If Owner…*

SC-11.01 LOST OF THE WORK

In paragraph 11.01.A.5.C., **add** the following after the last sentence:

> "Equipment and machinery rental rates shall be based on the Rental Rate Bluebook for Construction Equipment (latest edition thereof) as published by Nielson/Dataquest or any other publication of similar nature approved by the Engineer. Contractor shall obtain written approval of rental rates prior to implementation."

SC-13.06 CORRECTION OR REMOVAL DEFECTIVE WORK

Add the following sentence after the last sentence in paragraph 13.06.A.:

> *…of work of others).* "No additional contract time will be granted for correction or removal of defective work."

SC-14.02 PROGRESS PAYMENTS

A. **Add** the following phrase after the word "payment" and before the word "but" in the first sentence of paragraph 14.02.A.1. of the General Conditions:

> "for non-Federally or non-State funded projects"

B. **Add** the following to paragraph 14.02.A. of the General Conditions:

> "4. For Federally or State funded projects, the period for review and payment by the Owner shall be as follows:

Engineering Review	-	5 Days
Owner's Review	-	5 Days
Review and Approval by Agency	-	21 Days
Owner's Check Processed	-	1 Day
TOTAL		32 Days

> It is the Owner's intent to receive payment from Federal or State programs prior to payment to the Contractor. In no case will the Contractor be paid monthly estimates until grant/loan monies have been received by the Owner. Interim financing should be figured accordingly.
>
> 5. When progress payments are made for material and equipment not incorporated in the Work but stored at the site, Owner shall not be obligated to accept from the Contractor any excess inventory of materials and equipment remaining at the end of the Project. All excess material and equipment shall revert to the Contractor upon completion of the Work and no funds shall be expended to the Contractor for this excess material and equipment not incorporated into the Project."

5.11 SUMMARY INSURANCE REQUIREMENTS

TYPE	MIN.LIMITS OF COVERAGE[1] PER ACCIDENT/OCCURRENCE/AGGREGATE	PURCHASER	REMARKS
Workman's Compensation (Inc. Occupational Disease)	Set by State Law	General Contractor and Subcontractor	As applicable for those employees in hazardous occupations not covered by workman's compensation. Claims shall provide for a Written Waiver of Subrogation in favor of Owner.
Employer's Liability	$1,000,000 combined single limits	General Contractor and Subcontractor	
Comprehensive General Liability[2]	$1,000,000/$1,000,000/$1,000,000 with $1,000,000 umbrella	General Contractor and Subcontractor	
Vehicular Liability[3]			
Bodily Injury and Property Damage	$1,000,000 per accident combined single limit	General Contractor and Subcontractor	
Umbrella	$1,000,000	General Contractor and Subcontractor	
All Risk Property[4][5]	100% of completed value of insurable portions of the work including machinery & equipment.	General Contractor	Name the Owner, Engineer, Contractor, Subcontractor, as insured, as their interest may appear.
Flood Insurance[6]	100% of completed value to a maximum limit of $200,000 for walled and roofed structures costing $10,000 or more at wastewater treatment plants or pumping stations located in eligible communities.	General Contractor	Name the Owner, Contractor, Subcontractor, as insured, as their interest may appear.

(1) All insurance coverage called for under this agreement shall be primary. Greater limit may be required by State or approving authority, such as Railroad or State DOTD.

(2) All policies shall include coverage for personal injury, property damage, contractual liability, operations premises liability, Contractor's protective liability, and completed operations/products hazard. Coverage for underground piping contractors shall also include explosion, collapse and underground property damage (X-C-U). Care, custody, and control coverage is only required for contracts to modify existing plants or facilities.

(3) To include coverage for owned, hired and non-owned vehicles.

(4) Coverage not required on underground piping.

(5) All policies shall include coverage for fire, windstorm, hail, explosion, vehicle damage, falling aircraft, lighting, riot, smoke, vandalism, malicious mischief, and theft.

(6) Flood insurance not required for bridges, dams, piping and underground structures and for facilities not located in a flood plain.

DRAWINGS AND DETAILS

SECTION 00850
DRAWING AND DETAILS

The following is a list of drawings on this project:

DRAWING NUMBER	DESCRIPTION
-	Title Sheet
G01	General Notes/Drawing List
G02	Flow Schematic and Hydraulic Profile
G03	Structure and Location Plan
G04	Miscellaneous Details
M01	Site Piping Plan
M02	Water Well Piping
M03	RO System Plan & Profile
M04	Ground Storage Tank Plan & Profile
M05	High Service Pumping Station
M06	Connection to St. James Force Main
M07	Chlorine Building Details and Isometric
M08	General Details
S01	Ground Storage Tank and RO Unit Foundation Plan
S02	Ground Storage Tank Plate Layout & Openings
S03	Ground Storage Tank Plan, Section, & Details
S04	Structural Notes and Details
S05	Fence Details
E01	Electrical Legend
E02	Electrical Details
E03	Electrical Details
E04	Electrical Site Plan

TECHNICAL SECTION

DIVISION ONE

GENERAL REQUIREMENTS

1

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 LOCATION OF WORK

All of the Work of this Contract is located in rights-of-way servitudes, or on property owned by the Owner.

1.02 WORK TO BE DONE

A. The Contractor shall furnish all labor, materials, equipment, tools, services and incidentals to complete all Work required by these Specifications and as shown on the drawings, all as prepared by Environmental Engineering Services, Inc.

B. The Contractor shall perform the Work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, cleanup, replacements and restoration, including restoration of vegetative cover required as a result of damages caused during this construction.

C. All materials, equipment, skills, tools and labor which are reasonably and properly inferable and necessary for the proper completion of the Work in a substantial manner and in compliance with the requirements stated or implied by these Specifications or drawings shall be furnished and installed by the Contractor without additional compensation, whether specifically indicated in the Contract Documents or not.

D. The Contractor shall comply with all Federal, State, and Local codes, which are applicable to the proposed construction works.

1.03 GENERAL DESCRIPTION OF WORK TO BE PERFORMED

A. The Work included in the Contract shall be described in the Construction Contract.

B. All Work shall be done as described in the Specifications and as shown on the drawings, complete, tested and ready for operation.

C. Work shall include the following:

1. Completing a water well with pumps, piping, fittings, and controls.
2. Installation of a Reverse Osmosis Treatment Plant.
3. Installation of a 42,000 gallon ground storage tank.
4. High service pumps with VFD drives.
5. Chlorination system.
6. Flow control valve from adjacent water system.

1.04 WORK SEQUENCE

A. Contractor shall complete all the potable water system components. Control valve at Bon Temps Trail shall be installed and operational. After water quality tests are acceptable, Contractor may complete the tie-in to the existing main. Ensure ground storage tank is 50% filled when tie-in is performed.

B. A sequence of construction must be developed so as to minimize the temporary loss of electrical power, water and gas to all buildings on all streets within and around the limits of the project. Driveways and pedestrian entrances to all buildings or residences must be provided and maintained at all times. No direct pay will be made for minimizing temporary loss of utilities and providing and maintaining driveways and entrances.

C. If the Owner is desirous of performing certain portions of the Project prior to other portions, the sequence of Work shall be performed in accordance with the Contract Documents and shall be stated in the drawings. The Contractor shall advise the Owner of any adverse effects the desired sequence of work may have on the successful completion or operation of the Project.

1.05 SCHEDULING OF WORK

A. Prior to commencement of work, a pre-construction conference shall be conducted and a proposed schedule of work and sequence of construction shall be submitted to the Engineer by the Contractor for approval. If the presence of a Project Engineer is required, the Contractor will be required to schedule work so that such personnel will not be required to be on duty on Sundays.

B. The Contractor shall cooperate fully with all utility forces of the Owner or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the Work, and shall schedule the work so as to minimize interference with said relocation, altering, or other rearranging of facilities.

C. The Contractor shall schedule and perform the Work in such a manner as to result in the least possible disruption to the public's use of roadways, driveways, and utilities. Utilities shall include but not be limited to water, sewage, drainage structures, ditches, and canals, gas, and telephone. The Contractor shall also deliver notice to property occupants (private and public) of all planned disruption to roadways, driveways, and utilities 72 hours in advance of the disruption.

D. After Work has begun on any portion or designated part of the Project, it shall be carried

forward to its final completion. All Work shall conform to the provisions of the approved Contractor's schedule.

E. Prior to commencement of any phase of Work, the Contractor is required to notify the Engineer 24 hours in advance.

1.06 SPECIFICATIONS AND DRAWINGS

A. Specifications - The Technical Specifications consist of three parts: General, Products, and Execution. The General Section contains general requirements, which govern the Work. The Products and Execution sections modify and supplement these by detailed requirements of the Work and shall always govern whenever there appears to be a conflict.

B. Intent - All Work called for in the specifications applicable to the Contract but not shown on the drawings in their present form or vice versa shall be of like effect as if shown or mentioned in both. Work not specified in either the drawings or in the specifications but involved in carrying out their intent or in the complete and proper execution of the Work is required and shall be performed by the Contractor as though it were specifically delineated or described.

The apparent silence of the specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specification shall be made upon that basis.

C. Conflict between Drawings and Specifications - Where an obvious conflict exists between the drawings and specification, the Engineer shall decide which governs and the Contractor shall comply with the decision. Such decision shall not be grounds for additional payment to the Contractor, i.e., the Contractor shall include the price of the most expensive alternative in his bid.

1.07 CONTRACTOR'S RESPONSIBILITY CONCERNING DRAWINGS AND SPECIFICATIONS

A. All drawings, project specifications and addenda are mechanically reproduced. The Contractor is responsible for checking his sets of drawings and specifications to assure they are complete in number and all sheets are legible. The Engineer will replace any copies of sheets as necessary without additional charge to the Contractor when notified.

B. Contractor is responsible for compliance with all drawings, drawing revisions,

specifications and addenda to specifications, whether or not the set(s) issued to the Contractor are complete and totally legible.

C. It shall be understood that the failure of the Contractor to review and verify his set(s) of drawings, drawing revisions, project specifications, and addenda for completeness and legibility which results in additional costs to the Contractor shall in no way increase the cost of the Project to the Owner or the Owner's Engineer after bids are received.

D. Contractor shall have present on the jobsite at all times a minimum of two (2) complete sets of construction drawings and specifications. One (1) set shall be used for record keeping for preparation of record drawings upon completion of Project.

1.08 RIGHTS OF LAND USAGE

A. Refer to Article 4 and 8.05 of the General Conditions. All permanent lands, rights-of- way, and easement for utility lines or access to the work, as indicated on the drawings, shall be furnished by the Owner. The location and limits of both permanent and temporary lands for the work, if not shown on the drawings, will be indicated in detailed survey plats, descriptions and titles. Copies of available documents will be furnished by the Owner upon request. Copies of permits issued to the Owner will be made available upon request. The Contractor shall keep his work within the limits of the lands for the work. Storage of the Contractor's material and equipment on privately owned lands which are outside the limits of land for the work or are inside the limits of lawful use of publicly owned lands shall only be done with written agreement between the property owner and the Contractor, subject to notification of the Engineer and the Owner by the Contractor.

B. The land available for the Contractor's use during the performance of the work is limited to the area defined by that area which is shown on the plans.

C. Nothing in this contract shall imply that the Contractor has exclusive use of roadways or public and/or private land employed to perform the Work.

D. In addition, areas of privately owned land may be made available through a right-of-way document executed by the property owner and the Owner for the Contractor's use subject to provisions of the right-of-way document. These areas and their use limitations are as follows:

1. The Contractor's use of this area shall be limited to the direct performance of the Work and shall not be used for storage of materials and/or equipment.

Existing pavements, sidewalks, landscape and all miscellaneous items within the boundaries shall be removed as required to perform the work and be immediately restored to an equal or better condition upon successful completion of the work, all in accordance with the Contract Documents.

2. The Contractor is hereby made aware that the area is an active site and special measures will be required to maintain traffic and access to the property at all times. All Work in this area must be coordinated with the Owner and the Contractor shall minimize any disruption to the normal activities of the Owner.

E. All other land deemed necessary by the Contractor for the storage of materials and equipment and other facilities or required for the performance of the work shall be arranged for by the Contractor at no additional cost to the Owner.

1.09 RAIN DAYS

If requested the Contractor shall be granted time extensions for excessive rain days, beyond the reasonably anticipated days of adverse weather. This time extension must be requested monthly. The following are considered reasonably anticipated days of adverse weather on a monthly basis.

January	11	days	July	6	days
February	10	days	August	5	days
March	8	days	September	4	days
April	7	days	October	3	days
May	5	days	November	5	days
June	6	days	December	8	days

1.10 OWNER OCCUPANCY

Owner will have full access to and use of all existing Owner-owned facilities during the entire period of construction for the conduct of his normal operations. Cooperate with Engineer in all construction operations to minimize conflict and to facilitate Owner usage. A listing of the Owner's existing facilities in conjunction with this project may be shown in the drawings.

1.11 PARTIAL OWNER OCCUPANCY

The Contractor shall schedule his operations for completion of portions of the Work, as designated, for the Owner's occupancy prior to Substantial Completion of the entire Work. Refer to paragraph 1.04 Work Sequence for completion schedule.

1.12 OWNER FURNISHED ITEMS

Items to be furnished by the Owner on this Project shall be listed in the Supplementary Conditions. If no items are listed in the Supplementary Conditions, it is understood by all parties that materials and/or equipment furnished on this Project shall be by the Contractor.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SCOPE

The scope of this Section defines the basis for which a Contractor will be paid for his work. Measurement and payment for all work shall be made either by (1) Lump Sum; and/or (2) Unit Prices.

1.02 LUMP SUM WORK

Prior to commencement of Work, the Contractor shall submit to the Engineer for review and approval, a schedule of values for all Work. The schedule of values shall include all quantities and prices of items aggregating the Contract Price and will subdivide the work into component parts in sufficient detail to serve as a basis for progress payments.

1.03 UNIT PRICE WORK

Work completed under a unit price contract shall be measured and payment made based on actual quantities installed, tested, and accepted at the unit price stated in the Contract.

A. Any items of work appearing in this measurement and payment section and which are not listed in the Bid Proposal, but are necessary for completion of the work in accordance with the Drawings and Specifications, shall be included in the cost of the other items listed and bid in the Proposal.

B. Further, any items of work not appearing in this Measurement and Payment Section and not listed in the Bid Proposal, including those items on the drawing which are labeled "No Direct Payment", but are necessary for completion of the Work in accordance with the Drawings and Specifications, shall also be included in the cost of the other items listed and bid in the Proposal.

C. Final payment shall only be made for items that are installed and are complete, tested, workable, and accepted. The measurement of unit price items for payment shall be only within the pay limits shown on the Drawings, listed in the Bid Proposal of the Specification, and/or authorized in writing by the Owner in an approved Change Order. Quantities measured for payment shall be in accordance with the foregoing qualification for only those amounts which conform to the original Contract Orders or Field Changes, but in no case will measurement be made for more work than was authorized in writing nor for more work than was actually installed and accepted.

1.04 MEASUREMENTS

Measurement of unit price and lump sum items will generally be by the standard inch-pounds system of units commonly used in the United States, which are defined by the U.S. National Bureau of Standards.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01030 - ALTERNATES/ALTERNATIVES

PART 1 - GENERAL

1.01 SCOPE

This Section identifies each alternate/alternative allowance on major equipment and/or material by the Engineer.

1.02 BIDDING REQUIREMENTS

A. In the bid form, the bidder shall identify the type of material or manufacturer of equipment proposed for this project in the blanks provided.

B. When required by these specifications, pre-qualifications of certain material and/or equipment will be required during the bidding phase of the project. A list of pre-qualified material and/or equipment shall be stated in paragraph III of the Bid Qualifications.

C. The pre-qualification process requires all data and information of material and/or equipment not listed in the technical specification but desiring consideration for this project be submitted to the Engineer, fifteen (15) working days prior to the receipt of bids. No submittals will be considered within fifteen (15) working days prior to the receipt of bids.

1.03 PRE-QUALIFIED MATERIAL AND/OR EQUIPMENT

A. If pre-qualified material and/or equipment are specified; only those items listed in the specification or addenda will be permitted to be incorporated into the Project.

B. Those items, which are not listed as pre-qualified materials and/or equipment in the Supplementary Conditions shall be submitted for consideration as product substitutions and options as required by Section 01600.

1.04 APPROVAL OF PRE-QUALIFIED MATERIAL AND/OR EQUIPMENT ALTERNATES/ALTERNATIVES

If an alternate material and/or equipment is approved by Addendum, the Contractor shall be responsible for providing design calculations and drawing revisions for alternate products which affect the existing design, specifications and drawings, including, but not limited to, hydraulics, structural, piping, and electrical. The Contractor shall pay for the cost of these revisions. The Engineer prior to incorporation into the Project shall approve all design changes.

PART 2 - PRODUCT - NOT USED
PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01030 - ALTERNATES/ALTERNATIVES

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01035 - MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 REQUIREMENTS

A. Refer to Articles 10, 11 and 12 of the General Conditions with regards to changes in Contract Price and Contract Time.

B. Promptly implement Change Order procedures.

1. Provide full written data required to evaluate changes.
2. Maintain detailed records of work done on a time and material/force account basis.
3. Provide full documentation to Engineer on request.

C. Designate in writing the member of Contractor's organization:

1. Who is authorized to accept changes in the work?
2. Who is responsible for informing others in the Contractor's employ of the authorization of changes in the work?

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

1.02 DOCUMENTATION

A. Contractor may initiate a change by submitting a written notice to the Engineer containing:

1. Description of the proposed change.
2. Statement of the reason for making the change.
3. Statement of the effect on the Contract Price and the Contract Time.
4. Statement of the effect on the work of other Contractors.
5. Documentation supporting any change in Contract Price or Contract Time as appropriate and adequate for proper review by the Engineer.

B. If not required by any U.S. Government Agencies, Change Order form shall be E.J.C.D.C. Form No. 1910-8-B or the latest revision thereof. Change Order request shall be within thirty (30) days of the occurrence with the exception of inclement weather as outlined by other Sections of this Specification.

1.03 CONSTRUCTION CHANGE AUTHORIZATION

A. Change Orders will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change and will designate the method of determining any change in the Contract Sum and any change in Contract Time.

B. Change orders must have the Owner and Contractor's approvals. Change orders on projects funded in whole or in part by loans or grants from agencies of the U.S. Government must be approved by the respective agency prior to their incorporation into the Project.

1.04 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Contractor shall support proposed lump sum proposal pricing and each unit price, which has not previously been established with sufficient substantiating data to allow the Engineer to evaluate the pricing.

B. Contractor shall provide the following data to support proposed time and pricing of both lump sum proposals, unit pricing, and time and material proposals:

1. Labor required.
2. Equipment required.
3. Products required.
   - **a**. Recommended source of purchase and unit cost.
   - **b**. Quantities required.
4. Taxes, insurance and bonds.
5. Credit for work deleted from Contract, similarly documented.
6. Overhead and profit.
7. Justification for any change in Contract Time.

C. In addition, Contractor shall support each claim for work done on a time and material/force account basis with the following additional information:

1. Dates and times work was performed and by whom.
2. Time record, summary of hours worked, and hourly rates paid.
3. Receipts and invoices for:
   - **a**. Equipment used, listing dates and times of use.
   - **b**. Products used, listing quantities purchased.
   - **c**. Subcontractors used, showing the same data as above.

1.05 PREPARATION OF CHANGE ORDERS

A. Engineer will prepare each Change Order.

B. Form: E.J.C.D.C. No. 1910-8-B

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

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

1.06 LUMP SUM/FIXED PRICE CHANGE ORDER

A. Engineer initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor or requests from Owner or both.

B. Once Engineer has completed and signed the form, all copies will be sent to Contractor for execution. The Contractor shall execute the change order documents and return it to the Engineer within seven (7) days. After execution by Contractor, all copies will be sent to the Owner for execution. Engineer will make distribution of executed copies.

1.07 UNIT PRICE CHANGE ORDERS

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

1. Engineer's definition of the scope of the required changes.
2. Contractor's proposal for a change, as recommended by Engineer.
3. Survey of complete work.

B. The amounts of the unit prices to be:

1. Those stated in the Contract Bid Form.
2. Those mutually agreed upon between Owner and Contractor.

1.08 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Contractor shall revise monthly the Schedule of Values and Application for Payment forms to record each Change Order as a separate item of work and to record the adjusted Contract Price.

B. Contractor shall revise monthly the Construction Schedule to reflect each change in Contract Time, to include sub schedules to show changes for other items of work affected by the changes.

C. Upon completion of work under a Change Order, the Contractor shall enter pertinent changes in Record Documents.

1.09 PROCEEDINGS WHEN CONTRACTOR DOES NOT EXECUTE THE CHANGE ORDERS

It is anticipated that at the time of submittal to the Contractor, negotiations will have been completed with all parties agreeing to the change(s) in the work, change in Contract Price, and change in Contract Time. In the event that no agreement can be reached and the Contractor fails to execute the Change Order within the specified time limit, the Owner may issue a Change Order without signature of the Contractor establishing a change to Contract Price or Contract Time in accordance with the provisions of Article 10 of the General Conditions. The Contractor will then be paid or assessed time on the basis of the Change Order for the change in work with the Contractor not relinquishing his rights to submit a claim in accordance with Articles 11 and 12 of the General Conditions.

PART 2 - PRODUCT - NOT USED
PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01035 - MODIFICATION PROCEDURES

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01041 - PROJECT COORDINATION

PART 1 - GENERAL

1.01 WORK PROGRESS

The Contractor shall furnish personnel and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of Work and a rate of progress which will insure the completion of the work within the time stipulated in the Contract. If at any time such personnel appear to the Engineer to be inefficient, inappropriate, or insufficient for performing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to perform the Work at the specified quality and rate of progress.

1.02 PRIVATE LAND

A. The Contractor shall be aware that his work will be performed adjacent to private property. The Contractor shall notify all property owners adjacent to and along the route of construction by means of either a printed circular or form letter of the general details of the construction. The letter shall also include names and telephones numbers for key project personnel so that property owners can report problems. These contact telephone numbers shall be given so that appropriate personnel can be contacted 24 hours a day, seven days a week.

B. The Contractor shall not enter or occupy private land outside the Owner's land, rights-of-way, or servitudes except by written permission of both the Owner and the Owner of the private land. Such permission shall be obtained by and at the expense of the Contractor and at no additional cost to the Owner.

C. Owners of adjacent private land shall be inconvenienced as little as possible by the construction Work. Where possible, the Contractor shall maintain access across or over the work to adjacent property. At locations where an adjacent property has more than one access point for vehicular traffic, such as paved or aggregate surfaced driveways, grassed ramps, gaps, etc., the Contractor shall schedule his work so that at least one access point is usable by the property owner, his associates, or his clientele in the case where the adjacent property is a business establishment.

1.03 WORK LOCATIONS

Structures and pipelines shall be located substantially as indicated on the drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

1.04 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights, and other means to prevent accidents to persons and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by the public, Owner's and Engineer's personnel, and workmen. Bridges provided for access to private property during construction shall be removed when no longer required. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of open trench, prohibiting the stacking of excavated material in the street, and requiring that the excavations shall not remain open overnight.

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles, which could be dangerous to the public, shall be barricaded and well lighted at all times when construction is not in progress.

1.05 TEST PITS

Test pits for the purpose of locating underground utilities or structures, which may interfere with installation of the Work shall be excavated in advance of the Work and backfilled by the Contractor. Test pits shall be backfilled immediately after their purpose has been satisfied and maintained in a manner satisfactory to the Engineer. The cost for such test pits, except as provided for in the Bid Form, shall be included in the cost of the work for which the test pits benefit. Backfill shall comply with the Specifications for backfill of pipe. The maximum number of test pits to be excavated shall be equivalent to two for each structure and one for each 200 lineal feet of pipeline.

1.06 MAINTENANCE OF TRAFFIC

A. Open pits, trenches, unpaved streets, debris, or other obstructions due to construction that will prevent the normal flow of traffic during an extended construction stoppage, for any reason, shall be minimized. In the event an extended construction stoppage is found to be necessary, Contractor shall provide for normal traffic flow during extended construction stoppage, regardless of the cause.

B. All excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operation causes traffic safety hazards, he shall repair the road surface, provide temporary roadways, erect wheel guards or fences, or take other measures for safety satisfactory to the Engineer. All excavations shall be covered, backfilled, or protected as directed by the Engineer, fully delineated at night when the Work is not in progress.

C. Detours around construction areas will be subject to the approval of the Owner and the Engineer. Where detours are permitted the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations. The periods when traffic may be detoured will be strictly controlled by the Owner.

1.07 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in another manner acceptable to the Engineer.

B. All sidewalks, which are disturbed by the Contractor’s operations, shall be restored to their original or better condition by the use of similar or comparable materials. All curbing shall be restored in a condition equal to the original construction and in accordance with the best modern practice.

C. Along the location of this Work, all fences, walks, brushes, trees, shrubbery, and other physical features shall be protected and restored in a thoroughly workmanlike

manner.

Fences and other features removed by the Contractor shall be replaced in the location indicated by the Engineer as soon as conditions permit. All grass areas beyond the limits of construction, which have been damaged by the Contractor, shall be re-graded and sodded.

D. Trees close to the Work shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the Engineer. All injuries to bark, trunk, limbs and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.

E. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Proposal.

F. Where fences must be removed for construction purposes or access, they shall immediately be reconstructed or replaced. The Contractor shall provide adequate temporary fence and gates as necessary to contain or restrict domestic farm animals within their proper areas during the life of this Contract and shall provide reasonable safe and convenient means of access where and when required.

1.08 MAINTENANCE OF FLOW

The Contractor shall maintain the flow of sewers, drains, and watercourses interrupted during the progress of the Work, including complete pumped bypass systems where necessary. The Contractor shall immediately remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow. All temporary works installed for flow maintenance shall be removed when the permanent work is finished and the areas cleaned and restored to good condition. Pavement removal and replacement, which, in the opinion of the Contractor, is necessitated by placement of temporary flow control facilities, shall be considered as an item for convenience to the Contractor. Such costs for pavement removal and replacement shall, therefore, be born by the Contractor at his own cost as required for other flow control measures. The intent of this

Specification is that pavement removal is limited to the least amount possible and the Contractor shall investigate alternative methods for flow control, which require the least amount of pavement removal.

1.09 CONNECTION TO WORK BY OTHERS

It is anticipated that pipeline construction by others may occur at the same time and in the same areas as work being done under this Contract. The Contractor will, therefore, conduct his operations as follows:

A. Sewer Lines:

1. If shown on the Drawings, sewers built by others may be connected to sewers and/or manholes constructed under this Contract.

2. If the sewers and/or manhole by others have already been constructed, the manholes and/or sewers under this Contract shall be built at the exact locations of the connection as actually exist in the field. The Contractor is responsible for pot holing the connection points in advance of constructing manholes and/or sewers under this Contract to ensure the proper alignment at the connection point.

3. If the sewers and/or manholes by others have not been constructed, the sewers shall be built at the exact locations of the connection as shown on the drawings and plugged.

B. Force Mains & Waterline:

1. Where shown on the drawings, force mains constructed under this Contract shall be connected to pipelines to be built by others. All connections at the Contract limits of force mains shall be terminated with a standard mechanical joint bell end and plugged with a standard mechanical joint plug.

2. If the force main or waterlines by others have already been constructed, the force mains built under this Contract will be connected to the force mains constructed by others by removing all necessary plugs and making the connection(s). The Contractor shall pothole connection points in advance of development of laying schedules for all pipe sizes of 16 inches and larger to ensure the proper alignment at the connection point. Upon completion of the tie-in connection(s), Contractor shall deliver all removed plugs to the Owner's facility.

3. If the force mains or waterlines have not been constructed by others, the force mains or waterlines under this Contract shall be laid to the required line and grade, terminated with a plug at the location of the connection indicated on the drawings, backfilled and marked with a stake.

4. The notation on the drawings at tie-in points does state that the Contractor shall tie to facilities constructed by others or provide a plug. The intent of this instruction is that, if a tie-in cannot be made, the Contractor shall furnish and install a plug at the terminal end as defined above.

1.10 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed. The Contractor at his own expense shall reconstruct all portions injured.

B. All structures shall be protected in a manner approved by the Engineer. Should any of the floors or other parts of the structures become heaved, cracked or otherwise damaged, all such damaged portions of the Work shall be completely repaired and made good by the Contractor at no additional cost to the Owner and to the satisfaction of the Engineer. Special attention is directed to substructure bracing requirements, described in other sections. If, in the final inspection of the work, any defects, faults or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein for at least the guarantee period described in the Contract.

C. The Contractor shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Owner.

D. After the buildings or structures have been made weather tight and ready for the installation of pumps, motors, piping and other equipment, the interior temperature shall be maintained at a minimum temperature of 50ºF, and thereafter until the completion of the contract, temperature shall not be allowed to drop below 50ºF.

1.11 CLEANUP DURING CONSTRUCTION

During the course of the Work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residues resulting from the construction work and, at the conclusion of the Work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations, and shall leave the entire site of the Work in a neat and orderly condition.

1.12 COOPERATION WITHIN THIS CONTRACT

A. All firms or persons authorized to perform any work under this Contract shall cooperate with the General Contractor and his subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling, and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01041 - PROJECT COORDINATION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01046 -MODIFICATIONS TO EXISTING STRUCTURES, PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment, and incidentals required to modify, alter and/or convert existing structures as shown or specified and as required for the installation of new mechanical equipment, pumping units, piping, and appurtenances. Work shall be performed within the requirements of Special Project Procedures in Section 01100 and required Progress Schedules in Section 01310. Existing pumping units, piping, and equipment shall be removed and dismantled as necessary for the performance of structural alterations in accordance with the requirements herein specified.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall dismantle and remove all existing pumping units, equipment, piping, electrical conduit and wiring, electrical panels, and other appurtenances required for the completion of the work. Where called for or required, he shall cut existing pipelines for the purpose of making connections thereto. Anchor bolts for equipment and structural steel removed shall be cut off one inch below the concrete surface. Surface shall be finished as specified in Division 3.

B. No existing structure, equipment, or appurtenance shall be shifted, cut, removed, or otherwise altered except with the express approval of and to the extent approved by the Engineer.

C. When removing materials or portions of existing structures and when making openings in walls and partitions, the Contractor shall take all precautions and use all necessary barriers and other protective devices so as not to damage the structures beyond the limits necessary for the new work and not to damage the structures or contents by falling or flying debris.

D. Materials and equipment removed in the course of making alterations and additions shall remain the property of the Owner, except that items not salvageable, as determined by the Engineer and the Owner shall become the property of the Contractor

to be disposed of by him off the site of the work at his own place of disposal. Operating equipment shall be thoroughly cleaned and then lubricated and greased for protection during prolonged storage as specified in other sections.

E. All work of altering existing structures shall be done at such time and in such manner as will comply with the approved time schedule. So far as possible before any part of the Work is started, all tools, equipment, and materials shall be assembled and made ready so that the work can be completed without delay.

F. All workmanship and new materials involved in constructing the alterations shall conform to the Specifications for the classes of work insofar as such specifications are applicable.

G. All cutting of existing masonry or other material to provide suitable bonding to new work shall be done in a manner to meet the requirements of the respective Section of these Specifications covering the new work. When not covered, the work shall be carried on in the manner and to extent directed by the Engineer.

H. Where holes in existing masonry are required to be sealed, unless otherwise herein specified, they shall be sealed with cement mortar or concrete. The sides of the openings shall be provided with keyed joints and shall be suitably roughened to furnish a good bond and make a watertight joint. All loose or unsound material adjacent to the opening shall be removed, and if necessary, replaced with new material. The method of placing the mortar seal shall provide a suitable means of releasing entrapped air.

I. Surfaces of seals visible in the completed work shall be made to match as nearly as possible the adjacent surfaces.

J. Non shrink grout shall be used for setting wall castings, sleeves, leveling pump bases, doweling anchors into existing concrete and elsewhere as shown.

K. Where necessary or required for the purpose of making connections, the Contractor shall cut existing pipelines in a manner to provide an approved joint. Where required, he shall weld bends, flanges, or provide Dresser couplings, all as required.

L. The Contractor shall provide flumes, hoses, piping, etc., to divert or provide suitable plugs, bulkheads, or other means to hold back the flow of wastewater, water, or other liquids, all as required in the performance of the Work under this Contract.

3.02 WALL PENETRATIONS

Unless otherwise shown on the Drawings or specified herein, wall penetrations for pipes or conduits shall be made using a modular sealing strip such as the Link-Seal as manufactured by Thunderline Corporation, Wayne, Michigan, or approved equal. Wall sleeves for use with the sealing strips shall be Schedule 40, galvanized steel pipe. A suitable water stop approximately 1/4-inch thick by 2-inch wide shall be welded to the sleeve completely around the periphery of the pipe. The use of such sealing strips shall not relieve the Contractor of his responsibility of providing a guaranteed watertight seal. Wall penetrations will be permitted only with the expressed approval of the Engineer. Wall seals exposed to sewage or sewage gasses shall be rated for corrosive service.

3.03 CLEANING EXISTING STRUCTURES

A. After dewatering and before commencing work on each structure, the Contractor shall remove and dispose of, away from the site and at a properly permitted disposal site, any sand, sludge, and other solids remaining in such structure.

B. The use of explosives will not be permitted to complete any work under this Contract. Care shall be taken not to damage any part of existing buildings or foundations or outside structures.

END OF SECTION

TECHNICAL SECTION

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01046 -MODIFICATIONS TO EXISTING STRUCTURES, PIPING AND EQUIPMENT

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01048 - UTILITIES COORDINATION

PART 1 - GENERAL

1.01 UTILITIES

Utilities for the purpose of these Specifications shall be considered as including, but not limited to: pipelines, conduits, cables, transmission lines and appurtenances of Public Utilities and those of Special Utility Districts, Cities or Towns, businesses or individuals solely for their own use or for use of their tenants; and storm drains, sanitary sewers, street lighting, traffic signal and fire alarm systems, except those owned or under the direct control of the Owner.

1.02 UNDERGROUND INSTALLATIONS

Existing underground pipelines and utilities are indicated on the Drawings only to the extent such information was made available to or discovered by Engineer in preparing drawings. There is no guarantee as to the accuracy or completeness of such information, and all responsibility for the accuracy and completeness thereof is expressly disclaimed by the Owner and the Engineer.

1.03 UTILITIES LOCATED IN OWNER'S RIGHT-OF-WAY

Unless otherwise provided or accepted herein, the removal, adjusting, relocation, or replacement of utility structures or facilities within the Owner's right-of-way, which may be necessary for construction of the work being done, in accordance with these Contract Documents, shall be at the expense of the owners of the utilities. While it is the utility owner's responsibility to perform any work and bear any expense involved in relocations and adjustments within Owner's right-of-way, it shall be the Contractor's responsibility to protect and maintain those utilities which, in the opinion of the Engineer, do not need to be disturbed in order to accomplish the work required by the Contract.

1.04 RELOCATIONS OF EXISTING GAS LINES, TELEPHONE LINES, ELECTRIC LINES, CABLE TV LINES, AND WATER LINES

The Contractor shall notify the proper authority of the utility involved when relocation of these lines is required. The Contractor shall coordinate all work by the utility so that the progress of construction will not be hampered.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION

3.01 GENERAL

The Contractor, when the Notice to Proceed is received, shall notify the owners of utilities affected by the Work, the approximate date upon which he will begin work, and shall submit a progress schedule of the proposed work. This shall be deemed sufficient notice if the project progresses according to the progress schedule submitted with the notification. If changes in the schedule of the work occur, the Contractor shall appraise both the owner of the utility affected, and the Engineer so that adjustments in the work schedule of the utility can be made. The Contractor shall be responsible for damages to the utility facility and construction delays resulting from failure to notify the utility and the Engineer of changes in procedure or location.

3.02 UTILITY CROSSINGS

It is intended that wherever existing utilities such as water, gas, telephone, electrical, drains, or other service lines must be crossed by a force main or waterline, deflection of the pipe within recommended limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the drawings. However, when in the opinion of the Owner or Engineer this procedure is not feasible, he may direct the use of fittings for a utility crossing as detailed on the drawings.

3.03 TEST PITS

A. Test pits for the purpose of locating underground pipelines or structures shall be excavated prior to development of laying schedules for all pipe sizes of 16 inches and larger. The test pits shall be for the purpose of accurately locating underground utilities and structures both horizontally and vertically. Underground utilities' and structures' locations shall be referenced to the project baseline by station and offset distance, left or right and measured perpendicular to the baseline, along with the elevation of the top of the utility or structure. The data shall also include the size and depth or diameter of the utility or structure.

B. This procedure shall be completed for the entire project and all underground utilities and structures shall be located as described above in conformance with the requirements of the field engineering provision of Section 01050. The data collected shall be used to develop a pipe laying schedule with accurately depicts the location of

underground utilities and structures and details both horizontal and vertical deflections and adjustments of the proposed force main pipe required to eliminate conflicts. This laying schedule shall be submitted to the Engineer for approval prior to fabrication of the pipe.

C. Test pits shall be excavated and backfilled prior to both the preparation of the pipe laying schedule and the commencement of construction. The test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer. The costs of the test pit excavations shall be included in the various bid items for which the test pits benefit, except as otherwise allowed by Section 01025, Measurement and Payment.

3.04 PROTECTION OF EXISTING UTILITIES

A. The attention of the Contractor is drawn to the fact that during excavation, the possibility exists of the Contractor encountering water, gas, telephone, electrical or other utility lines not shown on the drawings. The Contractor shall exercise extreme care before and during excavation to locate and flag these lines so as to avoid damage to the existing lines. Should damage occur to an existing line, the Contractor shall repair the line at no cost to the Owner.

B. The Contractor shall assume full responsibility for the protection of all utilities, public and private, including poles, services to buildings, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the drawings. The Contractor shall carefully support and protect all such utilities from injury of any kind. Any damage resulting from the Contractor's operation shall be repaired by him at his expense. The protection and preservation of utility facilities, which are located within the right-of-way, but outside the normal limits of construction, as determined by the Engineer, shall be the responsibility of the Contractor. The Contractor shall be responsible for all damage to utilities, which are due to his negligence.

C. The Contractor shall bear full responsibility for obtaining locations of all underground structures and utilities (including existing water services, drain lines, and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the Contractor.

D. If, in the opinion of the Engineer, permanent relocation of a utility owned by the Owner is required, he may direct the Contractor, in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work under Article 10 of the General Conditions. If relocation of a privately owned utility is required, the Contractor will notify the Utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the Owner and Utility and shall have no claim for delay due to such relocation.

E. The Contractor shall notify public and private utility companies in writing at least two, but not more than five full days (excluding Saturdays, Sundays, and legal holidays) before excavating near their utilities.

F. The Owner will not be responsible for any delay or inconvenience to the Contractor in carrying out the work resulting from the existence, removal or adjustment of any public utility. Additional costs incurred as a result thereof shall be the expense of the Contractor.

3.05 UTILITIES TO BE ADJUSTED

The owners of utility facilities, which required relocation, removal, adjustment or replacement, shall, if possible and feasible, perform this work prior to the commencement of the Contractor's work. Where utility work must be done in conjunction with the Contractor's work on the project or in conjunction with the work of other utilities, arrangements for when, how and where the operation is to proceed shall be worked out among the parties concerned. If disputes arise, the Engineer shall decide the course of action to be taken.

3.06 UTILITIES CONFLICTING WITH OPERATIONS

Those utility facilities which do not conflict with the improvement, but which are obstructions to the operations required for installation or which present unusual difficulty due to their close proximity to the area of the operations shall be located with certainty by the owners of the utility prior to the arrival of the Contractor's operation which would be hindered by the utility facility. The Contractor is required to preserve the utility facility in place without damage and shall be responsible for damages sustained, if the utility owner has located the facility by exposing it to the view of the Contractor or has otherwise shown the Contractor, with certainty, the location of the facility. Any other arrangements that the Contractor may make with a utility

owner as a substitute for the requirements of this Section shall require the approval of the Engineer, in writing.

3.07 MIS-LOCATED UTILITIES

The owner of a utility shall be wholly responsible for the proper location of his facilities, which are affected by construction work performed according to these Specifications. Improperly located or mis-located facilities, which are damaged during construction, shall be the responsibility of the utility, providing proper notification has been given.

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01048 - UTILITIES COORDINATION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01060 - REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Abbreviations and acronyms used in Contract Documents to identify reference standards are illustrated in Section 01092 - Abbreviations.

1.02 QUALITY ASSURANCE

A. Application: When a standard is specified by reference, comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents or applicable codes establish stricter standards.

B. Publication Date: The publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified.

C. Merchantable timber must be harvested and sold commercially to satisfy requirements of the State of Louisiana Forestry Commission.

D. Siltation and sedimentation control shall be practiced to satisfy requirements of the State of Louisiana Department of Wildlife and Fisheries.

E. Detailed requirements such as fertilizer and seeding types, application rates, and seasons shall be subject to modification by the local Soil and Water Conservation District.

1.03 FINANCING BY GOVERNMENTAL AGENCIES

A. When projects are funded by Federal or State agencies, the regulations and rules of the funding agency shall be strictly adhered to.

B. Contractor shall secure from the Owner or the funding agency the regulation applicable to his work and organization including all labor requirements.

C. The Contractor shall be responsible to comply with all rules and regulations as outlined by the funding agency.

1.04 COMPLIANCE WITH REGULATIONS

A. The Contractor shall observe and comply with all Federal, State, and local laws, ordinances, codes, orders, and regulations, which in any manner affect those engaged or employed on the work, the materials used in the work, or the conduct of the work. If any discrepancy or inconsistency should be discovered in this Contract in relation to

any such law, ordinance, code, order, or regulation, the Contractor shall report the same in writing to the Engineer. Any particular law or regulation specified or referred to elsewhere in these specifications shall not in any way limit the obligation of the Contractor to comply with all other provisions of Federal, State and Local laws and regulations.

B. The Contractor shall be responsible for securing all permits and licenses required and shall pay all fees required to complete the job.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01091 - REFERENCE STANDARDS

PART 1 - GENERAL

1.01 UNIT OF MEASURE

The standard units of measure shall be the inch-pound as defined by the U.S. National Bureau of Standards. Metric conversion shall be in accordance with ASTM E380.

1.02 STANDARD STATUS

A. All Standards referred to shall be current with latest addenda and supplements as of the date of the Contract Documents.

B. All work shall comply with all governing building and safety laws, ordinances and regulations relating to building and public health and safety laws having jurisdiction.

1.03 REFERENCE MATERIAL

All reference material utilized in the formation of these specifications can be obtained from local libraries or from the Engineer at the costs of reproduction.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01091 - REFERENCE STANDARDS

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01092 - ABBREVIATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The following standards are referenced in the Contract Documents. The Contractor shall obtain copies of reference standards directly from the publication source when needed for proper performance of Work or when required for submittal by Contract Documents.

AA	Aluminum Association 900 19th Street, NW, Suite 300 Washington, DC 20006	202/862-5100
AABC	Associated Air Balance Council 1518 K Street NW, Suite 503 Washington, DC 20005	202/737-0202
AAMA	American Architectural Manufacturer's Association 1827 Walden Office Square, Suite 550 Schaumburg, IL 60173	847/303-5664
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, Suite 225 Washington, DC 20001	202/624-5800
AATCC	American Association of Textile Chemists and Colorists P.O. Box 12215 Research Triangle Park, NC 27709	919/549-8141
ABMA	American Boiler Manufacturers Association 950 North Glebe Road, Suite 160 Arlington, VA 22203-1824	703/522-7350
ACCA	Air Conditioning Contractors of America 2025 Southern Avenue Shreveport, LA 71104	318/868-2785
ACI	American Concrete Institute 3880 Country Club Drive Farmington Hills, MI 48331	248/848-3700
ACIL	American Council of Independent Laboratories 1629 K Street NW Washington, DC 20006-1633	202/887-5872
ACPA	American Concrete Pipe Association 8300 Boone Boulevard, Suite 400 Vienna, VA 22182	703/821-1990

ADC	Air Diffusion Council 1901 N. Roselle Road, Suite 800 Schaumburg, IL 60195	847/706-6750
AEICI	Association of Edison Illuminating Companies, Inc. 600 N. 18th Street Birmingham, AL 35203	205-254-3568
AGA	American Gas Association 400 N. Capitol St., NW Washington, DC 20001	202/824-7000
AGCA	Associated General Contractors of American 1901 Pennsylvania Avenue NW Washington, DC 20006	202/530-1188
AGMA	American Gear Manufacturers Association 1500 King Street, Suite 201 Alexandria, VA 22314	703/684-0211
AHA	American Hardboard Association 1210 West Northwest Highway Palatine, IL 60067	847/934-8800
AHAM	Association of Home Appliance Manufacturers 1111 19th Street NW Washington, DC 20036	202/872-5955
AI	Asphalt Institute 2696 Research Park Drive Lexington, KY 40511-8480	859/288-4960
AIA	American Institute of Architects 1735 New York Ave. NW Washington, DC 20006	202/626-7300
A.I.A.	American Insurance Association 1130 Connecticut Avenue, NW, Suite 1000 Washington, DC 20036	202/828-7100
AIHA	American Industrial Hygiene Association 345 White Pond Drive Akron, OH 44320	216/762-7294
AISC	American Institute of Steel Construction One East Waker Drive, Suite 3100 Chicago, IL 60611	312/670-8332
AISI	American Iron and Steel Institute 1140 Connecticut Avenue NW, Suite 705 Washington, DC 20036	202/452-7100

AITC	American Institute of Timber Construction 7012 S. Revere Pkwy Englewood, CO 80112	303/792-9559
ALI	Associated Laboratories, Inc. 500 S. Vermont Street Palatine, IL 60067	313/335-6114
ALSC	American Lumber Standards Committee P.O. Box 210 Germantown, MD 20875-0210	301/972-1700
AMCAI	Air Movement and Control Association International, Inc. 30 W. University Drive Arlington Heights, IL 60004	847/394-0150
ANLA	American Nursery & Landscape Association 1000 Vermont NW, Suite 300 Washington, DC 20005-4914	202/789-2900
ANSI	American National Standards Institute 25 W 43rd Street New York, NY 10036	212/642-4900
AOAC	Association of Official Analytical Chemists 481 N. Frederick Avenue Gaithersburg, MD 20877	301/924-7077
APA	American Plywood Association – The Engineered Wood Association P.O. Box 11700 Tacoma, WA 98411	206/565-6600
A.P.A.	American Parquet Association 2900 First Commercial Building Little Rock, AR 72201	501/375-5561
APHA	American Public Health Association 1015 15th Street N.W. Washington, DC 20005	202/789-8670
API	American Petroleum Institute 1220 L Street NW Washington, DC 20005	202/682-8000
ARCA	Asphalt Removing Contractors Association 237 Branston Road Burton Upon Trent Staffordshire DE14 3BT Canada	01283 531126
AREA	American Railway Engineering Associates 50 F Street NW, Suite 7702 Washington, DC 20001	202/639-2190

ARMA	Asphalt Roofing Manufacturers Association 1156 – 15th Street, NW, Suite 900 Washington, DC 20005	202/207-0917
ACRTI	Air Conditioning and Refrigeration Technology Institute 4100 North Fairfax Drive, Suite 200 Arlington, VA 22203	703/524-8800
AGCA	Associated General Contractors of America 333 John Carlyle Street, Suite 200 Alexandria, VA 22314	703/548-3118
ASA	Acoustical Society of America 2 Huntington Quadrangle Melville, NY 11747	516/576-2360
ASC	Adhesive and Sealant Council Inc. 7979 Old Georgetown Road Bethseda, MD 20814	301/986-9700
ASCE	American Society of Civil Engineers 1535 West Loop S. Houston, TX 77027	281/624-7153
ASHRACE	American Society of Heating, Refrigerating & Air Conditioning Engineers 1791 Tullier Circle NE Atlanta, GA 30329	404/636-8400
ASME	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-7722	800/843-2763
ASMI	ASM International 9639 Kinsman Road Novelty, OH 44072	440/338-5151
ASNDT	American Society for Non-Destructive Testing 1711 Arlingate Lane Columbus, OH 43228	614/274-6003
ASPE	American Society of Plumbing Engineers 8614 W. Catalpa Avenue Chicago, IL 60656	773/693-2773
ASSE	American Society of Sanitary Engineering 901 Canterbury Road Westlake, OH 44145	440/835-3040
ASTB	American Standards Testing Bureau, Inc. 1075 New Dehaven Street Conshohocken, PA 19428	610/825-2010

ASTM	American Society for Testing and Materials 100 Bar Harbor Drive Conshohocken, PA 19428-2956	610/832-9500
ATT	American Telephone and Telegraph Company 295 N. Maple Avenue Basking Ridge, NJ 07920	908/221-4191
AWI	Architectural Woodwork Institute 1952 Isaac Newton Sq. W. Reston, VA 22206	703/733-0600
AWPA	American Wood Preservers' Association 5001 Comache Vista Court Granbury, TX 76049	517/326-6300
AWPI	American Wood Preservers' Institute 2750 Prosperity Avenue Fairfax, VA 22031	703/204-0500
AWS	American Welding Society 550 NW 42nd Avenue or 550 Le Jeune Road NW Miami, FL 33126	305/443-9353 or 800/443-9353
AWWA	American Water Works Association 6666 W. Quincy Ave. Lakewood, CO 80235	303/347-0388
BANC	Brick Association of the Carolinas 8420 University Exec. Park Drive Charlotte, NC 28262	704/510-1500
BELLCORE	Bellcore 2101 l Street NW Lbby Washington, DC 20037	202/776-5400
BIA	Brick Institute of America 4194 Fulton Drive NW Canton, OH 44718	330/492-0303
BOBS	Board of Building Standards 6606 Tussing Road Reynoldsburg, OH 43068	
BOCAI	Building Officials and Code Administrators Int'l, Inc. 10830 East 45th Street Tulsa, OK 74146	918/664-4434
BOR	Bureau of Reclamation 11056 W. Country Road 18 E Loveland, CO 80537	970/667-4410

CAGI	Compressed Air and Gas Institute 1300 Sumner Avenue Cleveland, OH 44115	216/241-7333
CAUS	Color Association of the United States 343 Lexington Avenue New York, NY 10016	212/683-9531
CDA	Copper Development Association 260 Madison Avenue New York, NY 10016	212/251-7200
CDC	Centers for Disease Control 4770 Buford Highway Atlanta, GA 30341	770/451-7443
CEA	Cement Employers Association 122 East Board Street Bethlehem, PA 18018	610/868-8060
CEMA	Conveyor Equipment Manufacturers Association 6724 Lone Oak Blvd. Naples, FL 34109	239/514-3441
CFR	Code of Federal Regulations Government Printing Office Washington, DC 20402	
CGA	Compressed Gas Association 1725 Jefferson Davis Highway Arlington, VA 22202	703/412-0900
CIE	Carrier Information Exchange 1625 E. Washington Street West Bend, WI 53095	262/338-0817
CIMA	Cellulose Insulation Manufacturers Association 136 S. Keowee Street Dayton, OH 45402	937/222-2462
CISCA	Ceiling & Interior Systems Construction Association 1500 Lincoln Highway St. Charles, IL 60174	630/584-1919
CISPI	Cast Iron Soil Pipe Institute 5959 Shallowford Road, Suite 419 Chattanooga, TN 37421	423/892-0137
CPIA	Chlorinated Paraffin Industries Association 1250 Connecticut Avenue NW Washington, DC 20036	202/637-9040

CRI	Carpet & Rug Institute 310 Holiday Avenue Dalton, GA 30720	706/278-3176
CRSI	Concrete Reinforcing Steel Institute 933 North Plum Grove Road Schaumburg, IL 60195	847/517-1200
CTIA	Ceramic Tile Institute of America 12061 Jefferson Blvd. Culvert City, CA 90230	310/574-7800
C.T.I.	Cooling Tower Institute 2611 FM 1960 Road West Houston, TX 77068	281/583-4087
DHI	Door and Hardware Institute 14150 Newbrook Drive, Suite 200 Chantilly, VA 20151	703/222-2010
DIPRA	Ductile Iron Pipe Research Association 245 Riverchase Trail Hoover, AL 35244	205/402-8700
ECSA	Exchange Carriers Standards Association 100 South Jefferson Road, Suite 1 Whippany, NJ 07981	973/884-4596
EIA	Electronic Industries Association 2500 Wilson Blvd. Arlington, VA 22201	703/907-7500
EJCDC	Engineers' Joint Contract Documents Committee American Consulting Engineers Council 1015 15th Street NW Washington, DC 20005	
EJMA	Expansion Joint Manufacturers Association 25 North Broadway Tarrytown, NY 10591	914/332-0040
FCC	Federal Communications Commission 445 12th Street SW Washington, DC 20024	202/418/0101
FCI	Fluid Controls Institute 1300 Summer Avenue Cleveland, OH 44115	216/241-7333
FHWA	Federal Highway Administration 400 7th Street SW Washington, DC 20590-0411	

FMEA	Factory Mutual Engineering Association Charlotte, NC 28277	704/752-1021
FTL	Federal Testing Laboratories 4900 9th Avenue NW Seattle, WA 98107	206-706-9904
GA	Gypsum Association 810 1st St. NE, Suite 510 Washington, DC 20002	202/289-5440
HEI	Heat Exchange Institute 1300 Sumner Avenue Cleveland, OH 44115	216/241-7333
HI	Hydraulic Institute 9 Sylvan Way, Suite 180 Parsippany, NJ 07054-3802	973/267-9700
HLMA	Hardwood Lumber Manufacturers Association 545 W Chocolate Avenue Hershey, PA 17033	717/312-1244
HMA	Hardwood Manufacturers Association 400 Pen Center Blvd., Suite 53 Pittsburgh, PA 15235	412/829-0770
IAPMO	International Association of Plumbing and Mechanical Officials 20001 Walnut Drive South Walnut, CA 91789-2825	909/595-8449
ICBO	International Conference of Building Officials 2122 112th Avenue NE, Suite 8300 Bellevue, WA 98004	425/451-9541
ICEAI	Insulated Cable Engineers Association, Inc. 5 Deerfield Road Carrollton, GA 30116	770/830-0369
ICAA	Insulation Contractors Association of America 1321 Duke Street Alexandria, VA 22314	703/739-0356
ICAC	Institute of Clean Air Companies 1660 L Street NW Washington, DC 20036	202/457-0911
IEEE	Institute of Electrical and Electronic Engineers 445 Hoes Lane Piscataway, NJ 08854	732/981-0060

IESNA	Illuminating Engineering Society of North America 120 South Street New York, NY 10038	212/248-5000
IFI	Industrial Fasteners Institute 1717 East 9th Street, Suite 1105 Cleveland, OH 44115	216/241-1482
IIAR	International Institute of Ammonia Refrigeration 1110 N. Glebe Road Arlington, VA 22201	703/312-4200
ILIAI	Indiana Limestone Institute of America, Inc. Stone City Bank Building, Suite 400 Bedford, IN 47421	812/275-4426
IMI	International Masonry Institute 3421 Ivy Hills Blvd. Cincinnati, OH 45244	513/272-2449
IMSA	International Municipal Signal Association 200 Metro Center Blvd. Warwick, RI 02886	401/738-2220
IOS	International Organization for Standardization American National Standards Institute 25 W. 43rd Street New York, NY 10036	212/642-4900
IRI	Industrial Risk Insurers 85 Woodland Street Hartford, CT 06114	860/953-2211
ISA	Instrument Society of America Cincinnati Commerce Center Cincinnati, OH 45202	513/956-7016
ISS	Iron and Steel Society 186 Thorn Hill Road Warrendale, PA 15086	724/776-1535
ISSA	International Slurry Surfacing Association Annapolis, MD 21403	410/267-0023
ITEA	International Test and Evaluation Association 4400 Fair Lakes Court Fairfax, VA 22033	703/631-6220
KCMA	Kitchen Cabinet Manufacturers Association 1899 Preston White Drive Reston, VA 22091-4326	703/264-1690

LIA	Lead Industries Association, Inc. 13 Main Street Sparta, NJ 07871	973/726-5323
LPI	Lightning Protection Institute 3335 N. Arlington Heights Road Arlington Heights, IL 60004	847/255-3003
MBMA	Metal Building Manufacturers Association 1300 Sumner Avenue Cleveland, OH 44115	216/241-7333
MCAA	Mechanical Contractors Associations of America 1385 Piccard Drive Rockville, MD 20850	301/869-5800
MFMA	Maple Flooring Manufacturers Association 60 Revere Drive, Suite 500 Northbrook, IL 60062	847/480-9080
MIA	Marble Institute of America 28901 Clemens Road Westlake, OH 44145	440/250-9222
MSSVFI	Manufacturers Standardization Society of the Valve and Fittings Industry 127 Park Street NE Vienna, VA 22180	703/281-6613
NACE	National Association of Corrosion Barker, TX 77413	281/492-0535
NAPA	National Asphalt Pavement Association 5100 Forbes Blvd. Lanham, MD 20706	301/731-4748
NBBPVI	National Board of Boiler and Pressure Vessel Inspectors 7437 Pinque Drive Columbus, OH 43085	614/888-8320
NBHA	National Builders Hardware Association 1019 S.E. 10th Avenue Portland, OR 97214	503/233-5381
NCMA	National Concrete Masonry Association 13750 Sunrise Valley Drive Herndon, VA 20171	703/713-1900
NCRPM	National Council on Radiation Protection and Measurement 7910 Woodmont Avenue, Suite 1016 Bethesda, MD 20814	301/657-2652

NCTA	National Cable Television Association 1724 Massachusetts Avenue NW Lbby Washington, DC 20036-1969	202/775-3550
NDPA	National Decorating Products Association 403 Axminister Drive Fenton, MO 63026	636/326-2636
NEBB	National Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MD 20877	301/977-3698
NECA	National Electrical Contractors Association Southern Regional Office 5001 Highway 190, Suite D6 Covington, LA 70433	985/893-2920
N.E.C.A.	National Exchange Carrier Association 100 S. Jefferson Road, Suite 1 Whippany, NJ 07981	973/884-4596
NEII	National Elevator Industry, Inc. 20 W. 44th Street New York, NY 10036	212/730-2124
NEMA	National Electrical Manufacturers Association 1300 17th Street N Arlington, VA 22209	703/841-3200
NFLPA	National Fluid Power Association 3333 North Mayfair Road, Suite 101 Milwaukee, WI 53222	414/778-3344
NFPA	National Fire Protection Association Batterymarch Park Quincy, MA 02169	617/770-4543 or 617/745-2200
N.F.P.A.	National Forest Products Association 1111 19th Street NW Washington, DC 20036	202/463-2700
NHLAIS	National Hardwood Lumber Association Inspection School P.O. Box 34518 Memphis, TN 38184	901/377-1818
NIOSH	National Institute for Occupational Safety & Health 200 Independence Avenue SW, #7 Washington, DC 20201	202/401-0721
NKBA	National Kitchen & Bath Association 687 Willow Grove Street Hackettstown, NJ 07840	908/852-0033

NLA	National Lime Association 200 North Glebe Drive Arlington, VA 22203	703/243-5463
NRCA	National Roofing Contractors Association 10255 West Higgins Road Des Plaines, IL 60018	847/299-9070
NPCC	National Painting and Coatings Corporation P.O. Box 170 Orange, NJ 07051	973/324-5800
NSPE	National Society of Professional Engineers 1420 King Street Alexandria, VA 22314	703/684-2800
NSWMA	National Solid Wastes Management Association 4301 Connecticut Avenue NW Washington, SC 20008	202/244-4700
NTCA	National Tile Contractors Association 626 Lakeland East Drive Jackson, MS 39232	601/939-2071
NUCA	National Utility Contractors Association 4301 North Fairfax Drive, Suite 360 Arlington, VA 22203	703/358-9300
NWMA	National Woodwork Manufacturers Association 950 Jennings Street Bethlehem, PA 18017	610/317-6300
NWWDA	National Wood Window & Door Association 1111 19th Street NW Washington, DC 20036	202/463-2799
PDI	Plumbing and Drainage Institute 45 Bristol Drive South Easton, MA 02375	508/230-3516
PEI	Porcelain Enamel Institute 5696 Peachtreet Parkway Norcross, GA 30092	770/242-2632
PHCCNA	Plumbing-Heating-Cooling Contractors-National Association 180 S. Washington Street Falls Church, VA 22040	703/237-8100
PPI	Plastics Pipe Institute 1825 Connecticut Avenue NW Washington, DC 20009	202/462-9607

PPIC	Plumbing Piping Industry Council 9450 SW Commerce Center, Suite 310 Wilsonville, OR 97070	503/682-7919
RFCI	Resilient Floor Covering Institute 401 East Jefferson Street Rockville, MD 20805	301/340-8580
RIS	Redwood Inspection Service 405 Enfrente Road Novato, CA 94949	415/382-0662
RMA	Rubber Manufacturers Association 1400 K Street NW, Suite 900 Washington, DC 20005	202/682-4800
SBCCI	Southern Building Code Congress International 9420 Research Blvd. Austin, TX 78759	512/346-4150
SEMI	Semiconductor Equipment and Material International 1041 K Street NW Washington, SC 20005	202/289-0440
SIGMA	Sealed Insulating Glass Manufacturers Association 401 N Michigan Avenue Chicago, IL 60611	312/644-6610
SJI	Steel Joist Institute 3127 10th Avenue, Ext. N Myrtle Beach, SC 29577	843/626-1995
SMA	Screen Manufacturers Association 3950 North Lake Drive Chicago, IL 60613	773/525-2644
SMACNA	Sheet Metal / Air Conditioning Contractors National Association 4201 Lafayette Center Drive Chantilly, VA 20151-1209	703/803-2980
SPI	Society of Plastics Industry 1801 K Street NW Washington, DC 20006	202/974-5200
SPIB	Southern Pine Inspection Bureau 4709 Scenic Highway Pensacola, FL 32504	850/434-2611
STI	Steel Tank Institute 570 Oakwood Road, Suite 101 Lake Zurich, IL 60047	847/438-8265

SWI	Steel Window Institute 1300 Sumner Avenue Cleveland, OH 44115	216/241-7333
SWPA	Submersible Wastewater Pump Association 1866 Sheridan Road, Suite 201 Highland Park, IL 60035	847/681-1868
SWRI	Sealant Waterproofing & Restoration Institute 2841 Main Street Kansas City, MO 54108	816/472-7974
TAS	Technical Aid Series Construction Specifications Institute 601 North Madison Street Alexandria, VA 22314	703/684-0300
TCA	Tile Council of America 100 Clemson Research Blvd. Anderson, SC 29625	864/646-8453
TEMA	Tubular Exchanger Manufacturers Association 1001 North Fulton Avenue Tulsa, OK 74115	918/835-1042
TMANC	Terrazzo Mosaic Association of Northern California 700 Ygnacio Valley Road Walnet Creek, CA 94596	925/944-4911
TPI	Truss Plate Institute 583 Donoforio Drive, Suite 200 Madison, WI 53719	608/833-5900
UL	Underwriters Laboratories, Inc. 333 Pfingsten Road Northbrook, IL 60062-2096	847/272-8800
UNI-BELL	Uni-Bell PVC Pipe Association 2655 Villa Creek Drive, Suite 155 Dallas, TX 75234	972/243-3902
WCLIB	West Coast Lumber Inspection Bureau 6980 SW Varns Street Portland, OR 97223	503/639-0651
WIC	Woodwork Institute of California 552 Sunset Palmdale, CA 93551	661/272-1438
WPCF	Water Pollution Control Federation 601 Wythe Street Alexandria, VA 22314-1994	703/684-2400

WQA	Water Quality Association 4151 Naperville Road, Suite 100 Lisle, IL 60532	630/505-0160
WWPA	Western Wood Products Association 1500 Yeon Building Portland, OR 97204	503/224-3930

B. Names and titles of federal government standard or specification producing agencies are frequently abbreviated. The following acronyms or abbreviations as referenced in the contract documents indicate names of standard or specification producing agencies of the federal government.

CFR	Code of Federal Regulations Available from the Government Printing Office North Capitol Street between G and H Streets NW Washington, DC 20402 (Material is usually first published in the Federal Register)	202/783-3238
COE	Corps of Engineers (US Department of the Army) Chief of Engineers-Referral Washington, DC 20314	202/693-6456
CPSC	U.S. Consumer Product Safety Commission 4330 E. West Highway Bethesda, MD 20814	301/504-0515
CD	Commercial Development 601 13th Street NW Washington, DC 20005	202/777-2000
DOC	Department of Commerce 1110 Vermont Avenue NW Washington, DC 20005	202/728-6829
DOTn	U.S. Department of Transportation 2100 2nd Street SW Washington, DC 20593	202/646-5095
DOTy	U.S. Department of Treasury Bureau of Alcohol, Tobacco and Firearms c/o Superintendent of Documents U.S. Government Printing Office Washington, DC 20402-9325	202/606-8754
EPA	Environmental Protection Agency 901 5th Street NW Washington, DC 20001	202/260-2080

FAA	Federal Aviation Administration 1575 I Street NW Washington, DC 20005	202/789-1707
FCC	Federal Communications Commission 445 12th Street SW Washington, DC 20024	202/418-0101
FHA	Federal Housing Administration (U.S. Department of Housing and Urban Development) 451 Seventh Street SW Washington, DC 20410	202/708-1112 or 208-8216
FS	Federal Specification (General Services Administration) Specifications Unit (WFSIS) 7th and D Streets SW Washington, DC 20406	202/472-2205 or 472-2140
GSA	General Services Administration Rockville, MD 20847	301/443-0100
HUD	Department of Housing and Urban Development 451 7th Street SW Washington, DC 20410	202/708-1112
LADOTD	Louisiana Department of Transportation & Development 1201 Capital Access Road Baton Rouge, LA 70804	225/274-4326
MSD	Military Standardization Documents (U.S. Department of Defense) Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120-5099	215/697-2667
NBS	National Bureau of Standards (U.S. Department of Commerce) Gaithersburg, MD 20234	301/921-1000
OSCI	Office of Standards Code and Information National Bureau of Standards Gaithersberg, MD 20899	301/975-4029
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor) c/o U.S. Government Printing Office Washington, DC 20402-9325	202/783-3238

PS	Product Standard of NBS (U.S. Department of Commerce) Government Printing Office Washington, DC 20402	202/783-3238
REA	Rural Electrification Administration (U.S. Department of Agriculture) 14th Street and Independence Avenue SW Washington, DC 20250	202/720-2791
USDA	U.S. Department of Agriculture 1400 Independence Avenue Washington, DC 20250	202/264-8600
USPS	U.S. Postal Service 458 Lenfant Plaza SW Washington, DC 20024	202/523-2013

C. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up-to-date as of the date of the Contract Documents.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01092 - ABBREVIATIONS

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 DESCRIPTION

This Section refers to the general procedures and requirements for submittals. Specific requirements for submittals are included in other sections of these Specifications.

1.02 DEFINITION

The term "submittal" as used herein shall be understood to include detail design calculations, shop drawings, fabrication and installation drawings, erection drawings, lists, graphs, operation instructions, catalog sheets, data sheets, product data, samples, and similar items.

1.03 LIST OF SUBMITTALS

A. The following is a list of submittals and the times required for submitting all in accordance with the Contract Documents.

ITEM	TIME
1. Schedule of Progress	Pre-Construction Conference*
2. Schedule of Payments	Pre-Construction Conference*
3. Schedule of Values	Pre-Construction Conference*
4. List of Manufacturers and Associated Products	Prior to Start of Work
5. Substitute Material or Equipment	Prior to Start of Work
6. Manufacturers Certificate of Compliances	Prior to Start of Work
7. Change Orders	Within 15 days of occurrence
8. Layout and Shop Drawings of Fabricated Items	Prior to Installation
9. Shop Drawings or Prior to Installation	Preferred Prior to Start of Work
10. Operation & Maintenance Manuals & Spare Parts	Completion of Project
11. Tabulation of Equipment w/Data	Completion of Project

12.	Certificate of Gradation of Aggregate	Prior to Installation
13.	Concrete Mix Design	Prior to Installation

** If no Pre-Construction Conference is held, Prior to First Payment.*

B. The Engineer may require submittals not listed above to expedite the work. Contractor shall comply with all submittal requests made by Engineer.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01310 - PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall comply with the General Conditions.

B. Submit revised progress schedules periodically.

1.02 FORM OF SCHEDULES

A. Prepare schedules in the form of a horizontal bar chart.

1. Provide separate horizontal bar for each trade or operation.
2. Horizontal time scale: Identify the first workday of each week.
3. Scale and Spacing: To allow for notations and future revisions.
4. Minimum sheet size: 8 1/2" x 11"

B. Formal of Listings: The table of contents of the Contract Documents.

C. Identification of Listings: By bid items.

1.03 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity.
2. Show the dates for the beginning, and completion of, each major element of construction.
3. Show projected percentage of completion for each item, as of the first day of each month.
4. Show an anticipated monthly payment schedule.

B. Submittals Schedule for Shop Drawings, Product Data and Samples. Show the following:

1. The dates for Contractor's submittals.
2. The dates approved submittals will be required from the Engineer.

1.04 PROGRESS REVISIONS

A. Indicate progress of each activity to date of submission.

B. Show changes occurring since previous submission of schedule:

1. Major changes in scope.
2. Activities modified since previous submission.
3. Revised projections of progress and completion.
4. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays, and the impact on the schedule.
2. Corrective action recommended, and its effects.

1.05 SUBMISSIONS

A. Submit initial schedules in accordance with the General Conditions.

1. Engineer will review schedules and return review copy within ten (10) days after receipt.
2. If required, Contractor shall resubmit within seven (7) days after return of review copy.

B. Submit revised progress schedules with each Application for Payment.

C. Submit the number of opaque reproductions, which the Contractor requires, plus five copies, which will be retained by the Engineer.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01340 - SHOP DRAWINGS, PROJECT DATA, AND SAMPLES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall submit to the Engineer for review and exception, if any, such working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this article called data), and material samples (hereinafter in this article called samples) as are required for the proper control of Work, including but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.

B. Within fifteen (15) calendar days after the Effective Date of the Agreement, the Contractor shall submit to the Engineer a complete list of preliminary data on items for which shop drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specified items. Review of this list by the Engineer shall in no way relieve the Contractor from submitting complete shop drawings, data, and samples in accordance with the Specifications. This procedure is required in order to expedite final review of shop drawings.

C. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting. This log should include the following items:

1. Submittal Description and Number assigned.
2. Date to Engineer.
3. Date returned to Contractor (from Engineer).
4. Status of Submittal (Approved, Approved as Noted, Revise and Resubmit, Not Approved).
5. Date of Re-submittal and Return (as applicable).
6. Date material released (for fabrication).
7. Projected date of fabrication.
8. Projected date of delivery to site.
9. Status of O&M Manuals submitted.

1.02 CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the Contractor to check all Drawings, data and samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of the Drawings and data shall bear Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp or evidence that the Contractor has not performed the required review would be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the Contract Documents.

B. Determine and verify:

1. Field measurements.
2. Field construction criteria.
3. Catalog numbers and similar data.
4. Conformance with Specifications and indicate all variances from the Specifications.

C. All shop drawings or other submittals shall be accompanied by the Engineer's standard submittal transmittal form. This form may be obtained in quantity from the Engineer at reproduction cost. Any submittal not accompanied by such a form, or where all applicable items on the form are not completed, will be returned for re-submittal. A separate transmittal form shall accompany each shop drawing, product data, or sample.

D. The Contractor shall be solely responsible for the accuracy and completeness of the shop drawing. In no case shall a subcontractor or supplier submit shop drawings directly to the Engineer. All communications concerning shop drawings or the project in general shall be directed through the Contractor. Contractor shall coordinate between subcontractor, suppliers, and manufacturers all shop drawings to ensure that the total work including all interconnections, timers, control, etc., or the system confers to the design criteria specified.

E. No products, equipment, or material shall be delivered or fabricated until the shop drawings, product data, or sample have been submitted and checked by the Engineer for its conformance to the drawings and specifications and given final approval for fabrication or erection by the Engineer. Until final approval of shop drawing or sample is given in writing, Contractor shall not proceed with any work directly or indirectly associated with that item.

F. The Contractor shall furnish the Engineer a schedule of shop drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.

G. The Contractor shall submit to the Engineer all Drawings and schedules sufficiently in advance of construction requirements to provide no less than twenty-one (21) calendar days for checking and appropriate action from the time the Engineer receives them.

H. All shop drawings shall be clearly marked and labeled as to their intended use. Any submittal which causes the Engineer to ponder or guess at the intended use shall be rejected.

I. The Contractor shall submit one (1) copy of shop drawings and descriptive or product data submittals to complement shop drawings to the Engineer which will be retained for his use. The Contractor shall submit extra sets as required for his subcontractors, his suppliers, and his own use.

J. The Contractor shall be responsible for and bear all cost of damages, which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review by Engineer of the necessary shop drawings.

K. The Contractor shall utilize a Sequential Numbering System for submittals (1-999). Re-submittals or confirming material shall be assigned a letter next to the submittal number, i.e., A=second submittal, B=third submittal, etc.

L. Submittals shall include a certified statement of compliance to the requirements detailed in the specifications in addition to other submittal requirements. This certification shall be prepared by the manufacturer and not the local supplier. Validity of the authority and position of the person signing the certification shall be verified by a Notary Public. The statement of compliance shall address each point of conformance contained in the governing specifications with definitive comments of either compliance or non-compliance. Statements of non-compliance with points of conformance shall be accompanied by a statement of justification as to the reason for non-compliance and why the non-complying feature is considered to be either equal to or better than the specified feature. The Engineer will use the certified statement of compliance in his evaluation of the submittal rendering a judgment as to equality to the specified product and issuing a statement as to whether the product is acceptable for or rejected from incorporation into the work.

M. When a manufacturer named in the controlling specification is chosen to supply a product, and the details of manufacture, size, and installation are shown on his standard catalog cut sheets, the manufacturer may submit the certified statement of compliance as detailed above along with installation details specific to the Work such as laying schedules, etc. as required, deleting the standardized catalog data.

N. Should the Contractor provide a submittal that would require modification to a structure, hydraulic piping, electrical components, layout, controls, or other previously designed aspects of the project, he shall submit with his transmittal, additional design calculations and details of the modification. Any cost incurred by the Engineer for review of these modifications and the direct affect on other designed portions of the project and the implementation of alternate designs shall be borne by the Contractor. The Owner or Engineer will incur no additional costs for modifications or deviations from the original drawings and specifications as submitted by shop drawings, product data, or samples.

O. Shop drawings shall be prepared by a qualified detailer indicating all dimensions, weights, tolerances, clearances, space required, and structures. The manufacturer or supplier of equipment or materials shall certify as to the correctness of the dimensions. Contractor shall verify all drawings submitted as to their completeness with respect to field measurements, field construction criteria, catalog numbers, and similar data. Any drawing submitted through the Contractor not bearing the Contractors approval, data, and checker's name will be returned to the Contractor.

1.03 ENGINEER'S REVIEW OF SHOP DRAWINGS

A. The Engineer's review of Drawings, data and samples submitted by the Contractor will cover only general conformity to the Specifications, external connections, and dimensions that affect the installation.

B. The review of Drawings and schedules will be general, and shall not be construed:

1. as permitting any departure from the Contract requirements;

2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;

3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.

C. When reviewed by the Engineer, each of the shop drawings will be identified as having received such review being so stamped and dated.

1. If the copies received are marked "Approved", those documents are used as guidelines for installation.

2. If the copies received are marked "Approved As Noted", the Contractor shall make the appropriate corrections to the material and/or product and incorporate the revised material and/or product into the project.

3. If the copies received are marked "Revise and Resubmit", the material or product may be acceptable; however, substantial corrections require the Engineer to review the material or product after the revisions have been made. A formal re-submittal of the revised material and/or product is required using a separate transmittal form. One (1) copy of the revised re-submittal is required.

4. If the copies received are marked "Not Approved", the material and/or product cannot be incorporated into the project. Another product approved by the Contract Documents shall be submitted with a new transmittal form accompanied by one (1) copy of shop drawings, product data, or samples.

D. Upon review of the shop drawing, product data, or sample by the Engineer, the Engineer will distribute the submittals as follows:

No. Required	To Whom	For Use
1	Engineer	Office
1	Owner	O&M Manuals
1	Resident Project Representative	Field
1	Contractor	Field

E. If the drawings or schedules as submitted describe variations per subparagraph 1.04.D, and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or Time, the Engineer may return the reviewed Drawings without noting any exception.

F. Re-submittals will be handled in the same manner as first submittals. The Contractor shall direct specific attention to revisions other than the corrections requested by the Engineer on previous submissions by written details or markings on the resubmitted Shop Drawings. The Contractor shall make any corrections required by the Engineer.

G. If the Contractor considers any correction indicated on the Drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.

H. The Engineer will review a submittal/re-submittal a maximum of three (3) times after which cost of review will be borne by the Contractor. The cost of engineering shall be equal to the Engineer's charges to the Owner under the terms of the Engineer's agreement with the Owner.

I. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions or approval from the Engineer.

1.04 SHOP DRAWINGS

A. Shop Drawings shall be complete and detailed.

B. Drawings and schedules shall be checked and coordinated with the work of all trades involved, before they are submitted for review by the Engineer and shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the Contractor for resubmission.

C. Each shop drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:

1. Number and title of the drawing.
2. Date of drawing or revision.
3. Name of project building or facility.
4. Name of Contractor and Subcontractor submitting drawings.
5. Clear identification of contents and location of the work.
6. Specification number and title.

D. If Drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustments in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such Drawings have been reviewed.

E. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material as required. Materials and equipment lists shall give for each item thereon the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.

F. The Contractor shall provide a list including the equipment name, address, and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained for all mechanical and electrical equipment furnished.

G. All manufacturers or equipment suppliers who proposed to furnish equipment or products shall submit an installation list to the Engineer along with the required Shop Drawings. The installation list shall include at least five installations where identical equipment has been installed and has been in operation for a period of at least one (1) year.

H. Only the Engineer will utilize the color "red" in marking Shop Drawing submittals.

1.05 WORKING DRAWINGS

A. Working drawings shall be considered to mean the Contractor's plans for temporary structures.

B. Copies of working drawings as noted in subparagraph 1.02, shall be submitted to the Engineer where required by the Contract Documents or requested by the Engineer, and shall be submitted at least thirty (30) calendar days (unless otherwise specified by the Engineer) in advance of their being required for Work.

C. The Engineer will not review working drawings but shall use them as information to monitor the work performed by the Contractor.

1.06 SAMPLES

A. The Contractor shall furnish for the review of the Engineer samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed and the Contractor shall prepay all shipping charges. Materials or equipment for which samples are required shall not be used in work until reviewed by the Engineer.

B. Samples shall be of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of the product, with integrally related parts and attachment devices.
2. Full range of color, texture, and pattern.

C. Each sample shall have a label indicating:

1. Name of Project.
2. Name of Contractor and Subcontractor.
3. Material or Equipment represented.
4. Place of origin.
5. Name of Producer and Brand (if any).
6. Location in Project.

Samples of finished materials shall have additional marking that will identify them under the finished schedules.

D. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples containing the information required in subparagraph 1.06.B above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer and the remaining copy shall be for the Contractor's records. Review of a sample shall be only for the characteristics or use named and shall not be construed to change or modify any Contract requirements.

E. Reviewed samples not destroyed in testing shall be sent to the Engineer or stored at the site of the Work. Reviewed samples of the hardware in good condition will be marked for identification and may be used in the Work. Materials and equipment incorporated in work shall match the reviewed samples. Samples, which failed testing or were rejected, will be returned to the Contractor at his expense, if so requested at time of submission.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TRANSMITTAL FOR SHOP DRAWINGS, PRODUCT DATA, OR SAMPLES

TO: _____

FROM: _____

DATE: _____
PROJECT NO.: _____
PROJECT: _____
ENGINEER SUBMITTAL NO.: _____

CONTRACTOR HAS REVIEWED AND APPROVED SUBMITTAL:

BY: _____ DATE: _____ CONTRACTOR SUBMITTAL NO.: _____

SHOP DRAWING ☐ PRODUCT DATA ☐ SAMPLE ☐

GENTLEMEN: WE ARE SUBMITTING THE FOLLOWING SHOP DRAWINGS, PRODUCT DATA OR SAMPLES:

QTY	SPECIFICATION DIVISION AND SECTION	DRAWING	MANUFACTURER	DESCRIPTION

THERE ARE ☐ NO DEVIATIONS WHATSOEVER FROM DRAWINGS AND SPECIFICATIONS

☐ DEVIATIONS FROM DRAWING AND SPECIFICATIONS, EXPLANATION ON BACK OF SHEET

ENGINEER'S REVIEW STATEMENT:

	APPROVED	APPROVED AS NOTED	REVISE AND RESUBMIT	NOT APPROVED	CHECKED BY
STRUCTURAL	☐	☐	☐	☐	_____
MECHANICAL	☐	☐	☐	☐	_____
CIVIL	☐	☐	☐	☐	_____
ELECTRICAL	☐	☐	☐	☐	_____

ENGINEER'S FINAL STATEMENT:

APPROVED ☐

APPROVED AS NOTED ☐

REVISE AND RESUBMIT ☐

NOT APPROVED ☐

ENGINEER'S REVIEW AND APPROVAL OF THIS SUBMITTAL ARE EXPRESSLY LIMITED AS PROVIDED IN THE CONTRACT DOCUMENT AND ARE ONLY TO DETERMINE COMPLIANCE WITH INFORMATION GIVEN IN CONTRACT DOCUMENTS AND CONFORMANCE WITH DESIGN CONCEPT OF COMPLETED PROJECT AS A FUNCTIONING WHOLE. CONTRACTOR IS, AND ENGINEER IS NOT, RESPONSIBLE FOR ALL MATTERS RELATING TO FABRICATION, SHIPPING, HANDLING, STORAGE, ASSEMBLY INSTALLATION AND CONSTRUCTION FOR ALL SAFETY ASPECTS OF PERFORMING THE WORK AND FOR COORDINATING THE WORK.

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01370 - SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Submit to the Engineer a Preliminary Schedule of Values in accordance with Article 2.6 of the General Conditions.

B. Upon request of the Engineer, support the values with data, which will substantiate their correctness.

C. Refine the Schedule of Values to reflect the requirements of Article 2.9 of the General Conditions. The final Schedule of Values shall be used only as the basis for the Contractor's Applications for Payments.

1.02 FORM AND CONTENT OF SCHEDULES OF VALUES

A. Type schedule on 8-1/2" x 11" or 8-1/2" x 14" white paper. Contractor's standard forms and automated printout will be considered for approval by the Engineer upon Contractor's request. Identify schedule with:

1. Title of Contract and location.
2. Engineer and Contract numbers.
3. Name and Address of Contractor.
4. Contract designation.
5. Date of submission.

B. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Identify each line item with the number and title of the respective major section of the Specifications.

D. For each major line item, list sub-values of major products or operations under the item.

E. For the various portions of the Work:

1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.

2. For items on which progress payments will be requested for stored materials, break down the value into:

a. The cost of the materials, delivered and unloaded, with taxes paid. Paid invoices are required for materials upon request by the Engineer.

b. The total installed value.

F. Follow the Bid Form Schedule of Prices as the format for listing component items for unit price project.

G. The sum of all values listed in the schedule shall equal the total Contract Sum of all lump sum and extended unit price items in the Bid Form.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

This Section includes general quality control procedures and requirements that are applicable to other sections.

1.02 TESTING LABORATORY

A. If desired by the Owner, a qualified testing laboratory will make field visits to sample such items as Portland cement concrete, hot or cold-mix asphalt, earthwork fill and compaction, aggregate, welding, etc. The frequency of testing will be at the discretion of the Owner and the recommendations of the Engineer to the Owner.

B. Refer to Section 01410 for detail description of testing laboratory services.

1.03 INSPECTION SERVICES

A. The Owner may employ the services of a Resident Project Representative (RPR) to review field operations, provide daily reports, and act as a liaison between the Engineer and Contractor.

B. Refer to Section 01420 for detail descriptions of the Resident Project Representative.

1.04 CONFORMANCE STANDARDS

A. The manufacturer of equipment shall issue a manufacturer's conformance certificate indicating the product was assembled or constructed in accordance with specific standards and that the product performs under specific parameters.

B. Submit conformance certificates in accordance with Section 01300 - Submittals.

1.05 CERTIFIED TEST REPORTS

A. Test reports performed in the field or in the shop shall be certified by the manufacturer of the product.

B. Submit certified test reports in accordance with Section 01300 - Submittals.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01400 - QUALITY CONTROL

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01410 - TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Owner will employ and pay for the services of an Independent Testing Laboratory to perform testing specifically indicated on the Contract Documents or specified in the Specifications and may at any other time elect to have materials and equipment tested for conformity with the Contract Documents.

A. Contractor shall cooperate with the laboratory to facilitate the execution of its required services.

B. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract.

1.02 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents.
2. Approve or accept any portion of the Work.
3. Perform any duties of the Contractor.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel; provide access to Work and to Manufacturer's operations.

B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes, which require control by the testing laboratory.

D. Materials and equipment used in the performance of Work under this Contract are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. The Engineer may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents.

All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor, and no extra charge to the Owner shall be

allowed on account of such testing and certification.

E. Furnish incidental labor and facilities:

1. To provide access to Work to be tested.
2. To obtain and handle samples at the Project site or at the source of the product to be tested.
3. To facilitate inspections and tests.
4. For storage and curing of test samples.

F. Notify laboratory at least 24 hours in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.

G. Employ and pay for the services of the same or a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required for the Contractor's convenience and as approved by the Engineer.

H. If the test results indicate the material or equipment complies with the Contract Documents, the Owner shall pay for the cost of the testing laboratory. If the tests and any subsequent retests indicate the materials and equipment fail to meet the requirements of the Contract Documents, the Contractor may pay for the laboratory costs directly to the testing firm or the total of such costs shall be deducted from any payments due the Contractor.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION

3.01 REPORTS

Testing Laboratories are required to provide a minimum of four (4) copies of each testing report. Copies shall be distributed by the testing laboratory to 1) Owner, 2) Engineer, 3) Contractor, and 4) Resident Project Representative.

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01420 - INSPECTION SERVICES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Owner will employ the services of a Resident Project Representative (RPR) in an effort to protect the Owner against defects and deficiencies in the Work.

B. The RPR will 1) act as the Engineer's agent at the site, 2) act as directed by and under the supervision of the Engineer, and 3) will confer with the Engineer regarding the RPR's actions.

C. RPR's dealings in matters pertaining to the on-site Work shall in general be with Engineer and Contractor keeping Owner advised as necessary. RPR's dealings with subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner with the knowledge of and under the direction of Engineer.

1.02 DUTIES AND RESPONSIBILITIES OF RPR

A. Schedules - Review the progress schedule, schedule of Shop Drawing submittals and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.

B. Conferences and Meetings - Attend meetings with Contractor, such as pre-construction conferences, progress meetings, job conferences, and other project-related meetings, and prepare and circulate copies of minutes thereof.

C. Liaison:

1. Serve as Engineer's liaison with Contractor, working principally through Contractor's superintendent and assist in understanding the intent of the Contract Documents; and assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-site operations.
2. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

D. Shop Drawings and Samples:

1. Record date of receipt of Shop Drawings and samples.
2. Receive samples, which are furnished at the site by Contractor, and notify Engineer of availability of samples for examination.
3. Advise Engineer and Contractor of the commencement of any Work requiring a Shop Drawing or sample, if the submittal has not been approved by Engineer.

E. Review of Work, Rejection of Defective Work, Inspections and Tests:

1. Conduct on-site observations of the Work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

2. Report to Engineer whenever RPR believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of Work that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

3. Verify that tests, equipment and systems startup and operating and maintenance training are conducted in the presence of appropriate personnel, and that Contractor maintains adequate records thereof; and observe, record and report to Engineer appropriate details relative to the test procedures and startup.

4. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to Engineer.

F. Interpretation of Contract Documents - Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

G. Modifications - Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report with RPR's recommendations to Engineer. Transmit to Contractor decisions as issued by Engineer.

H. Records:

1. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples, reproductions of original Contract Documents including all Work Directive Changes, Addenda, Change Orders, Field Orders, additional Drawings issued subsequent to the execution of the Contract, Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.

2. Keep a diary or log book, recording Contractor hours on the job site, weather conditions, data relative to questions of Work Directive Changes, Change Orders or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

3. Records names, addresses and telephone numbers of all Contractors, subcontractors, and major suppliers of materials and equipment.

I. Reports:

1. Furnish Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and sample submittals.

2. Consult with Engineer in advance of scheduled major tests, inspections or start of important phases of the Work.
3. Draft proposed Change Orders and Work Directive Changes, obtaining backup material from Contractor and recommend to Engineer Change Orders, Work Directive Changes, and Field Orders.
4. Report immediately to Engineer and Owner upon the occurrence of any accident.

J. Payment Requests - Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.

K. Certificates, Operation and Maintenance Manuals - During the course of the Work, verify that certificates, operation and maintenance manuals and other data required to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to Engineer for review and forwarding to Owner prior to final payment for the Work.

L. Completion:

1. Before Engineer issues a Certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction.
2. Conduct final inspection in the company of Engineer, Owner and Contractor and prepare a final list of items to be completed or corrected.
3. Observe that all items on final list have been completed or corrected and make recommendations to Engineer concerning acceptance.

1.03 LIMITATION OF AUTHORITY OF RPR

A. The Resident Project Representative:

1. Shall not authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by Engineer.
2. Shall not exceed limitations of Engineer's authority as set forth in the Contract Documents.
3. Shall not undertake any of the responsibilities of Contractor, subcontractors or Contractor's superintendent.
4. Shall not advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents.
5. Shall not advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work.

6. Shall not accept Shop Drawing or sample submittals from anyone other than Contractor.
7. Shall not authorize Owner to occupy the Project in whole or in part.
8. Shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01435 - GEOTECHNICAL INVESTIGATION REPORT

PART 1 - GENERAL

1.01 SCOPE

This Section includes the results of a geotechnical investigation of the project site performed by a geotechnical testing laboratory.

1.02 APPLICABLE PUBLICATIONS

A geotechnical investigation was conducted by Geotechnical Testing Laboratory, Inc. for this project. The investigation consisted of ten (10) soil borings drilled in December 2003 and September 2004. The cover letter dated September 8, 2004 and associated report are included herein.

1.03 LIMITS OF LIABILITY

The Contractor may rely upon the general accuracy of the Atechnical data@ contained in the Geotechnical Investigations Report. Except for such reliance on such Atechnical data@, Contractor may not rely upon or make any claim against Owner, Engineer, or any of Engineer's Consultants with respect to the completeness of such reports for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto, or other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings, or any Contractor interpretation of or conclusion drawing from any Atechnical data@ or any such data, interpretations, opinions or information.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01435 - GEOTECHNICAL INVESTIGATION REPORT

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01505 - MOBILIZATION

PART 1 - GENERAL

1.01 DEFINITION

A. Mobilization shall include the obtaining of all permits, insurance, and bonds; moving onto the site of all plant and equipment; furnishing and erecting plants, temporary building, and other construction facilities; all as required for the proper performance and completion of the work. Mobilization shall include but not be limited to the following principal items:

1. Moving on to the site of all Contractor's plants and equipment required for first month operation.

2. Installing temporary construction power and wiring.

3. Establishing fire protection system.

4. Developing construction water supply.

5. Providing field office trailers for the Contractor and the Engineer, complete with all specified furnishings and utility services including telephones.

6. Providing on-site sanitary facilities and potable water facilities as specified.

7. Arranging for and erection of Contractor's work and storage yard.

8. Submittal of all required subcontractor insurance certificates and bonds.

9. Obtaining all required permits.

10. Posting all OSHA required notices and establishment of safety programs.

11. Have the Contractor's superintendent at the jobsite full time.

12. Have provided a detailed schedule acceptable to the Owner for project use as specified.

13. Audio-Video Survey.

1.02 PAYMENT FOR MOBILIZATION

A. The Contractor's attention is directed to the condition that no payment for mobilization or any part thereof will be approved for payment under the contract until all mobilization items listed above have been completed as specified.

B. If the project is a unit price contract and a line item is designated "mobilization", all costs incurred for the above work shall be placed under that item. If no item is listed for "mobilization", the costs for the above-described work shall be placed in other items. In this case, no direct payment will be made for mobilization.

C. For lump sum projects, the costs for this work shall be included in the overall costs of the project and shown as a separate item in the Schedule of Values.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01510 - TEMPORARY UTILITIES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Furnish, install and maintain temporary utilities required for field offices and construction and remove on completion of the Work.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with National Electric Code.

B. Comply with Federal, State and local codes and regulations and with utility company requirements.

PART 2 - PRODUCT

2.01 MATERIALS, GENERAL

Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

A. Arrange with utility company and Owner to provide service required for power and lighting, and pay all costs for service and for power used in the construction, testing and trial operation prior to final acceptance of the work by the Owner as stipulated by the Engineer.

B. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work, and for areas accessible to the public.

2.03 TEMPORARY HEAT AND VENTILATION

A. Provide temporary heat and ventilation as required maintaining adequate environmental conditions to facilitate progress of the Work.

B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases.

C. Portable heaters shall be standard approved units complete with controls.

D. Pay all costs of installation, maintenance, operation and removal, and fuel consumed.

E. Provide connections to existing facilities or extend and supplement the existing

facilities with temporary units as required to comply with requirements. Pay all costs of installation, maintenance, operation and removal.

2.04 TEMPORARY TELEPHONE SERVICE

Arrange with local telephone service company, provide direct line telephone service, as stipulated in Section 01590, including an external bell at the construction site for the use of personnel and employees. Service required.

A. One direct line instrument in Field Office of Engineer for the Owner.

B. Other instruments at the option of the Contractor, or as required by regulations.

2.05 TEMPORARY WATER

A. Provide and pay for all water required for construction and consumptive purposes.

B. Install at each and every connection to the potable water supply a backflow preventer meeting the requirements of ASA A40.6, latest revision. Contractor shall be required to meter all water used.

C. If potable water system is owned by the Owner, any water used for construction purposes will be provided by the Owner. Limited, reasonable, and unwasteful amounts of water will be provided for clearing, flushing, disinfecting, testing, and other minor construction purposes. Unreasonable or wasteful use amounts as determined by the Owner will be charged at prevailing rates. The hours and duration of water usage shall be determined by the Owner.

2.06 TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities in compliance with laws and regulations.

B. Service, clean and maintain facilities and enclosures.

PART 3 - EXECUTION

3.01 GENERAL

A. Comply with applicable requirements specified in Division 2 - Site Work, Division 15 - Mechanical, and Division 16 - Electrical.

B. Maintain and operate systems to assure continuous service.

C. Modify and extend systems as work progress requires.

3.02 REMOVAL

A. Completely remove temporary materials and equipment when their use is no longer required as determined by the Engineer.

B. Clean and repair damage caused by temporary installations or use of temporary facilities.

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01510 - TEMPORARY UTILITIES

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01570 - TRAFFIC REGULATION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall be responsible for providing safe and expeditious movement of traffic through or around construction zones. A construction zone is defined as the immediate areas of actual construction and all abutting areas which are used by the Contractor and which interfere with the driving or walking public.

B. Remove temporary equipment and facilities when no longer required and restore grounds to original and/or, or to specified conditions.

1.02 TRAFFIC CONTROL

A. The necessary precautions shall include, but not be limited to, such items as proper construction warning signs, signals, lighting devices, markings, barricades, channelization, and hand signaling devices. The Contractor shall be responsible for installation and maintenance of all devices and requirements for the duration of the construction period. Contractor to check traffic control devices on a daily basis as a minimum when beginning and ending the workday and on weekends, at a minimum of once per day.

B. Any additional traffic control devices which may be required at time of construction by the Engineer and/or Owner shall be provided by the Contractor at no additional contract cost.

C. The Contractor shall provide at least five (5) working days notification to the Engineer of the necessity to close any portion of a roadway carrying vehicles or pedestrians so that the final approval of such closing can be obtained from the roadway owner at least 48 hours in advance. With any such closing adequate provision shall be made for the safe expeditious movement of traffic and pedestrians.

D. The Contractor shall also be responsible for notifying Police, Fire and Ambulance Departments whenever roads are impassable.

E. The Contractor shall be responsible for removal, relocation, or replacement of any traffic control device in the construction area, which exists as part of the normal traffic control scheme prior to construction. Any such actions shall be performed by the Contractor under the supervision, and in accordance with the Specifications, of the Owner, unless otherwise specified. Construction signing and activities shall not block

existing traffic control signing, unless such signing is superseded by construction signing.

All traffic control devices not applying to an appropriate situation shall be covered or removed. No traffic conduit or traffic loops shall be disturbed without prior notification. Contractor shall take all precautions to avoid damage to traffic boxes, conduits, loops and supply lines. Should any of the above need to be relocated, the Contractor shall coordinate with roadway owner.

F. The Contractor shall immediately notify the Engineer of any vehicular or pedestrian safety or efficiency problems incurred as a result of the construction of the Project.

G. Vehicular access to commercial and residential driveways shall be maintained except when necessary construction precludes such access. When such conditions arises that ingress or egress to the property is to be temporarily terminated, the Contractor shall notify the affected property owner at least 24 hours in advance of such construction.

H. The Contractor shall also cooperate with the various parties involved in the delivery of mail and the collection and removal of trash and garbage to maintain existing schedules of these services.

I. Traffic directors shall be trained flaggers of at least average intelligence, good physical condition, including sight and hearing, having mental alertness, a courteous but firm manner, neat appearance, and a sense of responsibility for the safety of the public. Traffic directors shall wear an orange or fluorescent orange garment such as a shirt, jacket, or vest. This garment shall be reflectorized for nighttime operations. When controlling traffic, traffic directors shall be equipped with a sign and a 24" x 24" red flag. At night, flagmen shall use a red light. They shall follow the procedures stipulated for flaggers in the Louisiana Manual on Uniform Traffic Control Devices.

Flagging operations are most likely required, but not limited to, the following traffic control situations:

1. When one lane is alternately used for both directions of travel;

2. When the roadway is closed for a short period of time to allow equipment movements, blasting operations, etc.;

3. When workers are close to a travel lane without a positive barrier;

4. When traffic speeds must be reduced and traffic control devices alone will

not get the job done;

5. When public relations and publicity functions need to be handled at the worksite, such as explaining the situation, alerting motorists to changing conditions, and passing out handouts;

6. When installing and removing traffic control devices;

7. Other situations where variable conditions require responsive traffic control.

J. Construction signing, detours, and traffic control devices shall be in accordance with roadway owner's regulations and with the Louisiana Manual of Uniform Traffic Control Devices.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01570 - TRAFFIC REGULATION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01600 - MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Material and equipment incorporated into the Work shall:

1. Conform to applicable specifications and standards.

2. Comply with size, make, type, and quality specified to the greatest extent possible, detailing all aspects and providing explicit reasons for parameters not in compliance and specifically approved in writing by the Engineer.

3. Manufactured and Fabricated Products:

- **a**. Design, fabricate, and assemble in accord with the best engineering and standard shop practice.
- **b**. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
- **c**. Two or more items of the same kind shall be produced, by the same manufacturer.
- **d**. Products shall be suitable for service conditions.
- **e**. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.

4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

B. The term "Product" shall refer to material and/or equipment when used in these Specifications or visa versa.

C. When material or equipment requires pre-qualification as described by Section 01030 - Alternates/Alternatives, only those materials and equipment approved prior to the bid or by addendum will be incorporated into the Project.

1.02 SUBSTITUTE MATERIAL AND EQUIPMENT

A. When a particular product is specified or called for, it is intended and shall be understood that the Contractor includes those products in his bid. Should the Contractor desire to substitute products which he purports to be equal to those specified and not listed as an alternate/alternative pre-qualified product, the Contractor shall furnish the information as described in the General Conditions and described in this Section.

The substitute product(s) submitted by the Contractor shall meet the requirements of the specifications and shall, in all respects, be equal to the products specified by name herein.

B. Manufacturers of substitute equipment must submit through the Contractors evidence of manufacturer, installation, and successful operation of their equipment for ten (10) installations. The manufacturer shall submit the names, addresses, and telephone numbers of Owners, Engineers and Contractors. These installations shall be over a period of the past three (3) years. Installation shall be equal in application and operating conditions. If a manufacturer cannot meet these requirements as a result of new technology, experimental data can be submitted to meet the experience requirement.

C. Substitute equipment by manufacturers, which cannot provide acceptable references of comparable installations in successful operation will not be allowed to provide equipment on this Project.

D. The Owner and Engineer will solely make the determination as to whether or not a proposed substitute is "equal". This determination will be made in accordance with these Contract Documents and based upon submittal data supplied by the manufacturer. Submittal data which causes the Engineer and Owner to ponder, or does not address key items of the proposed equipment will be rejected. Submittal data shall be precise concerning the equipment parts and its operation.

E. To determine if a substitute product is equal, the following parameters shall be used:

1. Function of equipment
2. Capacity, size, rating
3. Reliability and past performance on similar projects
4. Quality control and workmanship
5. Design data
6. Installation and cost
7. Operational costs (i.e., fuel, electrical, manpower)
8. Maintenance schedules
9. Guarantees
10. Availability of parts and service from area reps
11. Replacement costs
12. Any required license fees or royalties
13. Other available data

F. Proposals for substitute material or equipment shall be made in writing to the Engineer with associated brochures and descriptive data. No substitute product may be submitted as a shop drawing, product data, or sample, unless it has been previously approved by the Engineer in writing. In the case where a substitute product is

approved, any modifications to the project such as design changes, construction changes, etc., shall be made at the Contractors expense. Any design modification shall be submitted to and approved by the Engineer prior to ordering or installing the substitute product.

G. All apparatus, mechanism, equipment, machinery, and manufactured articles for incorporation into the Work shall be new and unused and the standard products of recognized reputable manufacturers.

H. Contractor's Representation - A request for a substitution constitutes a representation that Contractor:

1. Has investigated the proposed Product and determined that it is equal to or superior in all respects to that specified;
2. Will provide the same warranties or bonds for the substitution as for the product specified;
3. Will coordinate the installation of an accepted substitution into the Work, and make such other changes as may be required to make the work complete in all respects; and,
4. Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.

1.03 APPROVAL OF MATERIALS

A. Only new materials and equipment shall be incorporated in the Work. All materials and equipment furnished by the Contractor shall be subject to the inspection and approval of the Engineer. No material shall be delivered to the Work without prior approval of the Engineer.

B. The Contractor shall submit to the Engineer, data relating to materials and equipment he proposes to furnish for the work. Such data shall be in sufficient detail to enable the Engineer to identify the particular product along with reference to the applicable section(s) of the Specifications to form an opinion as to its conformity to the Specifications. The data shall comply with Section 01340 - Shop Drawings, Product Data, and Samples and other paragraphs of this Section.

C. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. If the Engineer requires, the Contractor shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the specifications. Such samples shall be furnished, stored, packed, and

shipped as directed at the Contractor's expense. Except as otherwise noted, the Contractor will make arrangements for and pay for the tests. Where such tests confirm compliance with the specifications, the Owner will reimburse the actual charges of the testing firm paid by the Contractor.

D. Contractor shall submit data and samples sufficiently early to permit consideration, approval, manufacture, and delivery of materials before they are necessary for incorporation in the work. Any delay of approval resulting from the Contractor's failure to submit samples or data promptly shall not be used as a basis of claim against the Owner or the Engineer.

E. The materials and equipment used in the Work shall correspond to the approved samples or other data.

1.04 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

A. When Contract Documents require that installation of the Work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including copies to the Engineer. One complete set of the installation instructions shall be available for use on the job site during and through completion of the Work.

Installation instructions shall be submitted in accordance with Section 01340 - Shop Drawings, Product Data and Samples.

B. Handle, install, connect, clean, condition and adjust products as required by the manufacturer's instructions and in conformity with specified requirements.

1. Should the specified requirements conflict with the manufacturer's instructions, the manufacturer's instructions shall have priority unless changes are authorized in writing by the manufacturer.
2. Should job conditions conflict with the manufacturer's instructions, consult with the manufacturer for clarification.
3. Clarifications of installation instructions shall be issued only by the manufacturer, shall be in writing, and shall be distributed to all parties involved in the installation as stated above and prior to alteration of the installation procedures.
4. Do not proceed with the Work without clear instructions concerning the specific installation procedures.

C. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by the manufacturer.

1.05 SERVICES OF MANUFACTURER'S REPRESENTATIVE

A. From each company manufacturing or supplying equipment, the Contractor shall provide as outlined below the services of a qualified factory service representative. Equipment furnished under Divisions 11, 13, 15, and 16 shall include the costs of these services. A service representative shall be a full-time factory-trained service employee with a minimum of two (2) years field service experience. Manufacturer's sales representatives or sales agents, subcontractors to manufacturers, or similar personnel will not qualify. The service rendered by these representatives shall be at the work site for an eight (8) hour workday for each piece of equipment. The number of trips and days required for each piece of equipment stated below is as follows:

Phase I - Installation

The factory service representative shall direct the contractor in the proper unloading, setting, installation, erection, storage and connection to adjacent units for their respective equipment. These services shall be for a period of not less than one (1) day. Some equipment may require additional time for the installation of major units of equipment. In this case a longer period may be mutually agreed to by the Contractor and Manufacturer. These services during the installation phase may be omitted if the installation of the equipment is not complicated. Permission for deletion of these services shall be made in writing to the Engineer prior to the delivery of the equipment with the appropriate reasons why these services are not needed for this equipment. Only after written approval has been granted by the Engineer will these services be voided. In any case, the manufacturer is responsible for the correct installation of the equipment in accordance with the manufacturer's recommended practices.

Phase II - Testing

After the equipment has been properly installed by the Contractor and readied for operation, each unit of equipment together with piping, power, and controls shall be tested by a factory service representative for its intended use as outlined in the technical specifications and drawings. These services shall be a separate one (1) day minimum visit to inspect and test the unit to verify that the installation is in accordance with the recommended practice of the manufacturer.

Any calibrations, adjustments, or coordination of controls with other equipment shall be made at this time. The services of a factory service representative will be required on a consecutive day basis until the equipment has been properly tested to perform in accordance with the Contract Documents. If the equipment is not tested as required, the cost for additional visits will be paid for by the Contractor or the manufacturer.

In the presence of the Owner's representative, the Resident Project Representative and/or Engineer, the operation, testing, and adjustments shall be

performed to demonstrate the equipment operates as intended. After the site visit during this phase, the manufacturer or the supplier shall certify in writing a report (in triplicate) to the Engineer of the results of the inspection, operation and condition of the equipment. This report shall include a detailed description of tests performed and the actual performance of the equipment. Any results which would require precautions to be taken to ensure proper maintenance of the equipment should be included in the report. Finally, the report should include a certification that the equipment conforms to the requirements of the Contract Documents and is ready for permanent operation. Furthermore, the certification shall include a statement stating nothing in the installation or testing operations will void the manufacturer's warranty. All manufacturers are required to provide the services outlined in this phase without exception.

Phase III - Start-Up, Operation and Training

Once all equipment has been satisfactorily tested and the facility is substantially complete, the Contractor shall coordinate the concurrent start-up of all units of equipment. This coordination shall include the simultaneous attendance of the Owner's representative, the Engineer, and the factory service representative of each unit of equipment.

The factory service representative will provide for a minimum of one (1) day instruction and training for the Owner's representative in the proper operation, adjustment and maintenance of the equipment. At this item the service representative shall provide operation and maintenance manuals to the Engineer unless provided for otherwise.

B. For equipment or products furnished under other divisions, the Contractor, unless otherwise specified, shall furnish the services of authorized representatives of the manufacturers only when some evident installation or operation problem makes such services necessary in the opinion of the Engineer.

C. Manufacturer's Operating and Maintenance Manuals shall be delivered to the Engineer in accordance with the requirements of Section 01730.

1.06 TRANSPORTATION AND HANDLING

A. Arrange deliveries of Products as required by the currently approved construction schedule coordinating each delivery to avoid conflict with other work and conditions at the site.

1. Deliver products in an undamaged condition, in the manufacturer's original containers or packaging and with identifying labels intact and legible.

2. Prior to accepting delivery, inspect shipments to assure compliance with approved submittals, and that the products have been properly protected and are undamaged.

B. Provide equipment and personnel to handle products preventing soiling or damage to the products or their protective packaging.

1.07 STORAGE AND PROTECTION

A. Store Products in accordance with manufacturer's instructions, with seals and labels intact and legible.

1. Store products subject to damage by the elements in weather-tight enclosures.
2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
3. Store fabricated products above the ground, on blocking or skids, prevent soiling, staining or corrosion. Cover products, which are subject to deterioration with impervious sheet coverings and provide adequate ventilation to avoid condensation.
4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

B. All materials and equipment to be incorporated in the Work shall be handled and stored in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and other injury, theft or damage.

C. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All miscellaneous steel, structural steel and reinforcing steel shall be stored off the ground, kept free of accumulations of dirt and grease, and in areas free of standing water and minimize rusting. Pre-cast concrete sections shall be handled and stored in a manner to prevent staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce staining, breaking, chipping, cracking, and spilling.

D. All materials, which in the opinion of the Engineer, have become so damaged as to be unfit for the use intended, including aesthetics, shall be promptly removed from the site of the Work.

E. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections and exercise or rotate moving parts of stored products as required by the manufacturer to assure that products are maintained under specified conditions and free from damage or deterioration.

F. Provide substantial coverings as necessary to protect installed products from damage caused by traffic and subsequent construction operations. Remove the protective covering when no longer needed.

G. The Contractor shall be responsible for all material, equipment, and supplies sold and delivered to the Owner under this Contract until final inspection of the Work and acceptance thereof by the Owner. In the event any such material, equipment, and supplies are lost, stolen, damaged, or destroyed prior to final inspection and acceptance they shall be replaced by the Contractor.

H. Should the Contractor fail to take proper action to properly store and handle equipment supplied under this Contract, the Owner retains the right to notify the Contractor in writing of the deficiencies, to correct all deficiencies and deduct the cost associated with these corrections from the Contractor's Contract. These costs may be comprised of expenditures for labor, equipment usage, administration, clerical, engineering and any other costs associated with making the necessary corrections.

1.08 OFF-SITE STORAGE AND PROTECTION

A. Off-site storage arrangements shall be acceptable to the Owner and approved in writing by the Engineer for all material and equipment not incorporated into the Work but included in the application for payment. Off-site storage shall be permitted and payment made therefore if the following conditions are met:

1. Protection: The material and equipment is stored in a security-protected environment to avoid damage or theft by vandals.

2. Insurance: Adequate insurance in accordance with Article 5 of the General Conditions shall be maintained by the Contractor and property owner of the site in which the material and equipment is stored. A minimum level of insurance shall be maintained to replace the item should it become damaged or stolen.

3. Title: A title indicating the Owner has purchased the material and equipment is provided by the Contractor to the Owner after payment is made; and

4. Access for Inspection: The Owner, the Engineer or their representatives has access to the site for inspection purposes. Site inspection will be conducted with the site owners.

1.09 PRODUCT TESTING

A. All work installed in accordance with the plans and specifications shall have post installation tests performed to check the system conformance to the specified operation.

The Contractor shall file with the Engineer a standard form written report detailing the field operation of the product. The standard form reports will be furnished by the Engineer and completed by the Contractor and the Resident Project Representative.

B. Report forms shall be listed and shown in the Appendix.

1.10 SPECIAL TOOLS

Manufacturers of equipment and machinery shall furnish any special tools (including grease guns or other lubricating devices) required for normal adjustment, operations and maintenance, together with instructions for their use. The Contractor shall preserve and deliver to the Owner these tools and instructions in good order no later than upon completion of the Contract.

1.11 WARRANTY

For all major pieces of equipment, submit a warranty from the equipment manufacturer as specified in Section 01740. The manufacturer's warranty period shall be concurrent with the Contractor's as stipulated in the specifications for each piece of equipment.

1.12 SPARE PARTS

Spare parts for certain equipment provided under Divisions 11, 13, 15, and 16 have been specified in the pertinent sections of the Specifications. The Contractor shall collect and store all spare parts so required in an area to be designated by the Engineer. In addition, the Contractor shall furnish to the Engineer an inventory listing all spare parts, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivered cost.

1.13 GREASE, OIL AND FUEL

All grease, oil, and fuel required for testing of equipment shall be furnished with the respective equipment. The Owner shall be furnished with a year's supply of required lubricants including grease and oil of the type recommended by the manufacturer with each item of equipment supplied.

The Contractor shall be responsible for changing the oil in all drives and intermediate drives of each mechanical equipment after initial break-in of the equipment, which in no event

shall be any longer than three weeks of operation.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall comply with the requirements stated in the General Conditions and in the Specifications for administrative procedures in closing out the Work.

B. The following is a list of items required to complete the Project.

1. Owner may request use of substantially completed portions of the work without such use constituting acceptance. Provision should be made for consent or notification of the survey and the insurers for the Project;
2. Contractor to request Substantial Completion inspection of the project or a portion thereof when construction is sufficiently complete to be utilized for the purposes intended;
3. Engineer, Contractor, and Resident Project Representative to make substantial completion inspection. A list of incomplete items will be prepared by the Engineer.
4. Engineer will issue a Substantial Completion Certificate (E.J.C.D.C. Form 1910-8D) with a date of substantial completion with the attached list of uncompleted items. Certificate will be filed by the Owner for a prescribed period of time. Besides listing the uncompleted items, the substantial completion shall designate the responsibilities for utilities, maintenance and insurance; and any exceptions to guarantees or warranties.
5. Contractor shall complete list of uncompleted items. Upon the completion of work, he shall request a final inspection.
6. Final Inspection shall be made by Owner, Contractor, Engineer, Resident Project Representative, Regulatory Agencies, Funding Agency and any other agency involved in this project.
7. Contractor shall make final request for payment with the appropriate data; i.e., clear-lien certificate, release from surety, etc., all as required by State Law.
8. Engineer to process final payment request and present request to Owner.

1.02 SUBSTANTIAL COMPLETION

A. When the Contractor considers the Work is substantially complete, he shall submit to the Engineer:

1. A written notice that the Work or designated portion thereof is substantially complete.
2. A list of items to be completed or corrected.

B. Within five (5) working days after receipt of such notice, the Engineer will make an inspection to determine the status of completion. The Engineer's opinion as to the status of completion shall be based on completion of the following as applicable:

1. Installation of all piping, valves, force mains, and/or gravity sewers including pressure, leakage or other required tests.
2. Installation of all equipment including, but not limited to, fans, blowers, aerators, dehumidifiers, and surge suppressors.
3. Installation or construction of structures including all required protective or aesthetic coatings or devices including required tests.
4. Installation of electrical conduits, wiring, load centers, controls, and all other electrical elements as required including tests, inspections, and approval by local agencies for compliance with ordinances and codes.
5. Backfill and compaction of backfill as indicated by required tests for all structures, pipelines, conduits, and other subterranean installations.
6. Installation or restoration of pavements including required tests for sub-base, base and pavement materials, and approval by the local municipality. Pavements shall not be individually considered and shall be considered only with other portions of the Work requiring the installation or restoration of pavement.
7. All painting required by the Contract Documents except for touch-up.
8. Top soiling, final grading, fertilizing, seeding, sodding, or landscaping except for growth of vegetation and watering to establish the required ground cover of vegetative growth.
9. Release of all permits whether or not the permit was acquired by the Contractor.
10. Installation of all doors, windows, louvers, and other building appurtenances including painting, finish hardware, glazing, locks, and other required devices to secure the Work.
11. All required instructions for the Owner's operation and maintenance personnel including a minimum of one approved copy of the required operation and maintenance manual for use by the Owner's personnel.

C. Should the Engineer determine that the Work is not substantially complete:

1. The Engineer will promptly notify the Contractor in writing, giving the reasons therefore in accordance with the General and Supplemental Conditions.
2. Contractor shall remedy the deficiencies in the Work, and send a second written notice of substantial completion to the Engineer.
3. The Engineer will re-inspect the Work.

D. When the Engineer finds that the Work is substantially complete, he will:

1. Prepare and deliver to Owner a tentative Certificate of Substantial Completion with a tentative list of items to be completed or corrected before final payment in accordance with the General and Supplementary Conditions.
2. After consideration of any objections made by the Owner as provided in the General and Supplemental Conditions of the Contract, and when the Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with

a revised tentative list of items to be completed and/or corrected and a cost list for each of those items including the cost of mobilization, all in accordance with LA Revised Statues 38:2248.

1.03 FINAL INSPECTION

A. When Contractor considers the Work is complete, he shall submit written certification that:

1. Contract Documents have been reviewed.

2. Work has been inspected for compliance with Contract Documents.

3. Work has been completed in accordance with Contract Documents.

4. Equipment and systems have been tested in the presence of the Engineer and Owner's representative and are operational.

5. Work is completed and ready for final inspection.

B. The Engineer will make an inspection to verify the status of completion with five working days after receipt of such certification.

C. Should the Engineer consider that the work is incomplete or defective:

1. The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Engineer that the Work is complete.
3. The Engineer will re-inspect the Work.

D. When the Engineer finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.

1.04 RE-INSPECTION FEES

Should the Engineer perform re-inspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:

A. Owner will compensate the Engineer for such additional services.

B. Owner will deduct the amount of such compensation from the final payment to the Contractor.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

A. Evidence of compliance with requirements of governing authorities.

B. Project Record Documents: Requirements of Section 01720.

C. Manufacturer's Certificates of Installation: Requirements of Section 01600.

D. Warranties and Bonds: Requirements of Section 01740.

E. Keys and Keying Schedule.

F. Spare Parts and Maintenance Materials: Requirements of Section 01730.

G. Certificate of Insurance for Products and Completed Operations.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the Engineer.

B. Statement shall reflect all adjustments to the Contract Sum:

1. The original Contract Sum.
2. Additions and deductions resulting from:
   - **a**. Previous Change Orders
   - **b**. Unit Prices
   - **c**. Deductions for uncorrected Work
   - **d**. Penalties and Bonuses
   - **e**. Deductions for liquidated damages
   - **f**. Deductions for re-inspection payments
   - **g**. Other adjustments
3. Total Contract Sum, as adjusted.
4. Previous Payments.
5. Sum remaining due.

C. Engineer will prepare a final Change Order reflecting approved adjustments to the Contract Sum, which were not previously made by Change Orders.

D. In accordance with the requirements of Section 01035 - Modification Procedures, the Engineer will submit the final Change Order and a recommendation for acceptance of the Work to the Owner for approval.

1.07 APPLICATION FOR PAYMENT

Upon receipt of approval of the final Change Order, the Contractor shall submit an Application for Payment in accordance with procedures and requirements stated in the General Conditions.

1.08 CONTRACT CLEAR LIEN CERTIFICATE AND PAYMENT OF RETAINAGE

A. Upon receipt of the Owner's acceptance of the work, the Contractor shall make filings with the Recorder of Mortgages as required by Louisiana State Public Contract Statute.

B. In accordance with the Louisiana State Public Contract Statute, the Recorder of Mortgages shall issue a Clean Lien and Privilege Certificate upon expiration of a period of not less than forty-five (45) days, provided no liens are recorded against the Project.

C. Upon receipt of the Clear Lien and Privilege Certificate, the Contractor shall submit an Application for Payment to the Engineer requesting the release of the Project retainage with the certificate attached as evidence of authority for the Owner to pay the retainage.

D. The Engineer shall review the Application for Payment for the Project retainage and if in order shall transmit the application to the Owner for Payment.

E. In accordance with the General Conditions, the Owner shall release the Project retainage and make payment to the Contractor the legal sum of the retainage for which the Contractor is entitled.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01700 - CONTRACT CLOSEOUT

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01710 - SITE CLEANING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Cleaning shall include daily "policing" of the work and surrounding areas to clear general debris, waste paper, wood scraps, broken concrete, and other objectionable material along with the final cleanup of site(s) required for Project acceptance.

1.02 DISPOSAL REQUIREMENTS

Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

A. Execute daily cleaning to keep the Work, the site and adjacent properties, free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.

B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.

C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

C. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

D. Prior to final completion or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire Work is clean.

E. Apply a finished paint coat per Section 09010 to all equipment incorporated into the Project. Final finish coat of paint shall be applied after equipment has been installed.

3.03 FUELING

Upon servicing all equipment, all fuel storage and equipment tanks shall be filled to completion.

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01720 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Maintain at the site for the Owner one record copy of:

A. Conformed Drawings.

B. Conformed Specifications.

C. Change Orders and other Modifications to the Contract.

D. Engineer's Field Orders or written instructions.

E. Approved Shop Drawings, Working Drawings and Samples.

F. Field Test records.

G. Construction photographs.

H. Latest Approved Progress Schedule.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI section numbers.

C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all items for inspection by the Engineer.

E. As a pre-requisite for monthly progress payments, the Contractor is to exhibit the currently updated "record documents" for review by the Engineer and Owner.

1.03 MARKING DEVICES

Provide felt tip marking pens for recording information in the color code designated by the Engineer.

1.04 RECORDING

A. Label each document "PROJECT RECORD" with rubber stamp.

B. Record information concurrently with construction progress and do not conceal any work until required information is recorded.

C. Legibly mark drawings to record actual construction:

1. The Contractor shall use the following color code in marking Contract Drawings.

- **a**. Yellow for no change.
- **b**. Red to indicate additions, deletions and changes.

2. Elevations of various structure elements in relation to elevation datum.

- **a**. Elevations referenced to control points established by the Owner's agent.
- **b**. Specifically, elevations of drainage culvert inverts, building slabs, top of roadway and driveway curbs, bridges, etc.

3. All underground piping with elevations and dimensions, changes to piping location, horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements, actual installed pipe material, class, etc.

- **a**. Elevations of constructed underground piping at 100 ft. increments and points where changes occur in either the slope or horizontal direction.
- **b**. Three swing ties from referenced permanent surface improvements to the pipe centerline at 500 ft. increments and the center of each manhole cover, valve, the branch, vent, end of service connection at the property line, other fittings and appurtenances.
- **c**. Identify existing utilities, which parallel the proposed construction, including size and offset distance horizontally and vertically, when exposed by the construction activity.
- **d**. Identify existing utilities including size, material type, vertical clearance over or under, intersecting station, and angle of intersection crossing proposed construction.

4. Location of internal utilities and appurtenances concealed in the construction by referencing to visible and accessible features of the structure.

5. Field changes of dimension and detail.

6. Changes made by Field Order or by Change Order.

7. Details not on original contract drawings.

8. Equipment and piping relocations.

9. Identify the actual motor installed by manufacturer's name, nameplate horsepower and serial number.

10. Identify the actual pump installed by manufacturer's name, model number, impeller size, rated capacity and serial number.

11. Major architectural and structural changes including relocation of doors, windows, etc.

D. Specifications and Addenda; Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number, and supplier of each Product and item of equipment actually installed.

2. Changes made by Field Order or by Change Order.

E. Shop Drawings (after final review):

Five (5) sets of record drawings for each process equipment, piping, electrical system and instrumentation system.

F. Certified site survey and line elevations and stationing at 100 ft. increments and all points of change of direction of pipelines per Section 01050 by a registered land surveyor.

1.05 SUBMITTAL

A. At Contract closeout, deliver Record Documents to the Engineer for the Owner.

B. Accompany submittal with transmittal letter in duplicate containing:

1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Title and number of each Record Document.
5. Signature of Contractor or his authorized representative.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01720 - PROJECT RECORD DOCUMENTS

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01730 - OPERATING AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile product data and related information appropriate for Owner's maintenance and operation of equipment furnished under Contract.

1. Prepare operating and maintenance data as specified herein and as referenced in other pertinent sections of Specifications.
2. Submit operating and maintenance manuals as specified herein.

B. Instruct Owner's personnel in maintenance of products and in operation of equipment and systems.

1.02 QUALITY ASSURANCE

A. Preparation of data shall be done by personnel:

1. Trained and experienced in maintenance and operation of described products.
2. Familiar with requirements of this Section.
3. Skilled in technical writing to the extent required to communicate essential data.
4. Skilled as draftsman competent to prepare required drawings.

1.03 FORM OF SUBMITTALS

A. Prepare data in form of an operating and maintenance manual for use by Owner's personnel.

B. Format:

1. Size: 8-1/2 inches x 11 inches, punches and reinforced for insertion into the binders.
2. Paper: 20 pound minimum white, for typed pages.
3. Text: Manufacturer's printed data, or neatly typewritten.
4. Drawings:
- **a**. Provide reinforced punched binder tabs, bind in with text.
- **b**. Reduce larger drawings and fold to size of text pages but not larger than 11 inches x 17 inches.

5. Provide flyleaf for each separate product, or each piece of operating equipment:
- **a**. Provide typed description of product, and major component parts of equipment.
- **b**. Provide indexed tabs.

6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS" List:
- **a**. Title of Project.

b. Identity of separate structure as applicable.
c. Identity of general subject matter covered in the manual.

C. Binders:

1. Commercial quality three-post binders with durable and cleanable plastic covers.
2. Maximum post width: 2-inches, D-ring.
3. When multiple binders are used, correlate the data into related consistent groupings.

1.04 CONTENT OF OPERATING AND MAINTENANCE MANUAL

A. A complete neatly typewritten table of contents listing documents in all volumes shall be included and arranged in systematic order.

1. Contractor, name of responsible principal, address and telephone number.
2. A list of each product required to be included, indexed to content of the volume.
3. List, with each product, name, address and telephone number of:
a. Subcontractor or installer.
b. Maintenance contractor, as appropriate.
c. Identify area of responsibility of each.
d. Local source of supply for parts and replacement.
4. Identify each product-by-product name and other identifying symbols as set forth in Contract Documents.

B. Product Data:

1. Include only those sheets, which are pertinent to the specific product.
2. Annotate each sheet to:
a. Clearly identify specific product or part installed.
b. Clearly identify data applicable to installation.
c. Delete references to inapplicable information.

C. Drawings:

1. Supplement product data with drawings as necessary to clearly illustrate:
a. Relations of component parts of equipment and systems.
b. Control and flow diagrams.
2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
3. Do not use Project Record Documents as maintenance drawings.

D. Written text, as required to supplement product data for the particular installation:

1. Organize in consistent format under separate headings for different procedures.
2. Provide logical sequence of instructions of each procedure.

E. Copy of each warranty, bond and service contract issued and provide information sheet for Owner's personnel, giving proper procedures in the event of failure and instances, which might affect the validity of warranties or bonds.

F. Provide for each unit of equipment and system, as appropriate:

1. Description of unit and component parts.
- **a**. Function, normal operating characteristics, and limiting conditions.
- **b**. Performance curves, engineering data and tests.
- **c**. Complete nomenclature number of replaceable parts including standard or manufacturer's part.

2. Operating procedures:
- **a**. Start-up, break-in, routine and normal operating instructions.
- **b**. Regulation, control, stopping, shutdown and emergency instructions.
- **c**. Summer and winter operating instructions.
- **d**. Special operating instructions.

3. Maintenance Procedures:
- **a**. Routine operations.
- **b**. Guide to "troubleshooting".
- **c**. Disassembly, repair, and reassembly.
- **d**. Alignment, adjusting and checking.

4. Servicing and lubrication schedule including a list of lubricants required.

5. Manufacturer's printed operating and maintenance instructions.

6. Description of sequence of operation by control manufacturer.

7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance including the following:
- **a**. Predicted life of parts subject to wear.
- **b**. Items recommended to be stocked as spare parts.

8. As-installed control diagrams by controls manufacturer.

9. Each contractor's coordination drawings including as-installed color-coded piping diagrams.

10. Charts of valve tag numbers, with location and function of each valve.

11. Cataloged list of manufacturer's spare parts supplied with the equipment or system, manufacturer's current prices, and recommended quantities to be maintained in storage.

12. Other data as required under pertinent sections of Specifications.

G. Content, for each electric and electronic system, as appropriate:

1. Description of system and component parts.
- **a**. Function, normal operating characteristics, and limiting conditions.
- **b**. Performance curves, engineering data and tests.
- **c**. Complete nomenclature including standard or manufacturer's part number of replaceable parts.

2. Circuit directories of panel boards.

   a. Electrical service.
   b. Controls.
   c. Communications.
3. As-installed color-coded wiring diagrams.
4. Operating procedures:
   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Special operating instructions.
5. Maintenance procedures:
   a. Routine operations including recalibration procedures.
   b. Guide to "troubleshooting".
   c. Disassembly, repair and reassembly.
   d. Adjustment and checking.
6. Manufacturer's printed operating and maintenance instructions.
7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
8. Other data as required under pertinent sections of specifications.

H. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.

I. Additional requirements for operating and maintenance data as required by the respective sections of the Specifications.

Preparation of O & M Manual

In order for the Engineer to prepare the O & M Manual for the Owner, selected material presented by each equipment supplier is required. In addition to those items stated previous in other subsections, the Engineer requires specific information to complete the Manual. The structure of the O & M Manual for each piece of equipment is as follows:

General

Unit/Process Description
Relationship to Adjacent Units
Classification and Control
Major Components
Common Operation Problems
Laboratory Controls
Start-Up

Specific Plant Operation

Normal Operation
Alternate Operation
Emergency Operations and Failsafe Feature

Each equipment manufacturer shall ensure in their submittal of O & M data that the information submitted covers each of the topics stated above. Failure to submit O&M data on each of the topics above will be cause for rejection of the O&M Manual.

1.05 SUBMITTAL SCHEDULE AND REQUIREMENTS

A. Submit two (2) copies of preliminary draft of proposed formats and outlines of contents of Operating and Maintenance Manual within thirty (30) days of first Engineer review of shop drawings for each equipment item. The Engineer will review the preliminary draft and return one copy with comments.

B. Submit five (5) copies of the final manual to the Engineer within thirty (30) calendar days of product shipment to the project site and preferably within thirty (30) days after the reviewed copy is received.

C. Submit five (5) copies of any addenda to the Operating and Maintenance Manual as applicable with certificates as specified in Article 1.05 of Section 01600 within thirty (30) days after final inspection and start-up.

1.06 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to initial start-up inspection or request for substantial completion, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems. Refer to Article 1.05 of Section 01600.

B. Operating and maintenance manual shall constitute the basis of instruction and shall review comments of manual with personnel in full detail to explain all aspects of operation and maintenance.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01730 - OPERATING AND MAINTENANCE DATA

TECHNICAL SECTION
DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01740 - WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile specified warranties and bonds, as in Articles 5 and 13 of the General Conditions.

B. Co-execute submittals when so specified.

C. Review submittals to verify compliance with Contract Documents.

D. Submit to the Engineer for review and transmittal to Owner.

1.02 SUBMITTAL REQUIREMENTS

A. Assemble and include warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors including effective dates as required by Section 01730, Operation and Maintenance Data, in the required operation and maintenance manuals.

B. Number of original signed copies required - Two (2) each.

C. Table of Contents - Neatly typed in orderly sequence. Provide complete information for each item.

1. Product or work item.
2. Firm, with name of principal, address and telephone number.
3. Scope.
4. Date of beginning warranty, bond or service and maintenance contract.
5. Duration of warranty, bond or service maintenance contract.
6. Provide information for Owner's personnel:
   - **a**. Proper procedure in case of failure.
   - **b**. Instances that might affect the validity of warranty or bond.
7. Contractor, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size: 8-1/2 inches x 11 inches, punch sheets for standard 3-post binder.
   - **a**. Fold larger sheets to fit into binder.
2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS" List:
   - **a**. Title of Project.
   - **b**. Name of Contractor.

C. Binders - Commercial quality three-post binders with durable and cleanable plastic covers and maximum post width: 2-inches, D-ring.

1.04 WARRANTY SUBMITTAL REQUIREMENTS

A. For all major pieces of equipment, unless stated otherwise in the specifications for each individual item of equipment, submit a written warranty from the equipment manufacturer to replace promptly any equipment or component thereof which, in the sole opinion of the Engineer, has defects in design, workmanship, materials, or performance within a one (1) year period following the date of acceptance for operation (Substantial Completion) by the Owner. The manufacturer's warranty period shall be concurrent with the Contractor's for one (1) year, unless otherwise specified, commencing at the time of acceptance for operation (beneficial use) by the Owner and shall be read in conjunction with the Contractor's warranty which shall operate together to provide for replacement of defective equipment and restoration of proper operation. The Contractor shall be solely responsible for both warranties.

B. The Contractor shall obtain manufacturer's warranties for all equipment which has 1 HP motor or larger and/or which lists for more than $1,000.00. The Engineer reserves the right to request warranties for equipment not so classified. The Contractor shall warrant all equipment in the Contract one-year warranty period even though manufacturer's warranties may not be required.

C. In the event that the Contractor is unable to obtain from an equipment manufacturer or supplier the above one-year warranty, the Contractor shall provide, prior to acceptance for operation of the equipment by the Owner, a bank letter of credit in favor of the Owner in the amount of two-hundred percent (200%) of the purchase price of the equipment for a period of 18 months from the beginning of the warranty period on which the Owner may draw for replacement of defective equipment (materials and labor).

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION TWO

SITE CONDITIONS

2

TECHNICAL SECTION
DIVISION 2 – SITE CONDITIONS
SECTION 02020 – CONCRETE ROADS, PARKING AREAS, AND WALKS

PART 1 - GENERAL

1.01 GENERAL

Concrete roads, parking areas and walks shall be constructed to conform with the lines and grades as indicated on the Drawings. All Work shall be in accordance with the Contract Drawings and these Specifications.

1.02 RELATED WORK DESCRIBED ELSEWHERE

All Work shall conform to applicable provisions of Division 3 - "Concrete" of these Specifications.

1.03 SUBMITTALS

A. All products and/or materials to be used in this Project shall be submitted to the Engineer in accordance with Section 01340 of Division 1- General Requirements.

B. Manufactures shall submit with his shop drawings any recommended installation procedures which when approval by the Engineer shall become the basis for inspecting, accepting, and/or rejecting actual installation, procedures used on this Project.

C. The manufactures shall submit in writing a certification that the product meets these specifications. Certification shall be in the format similar to the certification form shown at the end of Section 01340.

D. Mill certificates shall be furnished upon request of the Engineer.

PART 2 – PRODUCTS

2.01 CONCRETE MATERIALS

All materials shall conform to specifications for Class A concrete with a minimum 28 day compressive strength of 3000psi in accordance with the 1982 State of Texas Standards.

2.02 JOINTS

Location of joints, types and details are shown on the Contract Drawings. Joint types used are as follows:

A. Control Joints (C.J.):

Two types of control joints are used, they are:

1. Transverse Joints: Transverse control joints are used to control shrinkage cracking and are spaced at approximately 30 ft. centers, max.

2. Longitudinal Dummy Joint: Longitudinal dummy joints are used along the centerline of the roadway to control cracking.

B. Expansion Joints - Expansion joints are used to prevent buckling and crushing of concrete due to creep and thermal expansion.

C. Construction Joints - Construction joints may be located to suit the Contractor's mode of operation, but should be located, where possible, at control joint locations.

2.03 JOINT FILLERS

Joint fillers shall be bituminous preformed expansion joint filler conforming to ASTM Designation: D994.

2.04 JOINT SEALER

Joint sealer shall be PVC extended coal tar sealer conforming to the requirements of LDOTD.

PART 3 – EXECUTION

3.01 EXCAVATION

Excavations shall be made to the depth required for installation of sub-base as indicated on the Drawings. Excavation width shall be as required for proper installation and bracing of forms. The sub-grade shall be shaped and compacted to a firm, even surface suitable for proper placement of sub-base or concrete. Unsuitable materials shall be removed and replaced with approved material at no additional cost to the Owner.

3.02 SUB-BASE

The sub-base shall be crushed limestone material placed to the dimensions indicated on the Drawings. The sub-base material shall be as called for in Subsection 2.1.7 and shall be thoroughly compacted in accordance with Subsection 2.1.8-E of these Specifications. Sub-bases shall be thoroughly wetted prior to placing of concrete.

3.03 PLACING CONCRETE

Concrete shall be placed on the prepared sub grade or sub-base and struck off or screeded to the required thickness as detailed on the Drawings. It shall be tamped sufficiently to bring mortar to the surface.

Surfaces shall be finished with a wood float or steel trowel and finally brushed to leave a

slightly rough finish. All joints and edges shall be rounded with an edging tool.

3.04 CURING

Concrete shall be protected from rainstorms with paper, burlap, canvas, or similar materials. In warm weather they shall be made wet daily for a minimum of five (5) days. Cold weather curing and placement shall be done in accordance with Division 3 "Concrete" of these Specifications.

Membrane curing compounds shall meet ASTM Specifications C309, latest revision, and shall be of the non-discoloring type applied according to the manufacturer's recommendations.

END OF SECTION

TECHNICAL SECTION
DIVISION 2 – SITE CONDITIONS
SECTION 02224 – PIPE JACKING AND BORING

PART 1 - GENERAL

1.01 DESCRIPTION

This Section covers the installation of gravity or pressure pipe for utility systems by means of jacking and boring, with or without encasement.

1.02 QUALITY ASSURANCE

A. All pipe and casing will be subject to inspection and acceptance by the Engineer.

B. Submit two (2) copies of manufacturer certificates of inspection and testing unless otherwise agreed upon by the Engineer.

C. Jacking and boring of pipe on State or US Highway crossings shall be in conformance with the requirements of the project permit, or these specifications. Jacking and boring of pipe for railroad crossings shall be in conformance with the requirements of the project permit or these Specifications.

1.03 SUBMITTALS

A. All products and/or materials to be used in this project shall be submitted to the Engineer in accordance with Section 01340 of Division 1- General Requirements.

B. Manufactures shall submit with his shop drawings any recommended installation procedures which when approval by the Engineer shall become the basis for inspecting, accepting, and/or rejecting actual installation, procedures used on this Project.

C. The manufactures shall submit in writing a certification that the product meets these specifications. Certification shall be in the format similar to the certification form shown at the end of Section 01340.

D. Mill certificates shall be furnished upon request of the Engineer.

PART 2 - PRODUCTS

2.01 General

A. Pipe to be jacked and bored without encasement or pipe to be installed in casing shall conform to the material requirements of the utility to be installed in accordance with the Contract Documents.

B. Locator wire, secured to the utility pipe before installation, shall conform to the requirements of these Specifications.

2.01 MATERIALS

A. Steel Casing:

1. Wall thickness for steel casing shall be Schedule 40 for sizes up to and including 12" diameter, and standard class for sizes greater than 12" diameter or as required in highway and/or railroad permits.
2. Steel casing shall be ASTM A53 seamless standard or seam weld pipe.
3. Steel casing shall have an external and internal coal tar bitumastic coating with a mill thickness of 12 mils. Fusion bonded epoxy "ScotchKote" 206N coating is an approved equal.

B. Centralizers or casing insulators shall be designed for use with the utility to be installed in the casing, and shall be subject to the approval of the Engineer.

C. Casing ends shall be sealed with the use of a standard pull-on or wrap-around. The end seals shall be Model S manufactured by Pipeline Seal and Insulator, Inc., or approved equal.

PART 3 - EXECUTION

3.01 INSPECTION AND DISPOSITION OF DEFECTIVE MATERIAL

A. All casing, piping, and appurtenances shall be inspected for defects by the Contractor before installation.

B. All materials found to have flaws, cracks, or other defects, whether before or after installation, will be rejected by the Engineer and will be repaired or replaced by the Contractor as directed by the Engineer to his satisfactions, at no additional cost to the Owner.

3.02 HORIZONTAL AND VERTICAL ALIGNMENT

A. The Contractor shall be responsible for jacking and boring the utility at the correct horizontal and vertical grades.

B. When installing sewer pipe with casings, the casings shall be installed before any sewer pipe is laid from either the preceding or following manhole to the casing, unless directed by the Engineer.

C. The Contractor shall have the horizontal and vertical locations of other utilities or structures within the limits of the crossing established before constructing the bore to ensure that no conflicts will occur during installation of the casing or pipe.

3.03 JACKING AND BORING OPERATION

A. If casing is required, the size shall be as shown in the Drawings.

B. The Work shall be conducted and safety-warning devices shall be installed as required by the Contractor to protect public and vehicles from the excavated area in which the bore will be made.

C. The jacking and boring installation shall be expedited, once initiated. The installation shall be protected from sloughing or cave-ins by installation of shoring and bracing as required. Dewatering equipment shall be provided as required to remove groundwater or rainwater from the excavation.

D. The locator wire shall be secured to the pipe before installation for future location purposes.

E. The hole shall be mechanically bored, with the pipe or casing being driven ahead of the auger to prevent undermining of the embankment through which the bore is being made.

3.04 CARRIER PIPE INSTALLED IN CASING

A. Unless noted otherwise in the Drawings, all carrier pipes shall be the same pipe as used for that same utility in the Project.

B. Locator wire shall be secured to the pipe before installation in the casing.

C. Casing insulators or centralizers shall be installed with all pipes except for pressure Polyethylene Pipe, and shall be suitable for use with the proposed utility installation in the casing in accordance with the manufacturer's requirements. Typical spacing shall be 6' on centers in the casing.

D. Casing seals shall be installed on the ends of the casing between the casing and carrier pipe. Casing seals shall be specifically manufactured for said purpose and shall be installed in accordance with the manufacturer's requirements.

3.05 MEASUREMENT AND PAYMENT

A. Carrier pipe jacked and bored shall be measured by the linear foot installed along the centerline of the pipe from the point of entry into the embankment at the spring line of the pipe to the point of exit from the embankment at the spring line of the pipe.

B. Payment will be made at the contract unit price bid per linear foot for the carrier pipe installed by jacking and boring for the various sizes, which price and payment shall constitute full compensation for furnishing all plant, labor, equipment and materials and all hauling, jacking and boring, pipe, locator wire, jointing, and other operations incidental to the satisfactory completion of the work as shown in the Drawings and specified herein.

C. Casing with carrier pipe, jacked and bored, shall be measured by the linear foot installed along the centerline of the casing from point of entry into the embankment at the spring line of the casing to the point of exit from the embankment at the spring line of the casing.

D. Payment will be made at the contract unit price bid per linear foot for the various size casings, which price and payment shall constitute full compensation for furnishing all plant, labor, material, and all excavation, backfilling, casing pipe, centralizers, insulators, casing seals, jacking, boring, and other operations incidental to the satisfactory completion of the Work as shown in the Drawings and specified herein.

END OF SECTION

TECHNICAL SECTION
DIVISION 2 – SITE CONDITIONS
SECTION 02376 – GEOTEXTILE FABRIC

PART 1 - GENERAL

1.01 SCOPE

This Section provides for the furnishing and placing of geotextile fabrics where shown on the Drawings or as directed by the ENGINEER.

1.02 REFERENCED STANDARD

Conform to the following Sections of the State of Louisiana, Department of Transportation and Development, Standard Specifications for Roads and Bridges, 2000 Edition; except as modified herein:

Section 712 - Revetments

All references made therein to measurement and payment is hereby deleted.

1.04 SUBMITTALS

Submittals shall be provided in accordance with Section 01340 - Shop Drawings, Product Data and Samples.

PART 2 - PRODUCTS

2.01 GENERAL

Materials related to geotextile fabric erosion control and soil stabilization for sub grades, rock rip-rap and other purposes shall conform to the following subsections of the referenced Standard:

A. Revetment 711.02

B. Geotextile Fabric 1019.01 (Class D)

PART 3 - EXECUTION

3.01 GENERAL

The Contractor shall neatly dress and prepare area designated for base construction or erosion control work as specified in Section 02240 - Filling and Grading, Section 02302 - Base Course and Section 02375 - Rip-rap for Rock Lining.

3.02 GEOTEXTILE FABRIC PLACEMENT

Geotextile fabric shall be buried for anchorage along the edges of the area to be protected. Adjacent strips shall be lapped a minimum of eighteen inches (18") and the laps shall be pinned

at five foot (5') intervals. The entire area to receive revetment shall be covered with geotextile fabric.

END OF SECTION

TECHNICAL SECTION
DIVISION 02 - SITE CONDITIONS
SECTION 02463 – TIMBER PILES

PART 1 - GENERAL

1.01 SCOPE

This Work consists of furnishing, driving, and completing timber pile installation for foundations.

1.02 SUBMITTALS

Submittals shall be furnished in accordance with Section 01300; Submittals and Section 01340; Shop Drawings, Product Data, and Samples. All submittals must be submitted on the Engineer's Submittal Form. Submitted form shall have all blanks completed by Contractor. In addition to standard submittal items, the Contractor shall submit the following information on timber piles:

A. Evidence of preservative treatment certification.

B. Size, length, and location of piles.

C. Sequence of driving.

D. Number of blows per foot for entire length of piles and measured set for last ten (10) blows.

E. Find tip and head elevations.

F. Driving force of each hammer-blow.

G. Type and size of equipment.

H. Alignment deviations.

1.03 REFERENCES

A. ASTM D25 – Standard Specification for Round Timber Piles; 1991 or latest revision thereof.

B. ASTM D1760 – Standard Specification for Pressure Treatment of Timber Products; 1996 or latest revision thereof.

C. AWPA C3 – Piles—Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 1997 or latest revision thereof.

D. AWPA M4 – Standard for the Care of Preservative-Treated Wood Products; American Wood-Preservers' Association; 1996 or latest revision thereof.

1.04 QUALITY ASSURANCE

Contractor specializing in performing pile foundation work shall have a minimum of seven (7) years of experience.

1.05 SCHEDULING

All pile-driving operations shall be performed between the hours of 7:00 a.m. to 5:00 p.m. weekdays.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Timber piles shall be Southern Yellow Pine or Douglas Fir and shall conform to the latest applicable requirements of the Standard Specification for Round Timber Piles ASTM Designation: D25, except that the tip and butt dimensions shall be as specified herein.

B. The minimum circumferences and diameters of the piles, and the measured feet from the butt shall be as follows:

For lengths under 54' – 38" and 12"
For lengths 54' – 41" and 13"

C. The maximum circumferences shall be 63", the maximum diameter shall be 20", and measured 3' from the butt of the piles for all lengths.

D. The minimum circumferences and diameters of the tips of the piles shall be as follows:

For lengths under 40' – 25" and 8"
For lengths 40' to 74' – 22" and 7"

E. The diameters are approximate. The circumferences are the specified requirements. All measurements shall be taken under the bark.

F. Timber piles shall be cleaned-peeled.

G. Piles shall be inspected by an independent laboratory at the source of supply for compliances with these Specifications. Any pile not meeting these Specifications shall be rejected and shall not be shipped to the job site. Each pile shall be stamped with the seal of the laboratory after approval inspection. The Contractor shall pay for all laboratory inspection fees.

2.02 TREATMENT

Piles shall be treated in accordance with the latest applicable requirements of the AWPA Standard C3, Piles–Preservative Treatment by Pressure Processes for Land and Fresh Water Piles.

2.03 PRESERVATIVE

The preservative used for the treatment of timber piles shall be in accordance with AWPA Standard P1-Standard for Coal Tar Creosote for Land and Fresh Water use. The contractor may use C.C.A. treated timber piles in lieu of coal tar creosote.

2.04 RETENTION

The minimum retention of preservative per cubic foot of wood shall be 12 pounds for pine and 17 pounds for fir.

2.05 PILE LENGTHS

All piles shall be driven to the elevations shown on the design drawings. The Contractor shall, at his own expense, increase the lengths given to provide for fresh heading and for such additional length as may be necessary to suit his method of operation.

2.06 DRIVING CAPS

The heads of treated timber piles shall be cushioned, while being driven by a cap of approved design. The approved cap preferably shall have a rope or other suitable cushion next to the pile head and fitting into a casting supporting a timber shock block. When the area of the head of any pile is greater than that of the face of the hammer, a suitable cap shall be provided to distribute the blow of the hammer throughout the cross-section of the pile.

2.07 POINTING

Timber piles shall not be pointed.

2.08 PILE SHOES

Pile shoes will not be required.

2.09 EQUIPMENT

A. Piles shall be driven with an approved-type air or diesel hammer that will obtain the required penetration without damaging the piles. Pile driving shall not be started until

Owner has approved the type and weight of hammer to be used.

B. Air or diesel hammers, either single or double acting, shall develop a total energy of not less than 9,000 foot-pounds nor more than 15,000 foot-pounds per blow for timber piles, and not less than 15,000 foot-pounds not more than 22,000-foot pounds per blow for pipe piles.

C. Leads

1. Pile driver leads shall be constructed in such a manner as to afford freedom of movement of the hammer and to support the pile in a way to insure driving the piles to the tolerances required without injury to the piles. The leads shall be held firmly in position by stiff braces.

2. Swinging leads will not be permitted.

PART 3 - EXECUTION

3.01 PREPARATION FOR DRIVING

If in the opinion of the Engineer the pile-driving operations may cause damage to recently placed-concrete, the Contractor shall alter operations to prevent such damage.

3.02 EXCAVATION AND EMBANKMENT

All excavation and embankment shall be completed before driving affected piles.

3.03 ACCURACY OF DRIVING

In pile bents, the centroid of a pile at cut-off elevation shall not vary from plan location by more than three inches, measured perpendicular to bent, or more than six inches, measured along centerline of bent. Piles shall be driven with a variation of not more than 1/4” per foot from vertical or from specified batter. For foundation piling, the centroid of a pile at cut-off shall be within a 12”-diameter circle having plan location as its center.

3.04 INTERRPTED DRIVING

When driving is interrupted before pile reaches final penetration, the record for resistance shall not be taken until after at least a 12” penetration has been obtained after driving is resumed.

3.05 EXTENT OF DRIVING

Driving shall be continued until plan cut-off is reached. If desired resistance to driving is not obtained at plan cut-off, the Engineer may order that pile be test-loaded to determine its capacity or that driving be continued until satisfactory-driving resistance is attained in which

case the additional pile length required shall be supplied by splicing.

If desired driving resistance is obtained before reaching plan cut-off and the Engineer determines that continued driving could damage the pile, the Engineer may order that driving be stopped when at least two-thirds of required penetration has been achieved.

3.06 OVERDRIVING

Care shall be exercised not to drive the pile beyond the depth of penetration required.

3.07 JETTING

Jetting of piles will not be permitted.

3.08 DEFECTIVE PILES

Any pile found to be unacceptable due to internal defects, by improper driving, driven out of its proper location, or driven below the elevation fixed by the plans, shall be corrected at the Contractor's expense by one of the following methods approved by the Owner for the pile in question:

A. The pile shall be withdrawn and replaced by a new and if necessary, longer.

B. A second pile shall be driven adjacent to the defective pile.

C. The foundation will be redesigned in a manner approved by the Engineer and at no cost to the Owner.

D. The Contractor may propose other corrective measures for consideration.

3.09 RECORDS

The Contractor shall furnish the services of a Resident Project Observer at the Contractor's expense, whose duties shall be to observe the driving of all piles and to keep accurate driving records.

The driving records shall show complete hammer data, type of pile, dimensions of pile (circumference and diameter measured three feet from butt and at the tip, the length of timber pile), driving data, number of blows required per foot for the final five feet of driving, weather, and name of observer.

3.10 REBOUND

After piles have been driven, make observations to determine rebound. If rebound occurs, re-drive piles so affected to their original elevation.

3.11 PROTECTION

No pile shall be driven within 20 feet of concrete less than seven days old.

END OF SECTION

TECHNICAL SECTION
DIVISION 02- SITE CONDITIONS
SECTION 02521 – POTABLE WATER BOLTED STEEL GROUND STORAGE TANK

PART 1 - GENERAL

1.01 SCOPE

Contractor shall provide and erect one (1) 21'-6" diameter by 16'-1" normal side wall height coated bolted carbon steel water storage tank with a normal capacity of 43,938 U.S. gallons.

1.02 APPLICABLE PUBLICATION

The publications lifted below form a part of this specification to the extent referenced. Latest edition shall apply.

1. Normal Fire Protection associations (NFPA 22)
2. American Water Works Associations (AWWA D103-97)

1.03 SUBNA

Contractor shall provide submittals in accordance with these specifications.

1.04 ACCEPTABLE MANUFACTURERS

The steel tank and accessories shall be a manufactured by Superior Tank Company from Rosenberg, TX; American Tank from New Iberia, LA; CST Industries of Kansas City, MO; or approved equal.

PART 2 - PRODUCTS

2.01 BOLTED STEEL TANK

The bolted steel tank shall include:

1 - Mushroom vent with ½" mesh stainless steel screen
1 - 24" Square roof manway with hinged cover
1 - 24"x46: flush cleanout with 2-piece cover – 24"x46 cleanout kit
1 - 6"150 #FF single flanged nozzle (influent)
1 - 6"150# Flanged suction nozzle with elbow and vortex Breaker
1 - 6"150#FF single flanged nozzle (drain)
1 - 1"3000 # FF Full Coupling (air piping)
1 - 6" Internal overflow weir cone with external Sch.10 downcomer pipe and flap gate with screen
1 - Outside ladder with safety cage and lockable entry hoop-OSHA- HDG
1 - 10' Partial perimeter guardrail with handrail and toe board
1 - Liquid level indicator with gauge board
1 - ½" Thick asphalt-impregnated fiber board for placing between tank bottom and full slab foundation
1 - 4 Mil Polyethylene sheets for placing under tank bottom

1 - 1/2" Sample Tap Assy.
1 - 1" 3000# FF full coupling (pressure indicator)

2.02 DESIGN

A. The design standard for the bolted steel tank shall comply with the following:

1. AWWA D103-97 Standards
2. NFPC 22
3. Seismic zone 0 per AWWA
4. Wind load: 130 Mph per AWWA
5. Live deck load: 25 PSF
6. Flat steel Bottom
7. Center supported with a 1:12 roof slope
8. Useable capacity 42,575 gallons based on 0.5-foot freeboard.
9. Specific gravity: 1.00

B. Tank inlets and outlets shall conform to drawings and requirements by LDHH Safe Drinking Water Act.

2.03 PAINTING

The painting system shall be a thermo setting epoxy coating that combines outstanding chemical resistance with exceptional physical properties in a thermally cured tank lining system the painting system shall have the following characteristics:

PHYSICAL PROPERTIES

Application	Factory-applied, thermally cured
Dry Film Thickness	Average DFT, 5.0 mils interior/3.0 mils exterior
Limiting Temperature	Dry Heat - 300 F
	Immersed - 140 F to 300 F
Corrosion Resistance	Salt Spray-ASTM B 117 - Pass 9,000 hours
	Cyclic Corrosion-ASTM D 5894 - Pass 7 Cycles
Impact Resistance	ASTM D 2794 - 160 in-lbs. direct/160 in-lbs. reverse
Abrasion Resistance	Falling Sand-ASTM D 968 - 227 L/mil
Hardness	AST D3363 H
Chemical Immersion (at 180 F)	
	10% Sodium Hydroxide - Pass 9,000 hours
	10% Sulfuric Acid - Pass 9,000 hours
Holiday Test	Passes 67 volts
Color	To be selected by Architect

The paint system shall be rated for chlorinated portable water.
The paint system shall be Trico-Bank EP or approved equal.

PART 3 - EXECUTORS

3.01 The tank shall be erected by the manufacturer of the bolted steel tank. All equipment required for erection shall be provided by the manufacturer.

3.02 The contractor shall provide a leveled concrete foundation for the bolted steel tank.

3.03 Material delivered to site shall be stored so as not to allow mud or debris to attach to the tanks.

3.04 Disinfectors of the bolted steel tank shall be in accordance with applicable AWWA standards and approved by LDHH.

3.05 After erecting and disinfection the manufacturer shall provide a leak test on the tank all leaks shall be sealed to provide a "leak-proof" structure.

3.06 Contractor to drain tanks after disinfections and testing and refill tank with potable water from water well.

END OF SECTION

TECHNICAL SECTION
DIVISION 2 – SITE CONDITIONS
SECTION 02527 – WATER SUPPLY WELL COMPLETION

PART 1 - GENERAL

1.01 SCOPE

The Contractor shall furnish all labor, materials, and equipment necessary for the completion of one water well at the location designated by the Engineer. Drilling of the water well, installation of the casing, screen, and seals has been completed by others. The well has been registered with the State Department of Health. Work in accordance with this Section of the specifications is for the completion of the water well in accordance with State Standards and these technical specifications.

1.02 REFERENCES

A. American Society of Mechanical Engineers:
1. ASME Section VIII- Boiler and Pressure Vessel Code- Pressure Vessels

B. ASTM International:
1. ASTM A53/A53M- Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

C. American Water Works Association:
1. AWWA A100- Standard for Water Wells

D. National Electrical Manufacturers Association:
1. NEMA MG 1- Motors and Generators.

1.03 GUARANTEE OF PRODUCTION

The Contractor shall guarantee to the Owner to construct and install one (1) water well, as herein specified, as shown on the drawings when continuously operated based on equipment capabilities.

1.04 LOCATION

The location of the water well is as shown on the drawings.

1.05 WELL DEPTH

The existing well was drilled to a depth necessary to penetrate the anticipated water bearing sand as shown on the test well water bearing report. See Layne No. 28290.

PART 2 - PRODUCTS

2.01 SUBMERSIBLE PUMPS

Submersible pumps shall be a 4" Grundfos Model 75s with a minimum capacity of 100 GPM at 92' TDH. Outlet size shall be 2" diameter.

2.02 COLUMN PIPE

Column pipe shall be galvanized steel 2" diameter pipe with threaded ends. Coupling shall be provided at each end of column pipe.

2.03 PUMP MOTOR

Motor shall be a 5 horsepower, 230 volts, single phase with a 3,450 rpm submersible motor. Motor shall be rated for continuous service.

2.04 SPARE PUMP AND MOTOR

Spare pump and motor shall be supplied and wrapped in plastic for long term storage, complete with power cord. Owner shall place pump at a facility they designate.

PART 3 - EXECUTION

3.01 PUMP SETTINGS

Contractor shall set pump motor and column pipe at 140-foot of depth in existing 4-inch casing.

3.02 GUARANTEE OF WATER QUALITY

Upon completion of the well and prior to acceptance, the Contractor shall disinfect and re-disinfect the well as is necessary until two consecutive chlorine free samples taken from the well, a minimum of two hours apart and without re-disinfection between samples, are found to meet the Louisiana Department of Health and Hospitals Standards for bacteriologic quality and the absence of coliform organisms or confluent growth. Samples of water shall be submitted to the Louisiana State Department of Health or LDHH approved laboratory in accordance with their requirements for submitting water samples for bacteriological examination. The bacteriological

samples shall be collected by the Certified Operator for the Owner, the Engineer for the project, Louisiana Department of Health representative or a certified laboratory.

3.03 PROVISIONS FOR DISINFECTION

Only portable water shall be used during all during operations, not less than one part per million of free chlorine shall be maintained in the water used for the wells' development. For gravel wall wells the Contractor shall disinfect the gravel as it is being placed in the well with a water solution containing not less than 50 milligrams per liter of free chlorine, and a residual of no less than 5 mg/1 free chlorine applied for 24 hours. Disinfection of water well shall be in accordance with applicable AWWA standards.

3.04 TIGHT JOINT BETWEEN WELL CASING AND PUMP HEAD

Pump head shall be connected to the outside casing by a watertight threaded connection or by the outside casing being carried to a point not less than one inch above the pump head foundation. Before setting the pump head casing the Contractor shall pour cement grout over the pump heads foundation to provide a seal between the foundation and pump head casting to prevent water entering the well under the pump head casing when a partial vacuum is created.

3.05 PUMP HEAD FOUNDATION

Pump head shall be mounted on a chamfered concrete foundation not smaller than 24-inch square at the top, extending less than 24-inch above the finished grade, and not less than 18-inch below the finished grade.

3.06 PROTECTION OF CONSTRUCTION MATERIALS

All materials to be used in the construction to the well shall be stored above the ground in a manner that will minimize the possibility of contamination by surface runoff.

3.07 TESTING

A. When the Contractor has completed the installation of the permanent pumping equipment and has the installation ready for testing, he shall notify the Owner and Engineer 24 hours prior to running the test. The test shall run continuously for a twenty-four (24) hour period and six (6) hours of recovery. Reasonable stops for adjustment of equipment and measuring

devices shall be allowed during this period. The well and pump shall be tested at the guaranteed capacity as measured at the centerline of the discharge flange at the specified pressure. The well efficiency should be a min8imum of 70% (percent) for wells utilizing at least 60% (percent) of the formation. The well efficiency shall be determined by the contractor's independent hydrologist in a bound report. Provide the permanent water well is less than 70% efficient, the owner may require a monetary adjustment or payment for failure to develop the well correctly.

B. Water level readings and capacity shall be as stated in previous Sections. A Step test run from open discharge to shut-off head shall be run in increments of ten (10) psi after the recovery part of the test is completed. Signed copies of the test results shall be supplied to the Owner immediately after completion of the test. The capacity of the well and pump shall be measured by the office method. The Contractor shall furnish the necessary equipment to conduct these tests.

3.08 WELL INFORMATION

Six (6) bound booklets on each well containing all information on the test hole, test well, and permanent well including copies of all logs, chemical analysis, certification meeting the bacteriological requirements, pumping tests, hydrologist's report, well drawing, screen information, pump data, setting depth, diameter of pump, stages, size of column pipe and shafting, material of pump, shafting and column assembly, and any other important information will be supplied to the Engineer at the time of the final inspection.

3.09 FINAL ACCEPTANCE

The Contractor shall notify the Engineer of completion of all work. The Engineer will make an inspection, and if all work provided by the Contract has been completed to the Engineer's satisfaction; the Engineer will notify the Owner of completion. Upon evidence that the Contractor has fulfilled all obligations under the Contract, the Owner will make final acceptance. If the inspection discloses any work as being unsatisfactory or incomplete, the Engineer will notify the Contractor as to the discrepancies found. An inspection of the completed and corrected work will be undertaken.

WELL DESIGN DATA

Well No.	Layne #28290
Well Location: Parish	St. John The Baptist
Well Capacity, GPM, Min. (Design)	100 GPM
Total Dynamic Head (Initial), Ft.	92 ft.
Total Depth of Well, Ft.	340 ft.
Type Well	Non-community public supply
Pump Setting, Ft.	140 ft. b.g.s.
Lubrication	Water
Minimum Motor Horsepower	5 hp
Motor RPM	3,450

END OF SECTION

THIS PAGE WAS INTENTIONALLY LEFT BLANK

TECHNICAL SECTION
DIVISION 2 – SITE CONDITIONS
SECTION 02980 – DIRECTIONAL DRILLING

PART 1 – GENERAL

1.01 DESCRIPTION

This Specification covers the furnishing and installing underground utilities using the directional drilling (horizontal directional drilling, HDD) method of installation. This work shall include all services, equipment, materials, and labor for the complete and proper installation, testing, and environmental protection and restoration.

1.02 QUALITY ASSURANCE

A. All piping will be subject to inspection and acceptance by the Engineer.

B. All personnel shall be fully trained in their respective duties as part of the directional drilling crew and in safety. Training shall be provided specific to the project if any potential hazards may be encountered which has not already been included in personnel's training.

C. All equipment shall be in good, safe, operating condition with sufficient supplies, materials, and spare parts on hand to maintain the system in good working order for the duration of this project.

1.03 SUBMITTALS

A. Submittals shall be furnished in accordance with Division 01300; Submittals and Section 01340; Shop Drawings, Product Data, and Samples.

B. Manufacturers shall submit with his shop drawings any recommended installation procedures which when approved by Engineer shall become the basis for inspecting, accepting, and/or rejecting actual installation, procedures used on this project.

C. The manufacturers shall submit in writing a certification that the product meets these specifications. Certification shall be in the format similar to the certification form shown at the end of Section 01340.

D. Mill certificates shall be furnished upon request of the Engineer.

E. Contractor will submit specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the project. Spares inventory shall be included.

F. Specifications on material to be used shall be submitted to Engineer. Material shall include the pipe, fittings, and any other item which is to be an installed component of the

project.

G. Documentation of training and relevant experience of personnel shall be submitted.

PART 2 – PRODUCTS

2.01 DRILLING SYSTEM

A. The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during drilling and pull-back operations. Sufficient spares shall be kept on hand for any break-downs which can be reasonably anticipated.

B. The bore head shall be steerable by changing its rotation and shall provide the necessary cutting surfaces and boring fluid jets.

C. Mud motors (if required) shall be of adequate power to turn the required drilling tools.

2.02 GUIDANCE SYSTEM

The guidance system shall be of a proven type and shall be setup and operated by personnel trained and experienced with this system.

2.03 BORING FLUID (MUD) SYSTEM

A. A self-contained, closed, boring fluid mixture system shall be of sufficient size to mix and deliver boring fluid. The mixing system shall continually agitate the boring fluid during drilling operations.

B. Boring fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of the bore wall. No hazardous additives may be used.

PART 3 – EXECUTION

3.01 BORING PROCEDURE

A. Prior to any alterations to work-site, Contractor shall photograph or video tape entire work area, including entry and exit points. One copy of which shall be given to Engineer and one copy to remain with Contractor.

B. Entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on drawings. If Contractor is using a magnetic guidance system, drill path will be surveyed for any surface geo-magnetic variations or anomalies.

C. Pipe shall be connected together in one length prior to pull-back operations, if space permits. Steel pipe welds will be x-rayed prior to being placed in bore hole. Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe.

D. Pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100'. In the event that pilot does deviate from bore path more than 5% of depth in 100', Contractor will notify Engineer and Engineer may require Contractor to pull-back and re-drill from the location along bore path before the deviation.

In the event that a boring fluid fracture, inadvertent returns or returns loss occurs during pilot hole drilling operations, Contractor shall cease drilling, wait at least 30 minutes, inject a quantity of boring fluid with a viscosity exceeding 120 seconds as measured by a March funnel and then wait another 30 minutes. If mud fracture or returns loss continues, Contractor will cease operations and notify Engineer. Engineer and Contractor will discuss additional options and work will then proceed accordingly.

E. Upon successful completion of pilot hole, Contractor will ream bore hole to a minimum of 25% greater than outside diameter of pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle.

F. After successfully reaming boring hole to the required diameter, Contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations, Contractor will not apply more than the

maximum safe pipe pull pressure at any time.

In the event that pipe becomes stuck, Contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, Contractor will notify Engineer. Engineer and Contractor will discuss options and then work will proceed accordingly.

3.02 SITE RESTORATION

Following boring operations, Contractor will de-mobilize equipment and restore the work-site to original condition. All excavations will be backfilled and compacted to 95% of original density. Landscaping will be restored to original.

3.03 RECORD KEEPING, AS-BUILTS

Contractor shall maintain a daily project log of drilling operations and a guidance system log with a copy given to Engineer at completion of project. As-built drawings shall be certified as to accuracy by Contractor.

END OF SECTION

DIVISION THREE

CONCRETE

3

TECHNICAL SECTION
DIVISION 3 - CONCRETE
SECTION 03010 - CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 SCOPE

This Section covers the requirements of concrete, reinforcing steel, and related materials, and methods of construction for cast-in-place concrete structures and facilities as shown on the drawings.

The Contractor shall provide all labor, material, equipment and services required to form, furnish, place and finish all reinforced and non-reinforced cast-in-place concrete work as shown on the drawings, specified herein, or directed by the Engineer, including furnishing and placing all reinforcing steel and ties, water stops, installing all items to be built into concrete work, and repairing and patching existing concrete work which is required to be disturbed or altered in this Contract.

1.02 GENERAL

In general, all structural concrete shall be in accordance with ACI-318R-89 Specifications, latest revision. All liquid holding or conveying structures shall also comply with ACI C350 and ACI 504.1R82 specifications, latest revision, shall govern in case of conflict with this Specification.

Unless otherwise indicated on the drawings, the 28-day compressive strength shall be as follows:

(1) Liquid holding and conveying structures:
4000 p.s.i. (cement as required by performance requirements)
(2) Building floor slabs and foundations, walkways, and other structures:
3000 p.s.i. (cement as required by performance requirements)

A. Submittals:

1. The Contractor shall furnish at his own expense, concrete mix designs to the Engineer for review and approval before any pours are made; however, this approval does not in any way relieve the Contractor of his responsibility for the concrete attaining the required strengths. The Owner reserves the right to have concrete test cylinders made during each monolithic pour at his own expense. If the tests reveal that adequate strength is not attained, the Contractor will be responsible not only for the testing cost but also for any required remedial work. He must also provide a new mix design.

2. Before beginning any reinforced concrete construction, the Contractor shall furnish to the Engineer for approval in accordance with Section 01340, fully dimensioned drawings of the proposed work indicating all reinforcing steel.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Cement - Portland Cement shall conform to the requirements of ASTM Standards for "Portland Cement," C 150, Type 1, latest revision, with approved air entraining admixture, as directed by the Engineer.

B. Aggregates:

1. Liquid Holding and Conveying Structures: Fine aggregates shall conform to the requirements of the ASTM Standards for "Concrete Aggregates," C 33, latest revision. If the materials become contaminated or streaked with clay, dust, or other foreign matter, or if the fine and coarse aggregates become intermixed, they shall be remixed and properly washed, or removed from the site of the Work, as directed by the Engineer.

Coarse aggregate shall have a maximum size of one inch and shall conform to ASTM C33, latest revision. The following maximum limitations shall apply:

- Soft particles:	2.0 percent
- Chert as a soft impurity (defined in Table 3 of ASTM C 33):	1.0 percent
- Total of soft particles and chert as a soft impurity:	2.0 percent
- Flat and elongated particles (long dimension more than 5 times short dimension):	15.0 percent

2. Other Structures: Aggregates for other concrete structures shall be in accordance with Section 204 of ACI 301-89, latest revision.

C. Water - Water for use in concrete shall be reasonably clean and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances. Water, which is suitable for drinking may be accepted for use with the cement without being tested.

If the water is of questionable quality, it shall be tested in accordance with the current standard Method of Test for Quality of Water to be used in Concrete, AASHTO Designation T-26, latest revision.

D. Admixtures - Water-reducing, set-controlling admixture conforming to ASTM C494-86 shall be used in all concrete placed in liquid holding and conveying structures. These admixtures may be used in all other structures as required. The following ASTM designations shall apply:

Type - A	(Water reducing)
Type - B	(Retarding)

Type - C	(Accelerating)
Type - D	(Water reducing and retarding)
Type - E	(Water reducing and accelerating)
Type - F & G	(High range water reducing super plasticizers)

1. Field Service - When requested, a qualified concrete technician employed by the manufacturer shall be available to assist in proportioning concrete materials for optimum use, to advise on proper use of the admixture and adjustment of concrete mix proportions to meet job site and climactic conditions. A minimum of 72 hours notice shall be given by contractor/supplier to insure availability.

2. Any admixture utilized must be shown capable of maintaining essentially the same composition and performance throughout the work.

3. Admixtures containing chloride ions shall not be used if their use will produce a deleterious concentration of chloride ion in the mixing water.

4. Air entraining admixtures shall conform to "Specifications for Air Entraining Admixtures for Concrete", ASTM C260, latest revision.

5. High-Range Water-Reducing Admixture (Super Plasticizer) - ASTM C494, Type F or Type G. The admixture shall not contain calcium chloride nor any chloride based ingredient. The admixture shall be added to the concrete at the batch plant. The treated concrete must be capable of maintaining its "high slump" state for at least 90 minutes.

a. Material shall meet or exceed the following qualities:

1) Product shall be manufactured under an established quality assurance program.
2) The manufacturer's concrete testing laboratory shall be regularly inspected by the Cement and Concrete Reference Laboratory of the National Bureau of Standards.
3) Manufacturer shall submit certification and a conformance test report from an independent testing laboratory attesting to the product meeting all requirements of ASTM C 494-86 for Type F and G admixtures.
4) Manufacturer shall submit a company warranty.

b. Available Products: Subject to compliance with requirements, products, which may be incorporated in the work include, but are not limited to, the following:

"Sikament"; Sika Chemical Corp.
"PSI Super"' Gifford-Hill
"Rheobuild"; Master Builders

2.02 MIX PROPORTIONING

A. Liquid Holding and Conveying Structures - Concrete shall be watertight and resistant to naturally occurring or commonly used chemicals. All materials shall be so proportioned as to produce a well-graded mixture of high density and maximum workability, with a specified 28-day compressive strength as required. The concrete

shall be proportioned in accordance with ACI 211 Standards, latest revision, subject to the following special requirements:

1. Compressive strength shall be 4000 p.s.i. (28-day)
2. Maximum aggregate size shall be 3/4 inch.
3. Cement content as required.
4. Air entraining admixture shall be required for all exposed concrete.
5. High range water reducing admixture will be required for walls, beams, columns and elevated slabs, etc. (base slabs are optional).
6. Maximum water/cement ratio = 0.50. When water-reducing admixtures are used in the concrete, the water/cement ratio shall be less than 0.45.
7. Air content (ASTM C 231 or ASTM C 173) shall be provided with a 4.5% +/- 1.5% treatment dosage (by volume).
8. Slump -8 in. < Slump < 11 in. (with super plasticizer) 1 in. < Slump < 3 in. (Base slabs without super plasticizer).

B. Other Structures - Building slabs, foundations, walkways and all other structures not described in Paragraph A shall be regular concrete subject to the following special requirements:

1. Compressive strength shall be 3000 p.s.i. (28-day).
2. Cement content as required.
3. Air entraining admixtures shall be required for all exposed concrete.
4. Water reducing admixtures may be used as required.
5. Maximum water/cement ratio: 0.50 (no water-reducing admixtures) 0.45 (with water-reducing admixtures)
6. Air content (ASTM C 231 or ASTM C 173) shall be provided with a 4.5% +/- 1.5% (by volume).
7. Slump:
   1" minimum
   3" maximum in footings
   4" maximum in slabs, beams, walls, columns, etc.

C. Control of Set - Concrete shall be adjusted to produce the required rate of hardening for varied climactic and job site conditions.

1. Under 50 degrees F (10 degrees C) ambient temperature - Accelerate (Type C or Type E admixture -ANSI/ASTM C 494-80).
2. Above 80 degrees F (27 degrees C) ambient temperature - Retard (Type B and D admixture ANSI/ASTM C 494-80).
3. Between 50 degrees F (10 degrees C) and 80 degrees F (27 degrees C) - Normal Rate of Hardening (Type A admixture - ANSI/ASTM C 494-80).

2.03 MIXING AND BATCHING

Concrete shall be mixed only in quantities needed for current use. Concrete which shows evidence of partial set or which has been re-tempered or remixed shall not be used. Mixing shall

be in accordance with ACI 301-72, latest revision.

A. Machine Mixing - If the concrete is to be mixed at the job site, an approved batch mixer shall be used, except when otherwise authorized by the Engineer. The mixer shall be capable of combining the aggregates, cement, and water within the specified time into a thoroughly mixed and uniform mass, and discharging the concrete without segregation. The mixer shall be equipped with an approved batch meter and timing device which will automatically lock the discharge lever during the time of mixing, and a means of accurately measuring the water, unless otherwise authorized. Before any mixing is begun, all equipment used in the mixing operation shall be thoroughly cleaned of all loose particles of old concrete, left over aggregates, ice, debris and other such foreign substances.

Each batch of concrete shall be mixed for 1-1/2 minutes after all the materials composing the batch, including the water, have been deposited simultaneously in the mixer drum. The mixer shall rotate at the rate recommended by the manufacturer. The drum shall be entirely emptied after each batch.

Hand mixing will not be permitted.

B. Ready Mixed Concrete - Ready mixed concrete shall include both central mixed and transit mixed concrete, and all the specification requirements covering materials, proportioning, and mixing and batching, as set forth in the ASTM Standards for "Ready Mixed Concrete,", C 94, latest revision, shall apply unless otherwise specified herein. The concrete shall be delivered and placed in the Work no later than 120 minutes after the water has been added, provided that mixing has been continuous in the truck agitator. When ready mixed concrete is used for a continuously poured concrete section, the elapsed time between batches shall be no more than 20 minutes. Non-agitating type trucks shall not be used to haul ready mixed concrete under any circumstances.

1. Transit Mixed Concrete - When the concrete is transit mixed, the truck mixer shall be of an approved revolving drum or revolving blade type.

2. Central Mixed Concrete - When a central mixing plant is used, the concrete shall be delivered in approved truck agitators or truck mixers.

C. Retempering - Retempering will not be permitted except in case of emergency and only then in accordance with special instructions of the Engineer. In general, all

concrete or mortar, which has partially hardened shall be wasted and not used in the Work.

2.04 REINFORCING STEEL

The Contractor shall be responsible for the furnishing, cleaning, placing, and protection of all reinforcing steel called for on the drawings and/or specified to meet the requirements of the work of this Contract.

A. Materials - All steel used for reinforcement of concrete shall be deformed bars rolled from new billets, unless otherwise authorized by the Engineer, and of the shapes, weights, and sizes shown on the drawings, or as required. The steel shall conform in all respects to the current ASTM "Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement," A615, latest revision. All reinforcing shall be Grade 60, 60,000psi, of new stock, free from mill scale, rust, dirt, grease, or other foreign matter.

Samples of reinforcing steel for analysis and tests shall be furnished by the Contractor, if required by the Engineer.

B. Cleaning - Before placing the reinforcing steel in the concrete, it shall be thoroughly cleaned, and shall be kept clean until the concrete is placed. If not kept clean during and after placing as specified, the steel may be required to be removed from the form, cleaned, and replaced as directed.

If the reinforcing steel is washed after having been placed in the forms and prior to concreting, the wash water shall be drained or pumped leaving the foundation firm and dry when the concrete is poured.

C. Placing - All reinforcing steel shall be placed in conformance with the spacing, splices, and sizes shown on the drawings, or as directed by the Engineer. It shall be bent or fabricated as shown on the drawings or as directed, and shall be fastened in position so as to prevent its possible displacement during the placing of the forms and the pouring of the concrete. Where splices in bars are allowed, the splices shall be in accordance with ACI 318-89 Standards. Bends shall be accurately made cold in a bending machine in conformance with the standard practices specified in the current codes of the "American Concrete Institute," or as directed by the Engineer. Bars shall be securely fastened at crossings and splices, and wherever practicable shall be supported and braced with acceptable steel chairs, steel spreaders and/or cement mortar

blocks cast for this purpose.

Sheets of mesh or bar mat reinforcement shall overlap each other sufficiently to maintain a uniform strength and shall be securely fastened at the ends and edges.

The edge lap shall not be less than one mesh in width. Before any concrete is placed, the Engineer shall have inspected and approved the placement of the steel reinforcing and given permission to place the concrete.

D. Protection - Before placing the steel, it shall be thoroughly protected from all moisture and dirt. After placing, it shall be protected against possible disturbance or displacement until the concrete is placed; and, if concreting is interrupted for any considerable number of days, the steel shall be protected with canvas, tarred paper, or other satisfactory covering.

Reinforcing bars left temporarily projecting from concrete to which other bars are to be joined shall be maintained in their original position. Bending of these bars, requiring subsequent straightening, will not be permitted.

2.05 CEMENT GROUT

Concrete material for grouting around pipes, repairing holes and grouting under machinery and equipment, shall be a non-shrink premixed mortar, similar or equal to Sealtight 558 as manufactured by W. R. Meadows, Inc. or approved equal. The non-shrink mortar shall be terminated one inch below the finished surface and the final inch shall be a conventional mortar material applied in a workmanlike manner to provide a neat appearing finished surface.

Grout shall be mixed as directed by the Manufacturer so as to form a stiff consistency. The grout shall be composed of high early strength cement, sand, and an expanding agent. No lime shall be permitted in the mix. The mix shall attain a compressive strength of at least 7,500psi after seven days and 9,000psi after twenty-eight days. Grout shall conform to Corps of Engineers Specification CRD-C-588-78, latest revision.

2.06 JOINTS

A. General - Three (3) types of joints are to be utilized in the project. They are described below:

1. C.J. (Construction Joint) provides a pre-formed key, reinforcing through the joint, water stop and joint sealant.
2. (Contraction Joint) provides terminated main reinforcing each side of joint, smooth dowels through the joint, water stop (PVC) and joint sealant.

Details in the drawings relate to contraction joints only.

3. E.J. (Expansion Joint) provides terminated main reinforcing each side of joint, smooth dowels with grease cup through the joint, water stop (PVC/bulb) and joint sealant.

After joints have been installed in all water-bearing structures, a survey shall be conducted to determine if joint is watertight. Should a joint leak, the Contractor, at his own expense, shall make adjustments necessary to make the joint watertight. Any adjustments shall be submitted to the Engineer for his approval prior to the commencement of any Work.

B. Material - Water stops shall be used on all liquid holding and conveying structures and below grade portions of other structures in accordance with Section 3.07 of these Specifications. Filler and sealants shall be as follows:

1. Pre-molded Joint Filler:

a. Joint filler for expansion and isolation joints called for on the drawings shall be "asphalt joint" as manufactured by W.R. Meadows or approved equal unless otherwise noted.

b. Other Pre-molded Joint Filler - Where pre-molded cork-asphalt or pre-molded closed cell neoprene joint filler is required by the Drawings, it shall be of the dimensions indicated on the Drawings and must be approved by the Engineer before installation.

2. Joint Sealer:

a. Joint sealer for construction, contraction, expansion and isolation joints called for on the drawings shall be "Sonomeric CT-1 Sealant" as manufactured by Sonneborn or an approved equal unless noted otherwise.

All construction and contraction joints in liquid holding and/or conveying structures shall receive joint sealant applied in a pre-molded block. Sealant shall be applied on the waterside of walls or slabs.

C. Construction Joints - When the placing of concrete is suspended, all necessary grooves or construction joints for joining future work shall be made before the concrete has had time to set. All construction joints shall be made in accordance with ACI 301-89, latest revision.

1. Location and Type - The location and type of construction joints shall be as shown on the drawings or as approved by the Engineer. The location of construction joints other than those indicated on the drawings shall be approved by the Engineer prior to commencing work on any structure.

They shall be designed and located so as not to impair the strength and appearance of the structure. All joints shall be either horizontal or vertical, unless otherwise shown on the drawings or approved by the Engineer.

2. Keys - Keys shall be provided in all construction joints unless otherwise shown on the drawings. Unless otherwise stipulated, the width of the keys shall be approximately one-third of the width of the section at that point, and their depth one-third of the width.

Immediately after the removal of the end form or bulkhead of a poured section, any projecting fins shall be removed from the surface and interior of the keys.

3. Alternate Water stop System:

a. The "Synko-Flex Preformed Plastic Adhesive Water stop" and "Synko-Flex Primer" system manufactured by Synko-Flex Products, Incorporated, Houston Texas (800-231-4551) (or approved equal) may be substituted for the PVC water stops shown on the Drawings for all construction joints (excluding contraction and expansion joints).

The water stop material shall be a single-component, self-sealing plastic adhesive type. It shall also have non-oxidizing, non-evaporating, non-expanding, non-shrinking, and with water, chemical and saturated hydrogen sulfide resistant characteristics.

The pre-formed plastic water stop shall meet or exceed all requirements of federal specifications SS-5-210A and shall not contain solvents, irritating fumes or obnoxious odors. The water stop shall be extruded in a "ropelike" form and wrapped between two silicone treated protective paper strips. The extrusion shall have at least 1.0 square inches of cross-sectional area and be shipped in lengths practical to install (3'-0" long, minimum).

Adhesive primer shall be supplied by the water stop manufacturer to insure compatibility of bonded materials.

b. The following criteria and/or conditions will serve as prerequisites for utilization of the alternate water stop system.

1) The starter walls shown at the base of the vertical walls may be omitted. A key will be cast into the base slab in place of the started walls. Inverted key will not be permitted.
2) The water stop system installed shall comply and meet or exceed those test criteria set forth in Shilstone Testing Laboratory Report 6-5016-B-R, dated 11/11/87, those test criteria set forth in the report titled "Hydrostatic Pressure Tests on Synko-Flex Preformed Plastic Adhesive Water stop" dated March 1979, issued by the Department of Civil Engineering of the University of Texas, and "Hydrostatic Pressure Testing of Synko-Flex Preformed Plastic Adhesive Water stop Report No. SWRI 06-1391-201" dated November, December, 1986 and January, 1987, by Southwest Research Institute, San Antonio, Texas.

3) Contractor shall install the alternate water stop system in accordance with his vendor/supplier's approved integrated shop drawings and installation procedures. Submittal of details of placement in and around PVC water stops in expansion/contraction joints will be required by the Contractor/vendor. Sample submittals will be required.
4) Contractor/vendor shall warrant the product, its installation and performance in accordance with the General Conditions.

2.07 PIPES, CASTINGS AND CONDUITS EMBEDDED IN CONCRETE

The Contractor shall do everything possible to have all castings and inserts delivered to the Work, so that they may be placed in the forms and concreted in place. In case any castings and inserts are not on the job, the Contractor shall remove the forms from the openings and prepare the opening for placing of the casting or insert. After the casting or insert is placed, he will then build forms for concreting the opening around the casting; such forms shall be so constructed that the concrete or mortar in the highest point can be poured under a head of concrete or mortar of not less than six inches and shall in every way meet with the approval of the Engineer. Where basins holding water or other liquids are involved or where leakage through the concrete so placed may occur, the concrete shall contain a waterproofing agent such as "Embeco", as manufactured by the Master Builders Company, Cleveland, Ohio; "Ferrolith GDS" as manufactured by the Sonneborn Chemical and Refining Corporation, New York, New York; "Thoroset Metallic Grouting Compound" as manufactured by Standard Dry Wall Products, Inc., New Eagle, Pennsylvania; or approved equal. All such waterproofing agents shall be used in strict accordance with the manufacturer's instructions. The Contractor shall be responsible for the water tightness of the concrete work and shall remove the forms and finish the concrete in a thorough competent and workmanlike manner.

PART 3 - EXECUTION

3.01 PLACING CONCRETE

Before placing the concrete, the space within the limits of the pour shall have been cleaned of all debris and water, and adjacent concrete surfaces prepared as hereinafter specified.

A. Methods - The Contractor shall provide sufficient and suitable equipment and labor to assure that the concrete when deposited in the forms shall have the quality and consistency specified regardless of the methods of transporting, handling, placing and working.

1. Transporting and Placing Concrete - Concrete shall be transported and placed by methods which will prevent segregation or loss of materials.

The concrete shall be placed so that the top surface is level and does not flow along the forms. Precautions shall be taken to eliminate the possibility of segregation through free dropping of the concrete.

2. Working the Concrete - During and immediately after placing, the concrete shall be thoroughly worked by spading, vibrating or other suitable methods to assure a dense, compacted, homogeneous concrete free of voids, pockets, or seams of segregated materials. The forms shall be completely filled without overflowing. Care shall be taken to avoid disturbing the alignment of the forms and displacing the steel reinforcement or any embedded fixtures.

B. Placing Concrete Under Water - Concrete shall not be deposited in water or exposed to the action of water before setting except with the approval of the Engineer. In no case shall concrete be deposited in running water. If concrete is to be placed in water, the formwork designed to retain such concrete shall be watertight.

C. Placing Concrete in Cold Weather - Using normal placing techniques, concrete shall only be poured when the ambient temperature is 40 degrees F and rising. Concrete may, with permission, be placed in weather colder than 40 degrees F subject to ACI 306R-88 and the following:

1. An approved accelerating agent shall be used in the concrete. Calcium chloride shall not be permitted as an accelerating agent without the prior written approval of the Engineer.

2. Water and aggregates used in the concrete mix shall be heated to 90 degrees F to 100 degrees F prior to injection into the mix.

3. Forms shall be heated prior to concreting and the area shall continue to be heated after placement of the concrete for a period of at least 48 hours or until the ambient temperature is above 45 degrees F, whichever occurs first.

The Engineer may, however, prohibit the placing of concrete at any time when, in his judgment, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather may be in any season.

3.02 CURING

All concrete surfaces normally exposed to the atmosphere shall be protected against too rapid drying by curing for a minimum period of seven (7) days.

Concrete shall be either cured by keeping continuously wet with water for the above specified periods or the exposed surfaces of the fresh concrete may be sealed with an approved curing compound which will minimize the escape of moisture from within the concrete.

Concrete being cured shall be wet down as often as is necessary to keep it continually wet. Vertical surfaces shall be protected from too rapid drying by being covered with burlap or other suitable blanket material kept continuously wet for a period of 7 days.

A. Membrane Curing - Membrane curing shall be accomplished by coating the entire exposed surface of the concrete with a liquid compound applied uniformly by means of an approved pressure spray distributor, at the rate of 200 square feet per gallon of material. To prevent waste or pooling, the required application may be secured by more than one coat.

Curing compound shall be of a nature and composition not deleterious to concrete, thinned to a working consistency either with a volatile solvent or by emulsification with water. The curing compound shall be of standard and uniform quality and shall be ready to use as shipped by the manufacturer. No diluting shall be permitted.

It shall form a membrane which will adhere to moist concrete and which will not disintegrate, check, peel from the surface, nor show signs of such deterioration within thirty (30) days after application, under actual weather and working conditions.

The compound shall, when tested in accordance with the method of test for "Water Retention Efficiency of Methods for Curing Concrete: ASTM C 156, latest revision, be effective in limiting the water loss in the concrete test specimen to 3-1/2 percent when applied at the rate of coverage recommended by the manufacturer.

3.03 FINISHING CONCRETE SURFACES

The provisions of this Subsection shall apply to all exposed exterior concrete surfaces and all interior concrete surfaces of conduits and structures whose finish is not specified elsewhere in these Specifications or specifically indicated on the drawings.

Holes produced by form ties, any other holes, honeycomb spots, broken corners or edges, and other defects on all surfaces shall be thoroughly cleaned and, where necessary, cut back to homogeneous concrete. These surfaces shall be saturated with water and carefully pointed and trued with mortar composed of one part of Portland Cement and 2 parts of sand so that a smooth, even surface of uniform color and texture results.

The exposed tops of walls of structures shall be brought to true level, floated to bring a workable grout to the surface, struck off and re-leveled where necessary with cement grout of the same proportions as the mortar of the concrete. The wall tops shall then be float finished and

edged unless otherwise indicated on the drawings. The edger used shall be of ½" radius and shall have its flanges ground to a knife-edge so as to have as little burr as possible.

Where not otherwise indicated on the drawings, the top and bottom slabs of all structures and water carrying conduits shall be finished as follows: The top of the slab shall be screeded to grade and cross section; lightly tamped as required to bring up a good bed of mortar for finishing and re-screeded as necessary. The surface shall then be finished with a wood float and leveling darby. No further finish will be required on top slabs or structures or conduits, which are to be buried. All exposed top slabs of structures and conduits shall be given a final wood and brush finish with a smooth surface that conforms with accuracy to required shape, slope and grade. Slabs shall be edged as appropriate.

A. Rubbing and Grinding - In general, all concrete exposed permanently to view including the inside of basins constructed to hold water (to 1'-6" below normal water level) shall be finished by wet rubbing. Where such wet rubbing is required, the forms shall be removed from the concrete as quickly as possible and the rubbing accomplished mechanically by a slow speed-grinding wheel or manually with No.20 carborundum stones.

During the rubbing process, the concrete shall be kept thoroughly wetted and the rubbing continued until all form marks, fins, and other such irregularities have been removed and until the entire surface of the concrete is of a smooth, even texture and is uniform in color. Where wet rubbing is accomplished manually, the final rubbing shall be accomplished with No. 40 carborundum stones.

Where dry grinding is required or necessary to remove fins or projections prior to final finishing or necessary because the concrete has hardened beyond the point where wet rubbing will be effective, it shall be accomplished mechanically with high speed grinding wheels or discs satisfactory for the purpose. Where air holes must be filled and the dry grinding is to affect the finished surface, the concrete shall first be painted with a coating of wet cement paste and then ground with a slower speed machine until the desired surface texture is obtained; additional cement paste and water shall be added as needed.

B. Building Floors - After the concrete has been placed, spread and compacted as specified, the floor shall be screeded or struck off to the proper level. When the

concrete has hardened to the point where it can no longer be dented with the finger or only a slight amount of moisture comes to the surface, it shall then be floated, mechanically with machines designed for this purpose or by hand with wooden floats. The floating shall be continued until all hollows have been filled and an even sandstone like surface achieved.

A chemical hardener shall be applied to interior building floor areas in accordance with the manufacturer's recommendations. The hardener shall be "HARDTOP" as manufactured by Gifford-Hill, Inc., an equivalent by Sonneborn or approved equal.

3.04 SWEPT CEMENT GROUT FINISH

The floor surfaces of basins in which raking mechanisms are to be installed, shall be finished, as indicated on the drawings, by sweeping in cement grout with the mechanism. The cement grout to be used shall be composed of one part Portland cement and two parts sand.

The sweeping-in process shall be performed under the supervision of a factory representative of the equipment manufacturer and all costs incidental to such supervision shall be included in the bid price for the Work.

The slab upon which the grout is to be applied shall be finished as described above except that after leveling and floating it shall be lightly raked in such a manner as to provide a good bond for the grout. Before grout is deposited on the slab it shall be thoroughly cleaned, wet down with clean water and lightly dusted with neat cement immediately prior to placement of the grout.

3.05 TESTING

The Contractor shall submit the mix design he intends to use to the Engineer, which must be provided by preliminary cylinder tests at least 30 days before the operation. The costs for these preliminary cylinder tests shall be borne by the Contractor.

A. Slump Tests - Slump tests, if ordered by the Engineer, shall be made at frequent intervals on the concrete that is to be incorporated into the Work. Failure of the concrete to satisfy the slump test shall be sufficient reason for removal of the concrete and replacement with satisfactory concrete, if, in the opinion of the Engineer, such concrete is unfit for the purpose for which it was designed. The slump test shall be performed in accordance with the ASTM Standards for "Slump Tests," C 143, latest

revision.

B. Test Cylinders - One set of test cylinders shall be obtained Contractor for each day's pour or one set for each 75 yards poured per day. Cylinders falling below the minimum compressive strength, as hereafter specified, will be sufficient reason for the removal of the concrete and replacement with satisfactory concrete, if, in the opinion of the Engineer, such concrete is unfit for the purpose for which it was designed.

One set of test cylinders shall include four (4) test cylinders six (6) inches in diameter and twelve (12) inches high. Two cylinders shall be tested at seven days and two cylinders shall be tested at 28 days. These cylinders shall be made and tested in accordance with the ASTM Standards for "Making and Curing Specimens," C 31, latest revision, and "Test for Compression Strength of Concrete Cylinders," C 39, latest revision. The costs for cylinder testing shall be borne by the Owner. The making, curing and testing of selected concrete cylinders shall be performed by a certified, independent laboratory, selected by the Engineer and paid for by the Owner.

Should the concrete fail to meet the specified 28-day strength, the Engineer may order tests on the hardened concrete as described in Section 1704 of ACI 301-89. If the concrete is cored and the cores fail to meet the specified 28-day strength, the Engineer shall have the right to reject the concrete, change the mix proportions, or both, at the expense of the Contractor.

3.06 FORMING

The forms shall be suitable for the work and shall conform to the shape, lines and dimensions of the structure to be built as shown on the drawings.

For all surfaces, which are exposed in the finished work, forms shall be of steel, metal surfaces on wood, plywood, pressboard, or well-seasoned boards, dressed all over and smooth. They shall be so built that when removed, the concrete will be left free from offsets, fins, ridges, or other unsightly defects. Formwork shall be constructed so as to ensure that the concrete surfaces will conform to the tolerances of Section 203.1, "Recommended Practice for Concrete Formwork," ACI-347, latest revision. Forms shall be sufficiently tight to prevent leakage of mortar. The size and spacing of studs and wales shall be determined by the nature of the work and the height to which concrete is placed. Joints shall be snug, and shall occur at the designated locations only.

All forms shall be cleaned and inspected immediately prior to placing concrete. Deformed, broken, or defective forms shall be removed from the work. Temporary openings shall be provided where necessary to facilitate cleaning and inspection just prior to placing concrete.

Should the forms show any sign of yielding, spreading or otherwise becoming displaced from correct alignment or position during or after the placing of concrete, they shall be corrected immediately by adjustment or bracing to the extent necessary, or, if required, shall be removed in part or in their entirety and rebuilt or reset.

The entire inside surfaces of forms shall be oiled with approved form oil, or shall be thoroughly wetted just prior to placing concrete.

All exposed corners and edges shall have a formed 3/4-inch chamfer unless otherwise indicated on the drawings.

Wooden forms for surfaces not exposed to view may be built of sound No.1 yellow pine, Douglas fir, or equivalent acceptable lumber, dressed on all sides and neatly fitted. Matched lumber, shiplap, or other satisfactory joint lumber shall be used throughout, and tongued and grooved material shall be used where required.

Sheeting shall be erected in level random courses. All vertical joints shall be squared, and all horizontal joints shall be level and matched throughout the entire job. Except for panel forms, vertical joints shall not exceed the width of one board and shall be staggered at least thirty-two (32) inches and made on the center of a stud. Inside forms shall not be placed until exterior forms have been checked, or vice versa.

Forms for beam and girder soffits shall be constructed with nominal 2-inch lumber, and all joints shall be tight and even. Beam and girder soffits shall be sufficiently braced, shored, and wedged to prevent deflection.

Forms for all interior exposed concrete surfaces and designated areas of exterior exposed concrete surfaces shall be constructed with minimum thickness 5/8-inch plywood for straight sections, and 3/8-inch plywood for curved sections. Plywood shall be made with waterproof glue and manufactured especially for concrete formwork. Edges shall match in thickness, width, and length. Full size sheets of plywood shall be used, except where otherwise required or where smaller pieces will cover an entire area. Forms shall be placed so that markings will be symmetrical. Plywood shall be thoroughly oiled on contact faces and edges with raw linseed oil

or other approved form lacquer. Surplus oil shall be wiped off forms before reinforcing steel is placed and while the surfaces are accessible.

If steel forms are proposed, they shall be approved prior to use. The forms shall be accurately constructed in a standard size and in such minor multiple widths and lengths as will permit plates and fillers to be erected to correct curves, as required.

Steel forms shall be coated before each use, with light, clear paraffin-base oil, or other acceptable commercial preparation that will not discolor the concrete. Plates shall be wire brushed after each use.

Voids below grade beams, walls, and slabs shall be closed by a monolithic extension of the concrete member at its edges, or by pre-cast concrete blocks which extend at least 6" into the sub-grade to retain the adjacent soil.

Only form ties, hangers, and clamps approved by the Engineer shall be used, and they shall be of such type that no metal will be closer than one-half (1/2") inch from the surface. Wire ties will not be permitted. Lugs, cones, washers, or other devices which will leave holes or depressions at the surface of the concrete greater than 7/8" diameter shall not be fitted within the forms. The spacing of form ties, hangers, and clamps shall be strictly in accordance with manufacturer's directions.

In general, forms shall not be removed until the concrete has hardened sufficiently to support its own load safely plus any superimposed loads that might be placed thereon. In any event, forms shall be left in place at least the minimum required length of time specified below, after the date of placing concrete:

Columns	2 days
Side forms for girders & beams	2 days
Bottom forms of slabs	7 days
Bottom forms of beams & girders	7 days
Walls	2 days

The removable portion of form ties shall be withdrawn from the concrete immediately after taking down the forms. The holes left by such ties shall be filled with grout and the surface shall be finished with a steel spatula or rubbed with sackcloth.

Care shall be taken in removing forms, wales, shorings, supports, and the form ties to avoid spalling or marring the concrete. The required rubbed finish and such patching as may be necessary shall be started within one (1) day after removal of the forms.

Where it is necessary to block out an opening in a concrete wall or slab to accommodate fittings the forms used in making the opening shall include a keyway on all facings. The space between the pipe or fitting and the concrete shall be thoroughly cleaned and filled with a non-shrink grout or mortar, which will preserve watertight integrity.

3.08 WATER STOPS

Water stops shall be installed in construction joints at locations shown in the drawings. All water stops shall be continuous throughout their length.

The water stops shall be heavy duty polyvinyl water stop conforming to Corps of Engineers Specification CRD-C-572, latest edition, as manufactured by Serviced Products Division of W.R. Grace and Company; B.F. Goodrich Company; Electrover, Inc.; W.R. Meadows, Inc.; Vinylex Corporation; Wal-John, Inc.; Greenstreak; or an approved equal of the same type and material and approximately equal in dimensions and weight but not necessarily of exactly the same shape. Water stops shall be of the type, shape and size shown on the drawings. A serrated center bulb type water stop will be provided at the expansion joints.

The water stop shall be extruded from polyvinyl chloride resin plastic having the following minimum properties:

Tensile Strength	1,700 psi
Ultimate Elongation	350%
Brittleness Temp (ASTM D746-57T)	-35 degrees F

All water stops shall be installed so that one-half width will be embedded on one side of the joint and one-half on the other. The Contractor shall employ a method of placing the water stop to insure that the water stop will be held securely in true vertical position and in straight alignment in the joint and to completely enclose the water stop in the concrete without air voids.

All water stops shall be continuous and so joined at all points of contact in the same plane, or at intersections with water stops in different planes, so as to form a complete barrier to the passage of water through any construction, contraction or expansion joint and all joints shall be made by heat welding as specified herein.

Joints in PVC water stops shall be made by heating the two surfaces to be joined until the material has softened to the point where it is just short of being fluid and then bringing the two softened surfaces together with a slight rubbing motion followed by firmly pressing them together so that a solid and tight bond is made. The joints in strips of water stop made in the

above manner shall be such that the entire cross-section of this joint shall be dense, homogeneous and free of all porosity. All finished joints shall have a tensile strength of not less than 75 percent of the material of the strip as extruded.

The heating of the surfaces to be jointed shall be done by means of an electric hot plate splicer designed for the specific purpose and controlled by means of a voltage regulator. It shall be rated at 1,000 watts for use with 115-volt electric current. The size of the plate shall be approximately 2-inch by 10-inch, with a Teflon cover, and shall be such that both sides of the plate can be used simultaneously. The voltage regulator to be used in conjunction with the above described hot plate shall be rated at 7.5 amps, 115-volt input and 0-135-volt output. In use, the heat of the hot plate shall be so regulated as to prevent too rapid melting and accompanying charring of the water stop material.

The Contractor shall provide such jigs as will assist in making the joints in a proper and workmanlike manner and in holding the strips so that the alignment of joined strips is correct and angles are true to those required.

Prior to embedment, all joints in the water stop strips will be carefully inspected by the Engineer and any found defective shall be corrected. The Contractor shall take such steps as are necessary to protect exposed water stops at all times.

END OF SECTION

TECHNICAL SECTION
DIVISION 3 - CONCRETE
SECTION 03010 - CAST-IN-PLACE CONCRETE

TECHNICAL SECTION
DIVISION 3 – CONCRETE
SECTION 03200 – CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SCOPE

This Section covers reinforcement for Portland cement concrete for Administration Building and sidewalk concrete. See 03010 Cast-In-Place Concrete for all other concrete reinforcement.

1.02 APPLICABLE PUBLICATIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American Concrete Institute (ACI) Standard

318-83 - Building Code Requirements for Reinforced Concrete

B. American Society for Testing and Materials (ASTM) Publications

A 82-85 - Cold-Drawn Steel Wire for Concrete Reinforcement
A 120-84 - Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses
A 184-86 - Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
A 185-85 - Welded Steel Wire Fabric for Concrete Reinforcement
A 497-86 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
A 499-81 - Steel Bars and Shapes, Carbon Rolled from "T" Rails
A 615-86 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
A 675-85 - Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties.

C. American Welding Society, Inc. (AWS) Publication

D1.4-79 - Structural Welding Code - Reinforcing Steel

D. Concrete Reinforcing Steel Institute (CRSI) Publication

Manual of Standard Practice (23rd Ed. 2nd Prtg 1981; 1983).

E. State of Louisiana Department of Transportation and Development, Office of Highways Standard Specifications

Louisiana Standard Specifications for Roads and Bridges, 2000 Edition.

1.03 SUBMITTALS

Submittals shall be provided in accordance with Section 01340 -Shop Drawings, Samples and Product Data. Submittals shall include:

A. Shop Drawings - Shop Drawings shall be submitted and show reinforcing steel schedules, sizes, grades, and splicing and bending details. Drawings shall show support details including types, sizes, and spacing.

B. Certificates - Certified copies of mill reports attesting that the reinforcing steel furnished meets the requirements specified shall be submitted prior to the installation of reinforcing steel.

1.04 DELIVERY AND STORAGE

Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

PART 2 - PRODUCTS

2.01 Dowels shall conform to ASTM A675, Grade 80, or ASTM A499. Steel pipe conforming to ASTM A120, Schedule 80, may be used as dowels provided the ends are closed with metal or plastic inserts or with mortar.

2.02 Reinforcing Steel shall be deformed bars conforming to ASTM A615 grade 60, sizes as indicated. Cold drawn wire used for spiral reinforcement shall conform to ASTM A82.

2.03 Welded Wire Fabric shall conform to ASTM A185 or A497.

2.04 Wire Ties shall be 16 gauge or heavier black annealed steel wire.

2.05 SUPPORTS

Bar supports shall be designed and fabricated in accordance with CRSI Manual of Standard Practice. Concrete blocks or bricks are not permitted. For slabs on grade, supports shall be steel with one piece rectangular bearing plates. SBP Slab Bolster with Plate as manufactured by Meadow Burke. Conical supports shall not be used on slabs. Specifically designed conical bar supports fabricated of plastic may be used for footings.

2.06 FIBER REINFORCEMENT

The concrete for all exterior flatwork shall be reinforced with the use of polypropylene, collated, fibrillated fibers as manufactured by Fibermesh Co. of Chattanooga, Tennessee or approved equal. The fibers shall be used at a rate of one and one half pounds (1½ lbs.) per cubic

yard and in strict accordance with the manufacturer's recommendations. The fiber manufacturer or approved distributor shall provide the services of a qualified technician at job startup.

PART 3 - EXECUTION

3.01 REINFORCEMENT

Reinforcement shall be fabricated to shapes and dimension shown and shall conform to the requirements of ACI318. Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete.

A. Placement - Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with ACI318 at locations shown plus or minus one bar diameter. Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage shall be as indicated or as required by ACI318. If bars are moved more than on bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed.

B. Splicing - Splices of reinforcement shall conform to ACI318 and shall be made only as required or indicated. Splicing shall be by lapping or by mechanical or welded butt connection; except that lap splices shall not be used for bars larger than No.11 unless otherwise indicated. Welding shall conform to AWS D1.4. Welded butt splices shall be full penetration butt welds. Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one-fifth the required length of lap or 6-inched. Mechanical butt splices shall develop 125 percent of the specified minimum yield tensile strength of the spliced bars or of the smaller bar in transition splices. Bars shall be flame dried before butt splicing. Adequate jigs and clamps or other devices shall be provided to support, align, and hold the longitudinal centerline of the bars to be butt spliced in a straight line.

3.02 DOWELS

Dowels shall be installed in slabs on grade at locations indicated and at right angles to joint being doweled. Dowels shall be accurately aligned parallel to the finished concrete surface and rigidly supported during concrete placement. One end of dowels shall be coated with a bond breaker.

END OF SECTION

DIVISION FIVE

METALS

5

TECHNICAL SECTION
DIVISION 5 – METALS
SECTION 05010 – STRUCTURAL STEEL

PART 1 – GENERAL

1.01 GENERAL

This Work includes the furnishing of all materials, equipment and labor necessary for fabrication and erection of all structural steel items shown on the Drawings and as specified herein.

The Contractor shall furnish all bolts, nuts, shims, pins, and other anchors and all miscellaneous items, which may be required by the Drawings or job conditions, to secure all items permanently in place, whether or not specifically called for or shown on the Drawings, as approved by the Engineer.

1.02 SHOP DRAWINGS

The Contractor shall furnish 8 copies of shop drawings, clearly indicating this Work in all details, for approval. The Engineer shall approve shop drawings before any of the Work is executed. Drawings shall show sizes, gauges and types of materials used for the various sections, details of construction, methods of assembly, hardware, weld size, type, and length, etc. Where necessary, the Contractor shall check and verify dimensions of all miscellaneous steel work at the site.

The approval of shop drawings will be for size and arrangement of principal auxiliary members and strength of connections. Any errors in dimensions shown on the shop drawings shall be the full responsibility of the Contractor.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Structural Steel - Structural steel for all work (except as otherwise indicated or specified) shall conform to ASTM Specifications A36, latest revision.

B. Cast Steel - Cast steel shall conform to ASTM Specification A-27, latest revision, Grade 65-35.

C. Bolts - High strength steel bolts shall conform to ASTM Specification A325; use high strength steel bolts for all connections of beams, girders and trusses to columns or hangers, bracing connections, and elsewhere as noted on the Drawings. All other bolts used in connection with structural steel shall conform to ASTM Specification A307, latest revision.

D. Filler Metal for Welding - Welding electrodes for manual shielded metal-arc shall conform to ASTM Specification A233, E60 or #70 Series, latest revision. Bare electrodes and granular flux used in the submerged-arc process shall conform to Section 1.17.3 of AISC Specification for Structural Steel for Buildings, latest revision.

E. Evidence of Conformity - Certified test reports of structural steel and cast steel shall constitute sufficient evidence of conformity with the Specifications. Manufacturer's certification for bolts and nuts and filler metal for welding shall constitute evidence of compliance.

PART 3 - EXECUTION

3.01 INSPECTION

The materials and workmanship to be furnished under this Specification shall be subject to inspection in the mill, shop, and field by the Engineer, or by qualified inspectors retained by the Owner. Inspection will be conducted without expense to the Contractor; however, inspection in the mill or shop shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with Contract requirements.

3.02 FABRICATION

Unless otherwise indicated on the Drawings or specified, the fabrication of structural steel shall be in accordance with the American Institute of Steel Construction - "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings," latest revision.

Shop connections shall be welded. Shop connections indicated on the Drawings are generally intended only to show the type of connection to be provided; the fabricator shall design all connections. On request from the fabricator, the Engineer will furnish loads and moments for which connections must be designed.

3.03 ERECTION

A. Applicable Standards - Except as otherwise indicated on Drawings or specified, the erection of structural steel shall be in accordance with the American Institute of Steel Construction "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings, latest revision and the "Code of Standard Practice for Steel Buildings and Bridges", latest revision.

B. Methods for Erection - Prior to starting work, the Contractor shall submit to the Engineer a description of the methods, sequence of erection and type of equipment he proposes to use for erecting the structural steel work. This submission or approval shall not relieve the Contractor of his responsibility for providing the proper methods, equipment, or workmanship, or safety precautions.

C. Field Connections - Field connections shall be bolted using high strength bolts for strength connections.

D. High Strength Steel Bolts - Where structural joints are made using high strength bolts, hardened washers and nuts tightened to a high tension, the materials, methods of installation and tension control, type of wrenches to be used, and inspection methods shall conform to specifications for "Structural Joints Using ASTM A325 Bolts," latest revision as approved by the research Council on Riveted and Bolted Structural joints of the Engineering Foundation. The high strength bolts used shall have a suitable identifying mark placed on the top of the head before leaving the factory.

Tightening-of-nuts shall be done by the turn-of-nut method. The minimum bolt tension for the size of bolt used shall be in accordance with tables listed in the above referenced standards. Bolts that have been completely tightened shall be marked with identifying symbol.

E. Welding - Where structural joints are made by welding, the details of all joints, the technique of welding employed, the appearance and quality of welds made, and the methods used in correcting defective work shall conform to requirements of the "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction, latest revision, and the "Code for Arc and Gas Welding in Building Construction" of the American Welding Society, latest revision. Welds shall be made only by operators who have been previously qualified by tests, as prescribed in the "Standard Qualification Procedure" of the American Welding Society to perform the type of work required.

F. Field Cutting - The use of a gas-cutting torch in the field for correcting fabrication errors will not be permitted.

G. Setting Plates - Column base plates shall be set level to correct elevations. The entire bearing area under plates shall be grouted solid with EMBECO non-shrink grout or an equal approved by the Engineer. At the Contractor's option, ¼-inch

leveling plates may be furnished and set in place on grout bed (reducing grout depth 1/4 inch) before erection of columns.

H. Templates - Templates shall be furnished as indicated on drawings or as required. The Contractor shall furnish instructions for the setting of anchors and bearing plates and shall ascertain that the items are properly set during the progress of the Work.

I. Framing - The framing shall be carried up true and plumb and temporary bracing shall be introduced wherever necessary to take care of all loads to which the structure may be subjected, including erection equipment and its operation. Such bracing shall be left in place as long as may be required for safety. The Contractor as part of his equipment shall finally remove it. As erection progresses, the work shall be securely connected to take care of all dead loads, wind, and erection stresses.

3.04 GALVANIZING

All structural steel shall be sandblasted to a near-white finish and then hot-dip galvanized. Galvanizing shall be in accordance with the applicable specifications of the ASTM.

END OF SECTION

TECHNICAL SECTION
DIVISION 5 – METALS
SECTION 05010 – STRUCTURAL STEEL

PART 1 – GENERAL

1.01 GENERAL

This Work includes the furnishing of all materials, equipment and labor necessary for fabrication and erection of all structural steel items shown on the Drawings and as specified herein.

The Contractor shall furnish all bolts, nuts, shims, pins, and other anchors and all miscellaneous items, which may be required by the Drawings or job conditions, to secure all items permanently in place, whether or not specifically called for or shown on the Drawings, as approved by the Engineer.

1.02 SHOP DRAWINGS

The Contractor shall furnish 8 copies of shop drawings, clearly indicating this Work in all details, for approval. The Engineer shall approve shop drawings before any of the Work is executed. Drawings shall show sizes, gauges and types of materials used for the various sections, details of construction, methods of assembly, hardware, weld size, type, and length, etc. Where necessary, the Contractor shall check and verify dimensions of all miscellaneous steel work at the site.

The approval of shop drawings will be for size and arrangement of principal auxiliary members and strength of connections. Any errors in dimensions shown on the shop drawings shall be the full responsibility of the Contractor.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Structural Steel - Structural steel for all work (except as otherwise indicated or specified) shall conform to ASTM Specifications A36, latest revision.

B. Cast Steel - Cast steel shall conform to ASTM Specification A-27, latest revision, Grade 65-35.

C. Bolts - High strength steel bolts shall conform to ASTM Specification A325; use high strength steel bolts for all connections of beams, girders and trusses to columns or hangers, bracing connections, and elsewhere as noted on the Drawings. All other bolts used in connection with structural steel shall conform to ASTM Specification A307, latest revision.

D. Filler Metal for Welding - Welding electrodes for manual shielded metal-arc shall conform to ASTM Specification A233, E60 or #70 Series, latest revision. Bare electrodes and granular flux used in the submerged-arc process shall conform to Section 1.17.3 of AISC Specification for Structural Steel for Buildings, latest revision.

E. Evidence of Conformity - Certified test reports of structural steel and cast steel shall constitute sufficient evidence of conformity with the Specifications. Manufacturer's certification for bolts and nuts and filler metal for welding shall constitute evidence of compliance.

PART 3 - EXECUTION

3.01 INSPECTION

The materials and workmanship to be furnished under this Specification shall be subject to inspection in the mill, shop, and field by the Engineer, or by qualified inspectors retained by the Owner. Inspection will be conducted without expense to the Contractor; however, inspection in the mill or shop shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with Contract requirements.

3.02 FABRICATION

Unless otherwise indicated on the Drawings or specified, the fabrication of structural steel shall be in accordance with the American Institute of Steel Construction - "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings," latest revision.

Shop connections shall be welded. Shop connections indicated on the Drawings are generally intended only to show the type of connection to be provided; the fabricator shall design all connections. On request from the fabricator, the Engineer will furnish loads and moments for which connections must be designed.

3.03 ERECTION

A. Applicable Standards - Except as otherwise indicated on Drawings or specified, the erection of structural steel shall be in accordance with the American Institute of Steel Construction "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings, latest revision and the "Code of Standard Practice for Steel Buildings and Bridges", latest revision.

B. Methods for Erection - Prior to starting work, the Contractor shall submit to the Engineer a description of the methods, sequence of erection and type of equipment he proposes to use for erecting the structural steel work. This submission or approval shall not relieve the Contractor of his responsibility for providing the proper methods, equipment, or workmanship, or safety precautions.

C. Field Connections - Field connections shall be bolted using high strength bolts for strength connections.

D. High Strength Steel Bolts - Where structural joints are made using high strength bolts, hardened washers and nuts tightened to a high tension, the materials, methods of installation and tension control, type of wrenches to be used, and inspection methods shall conform to specifications for "Structural Joints Using ASTM A325 Bolts," latest revision as approved by the research Council on Riveted and Bolted Structural joints of the Engineering Foundation. The high strength bolts used shall have a suitable identifying mark placed on the top of the head before leaving the factory.

Tightening-of-nuts shall be done by the turn-of-nut method. The minimum bolt tension for the size of bolt used shall be in accordance with tables listed in the above referenced standards. Bolts that have been completely tightened shall be marked with identifying symbol.

E. Welding - Where structural joints are made by welding, the details of all joints, the technique of welding employed, the appearance and quality of welds made, and the methods used in correcting defective work shall conform to requirements of the "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction, latest revision, and the "Code for Arc and Gas Welding in Building Construction" of the American Welding Society, latest revision. Welds shall be made only by operators who have been previously qualified by tests, as prescribed in the "Standard Qualification Procedure" of the American Welding Society to perform the type of work required.

F. Field Cutting - The use of a gas-cutting torch in the field for correcting fabrication errors will not be permitted.

G. Setting Plates - Column base plates shall be set level to correct elevations. The entire bearing area under plates shall be grouted solid with EMBECO non-shrink grout or an equal approved by the Engineer. At the Contractor's option, ¼-inch

leveling plates may be furnished and set in place on grout bed (reducing grout depth 1/4 inch) before erection of columns.

H. Templates - Templates shall be furnished as indicated on drawings or as required. The Contractor shall furnish instructions for the setting of anchors and bearing plates and shall ascertain that the items are properly set during the progress of the Work.

I. Framing - The framing shall be carried up true and plumb and temporary bracing shall be introduced wherever necessary to take care of all loads to which the structure may be subjected, including erection equipment and its operation. Such bracing shall be left in place as long as may be required for safety. The Contractor as part of his equipment shall finally remove it. As erection progresses, the work shall be securely connected to take care of all dead loads, wind, and erection stresses.

3.04 GALVANIZING

All structural steel shall be sandblasted to a near-white finish and then hot-dip galvanized. Galvanizing shall be in accordance with the applicable specifications of the ASTM.

END OF SECTION

TECHNICAL SECTION
DIVISION 5 – METALS
SECTION 05501 – MISCELLANEOUS METALS - STEEL AND ALUMINUM

PART 1 - GENERAL

1.01 SCOPE

This Section includes the furnishing of materials, equipment and labor for the fabrication and erection of metal and shop built items shown on the Drawings and not covered elsewhere.

1.02 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. Federal Specifications (Fed. Spec.)

TT-P-645	Primer, Paint, Zinc Chromate, Alkyd Type
TT-P-320D	Pigment, Aluminum; Powder and Paste for Paint
TT-V-119D	Varnish, Spar, Phenolic Resin
FF-B-575C	Bolts, Hexagon and Square

B. American Society for Testing and Materials (ASTM) Publications

A 123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
A 386	Zinc Coating (Hot-Dip) on Assembled Steel Products.
A 653	Steel Sheet, Zinc-Coated (Galvanized) OR Zinc-Iron Alloy Coated (Galvanized) by the Hot-Dip Process.

C. American Welding Society (AWS) Publication

D1.1	Structural Welding Code - Steel

D. Military Specifications (mil spec.)

AM 3	Docks
MIL-C-18480A	Coating Compounds, Bituminous Solvent, Coat Tar

E. American Institute for Steel Construction (AISC)

AISC	Manual of Steel Construction

1.03 General Requirements

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A123, A386, or A623, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely

shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.04 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected as covered in paragraph 3.4 Protection of Aluminum contained herein.

1.05. SUBMITTALS

A. Submit eight (8) copies of complete shop drawings and material product sheets, etc. in accordance with Section 01340 - Shop Drawings, Project Data and erection Samples. Shop drawings shall indicate material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions and templates.

Shop drawings shall be submitted for the following items:

1. Hot dipped galvanized hose bibb rack.
2. Ship ladders.
3. Aluminum rectangular weirs.
4. Aluminum grating and grating angles.
5. Aluminum handrails.
6. Hot dipped galvanized steel framing.
7. Access doors for pump stations and flow meter vaults.
8. Steel and stainless steel pipe supports.
9. Steel and stainless steel pipe hangers.
10. Steel pipe, uni-struts, and metal roofing.
11. Grating angles for FRP grate supports.
12. Weirs, weir plates and mounting angles.
13. WAS pump/chute support.
14. Clarifier weir plate, supports, uni-strut
15. Bridges, walkways and stairs.
16. Bridge, walkway and stair supports.
17. Clarifier velocity control baffles
18. Steel pipe brackets.
19. Stainless steel pipe brackets.
20. Mechanical bar screw chute supports.
21. Grit removal system chute supports.
22. FRP grating supports.

23. Stainless steel chlorine pipe supports.
24. Mechanical bar screen chute support brackets.
25. Grit conveyor support brackets.
26. Mooring frame for floating weir at sludge digester.
27. Mooring supports for floating weir at sludge digester.
28. Control panel sheds.
29. Bayou protection system galvanized rod tie backs.

Materials product information shall be submitted for the following:

1. Anchors, bolts, and fastening devices.
2. Pipe bollards
3. Steel sleeves.
4. Steel pipe supports
5. Stainless steel pipe supports.
6. Steel pipe hangers.
7. Stainless steel pipe hangers.
8. Aluminum ladders.

B. Submit Manufacturer's Mill Certificate certifying that products meet or exceed specified requirements.

C. Submit Welder's Certificates certifying welders employed on the Work, verifying AWS qualifications within the previous twelve (12) months.

1.06 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is indicated as being permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or metered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.07 ANCHORAGE

Anchoring systems shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when

approved for concrete; toggle bolts and through bolts, lag bolts, and screws for wood.

PART 2 - PRODUCTS

2.01 ANCHORS, BOLTS AND FASTENING DEVICES

A. Anchors, bolts, etc. shall be furnished as necessary for installation of the work of this Section.

B. Compound masonry anchors shall be of the type shown or required and shall be equal to Star Slugin compounded masonry anchors manufactured by Star Expansion Industries, equal by Phillips Drill Company, Rahlplug, or equal. Anchors shall be minimum "two unit" type.

C. The bolts used to attach the various members to the anchors shall be the sized shown or required. Aluminum and stainless steel shall be attached to concrete or masonry by means of stainless steel machine bolts and iron or steel shall be attached with steel machine bolts unless otherwise specifically noted.

D. For structural purposes, unless otherwise noted, expansion bolts shall be Phillips Drill Company "Wedge Anchors", Hilti "Kwik-Bolt", or equal. When length of bolt is not called for on the Drawings, the length of bolt provided shall be sufficient to place the wedge portion of the bolt a minimum of 1-inch behind the reinforcing steel within the concrete. Material shall be as noted on the Drawings. If not noted, provide galvanized steel. Bolts shall be supplied with nuts, flat washers, and lock washers as required and shall be of the same material as the bolt.

E. Bolts and nuts shall conform to Federal Specification FF-B-575. Bolts and nuts shall be hexagon type. Stainless steel bolts, nuts, screws, washers, and related appurtenances shall be equal to AISI Type 302. All exposed portions of anchor bolts installed in concrete shall be greased, wrapped in burlap or plastic sleeve, and tied.

F. Toggle bolts shall be Diamond, Keystone, Star, or equal.

2.02 HOT-DIPPED GALVANIZED HOSE BIBB RACK

The rack shall be made of Schedule 40 steel pipe and hot dipped galvanized after fabrication conforming to the detail on the Drawings; ASTM A53.

2.03 SHIP LADDERS

The ship ladders are to be fabricated of steel plate as detailed on the Drawings and hot-dipped galvanized after fabrication, ASTM A36.

2.04 ALUMINUM WEIRS

Aluminum weir plates shall be made of 1/4" thick aluminum plate with lip edge as detailed on Drawings, Alclad 3003.

2.05 STAINLESS STEEL ATTACHMENT ANGLES

The weirs are to be attached to the structure with 2" x 2" x 1/4" angles made of stainless steel, AISI Type 304 or Type 302.

2.06 ALUMINUM GRATING AND GRATING ANGLES

A. Aluminum grating shall be a plank type grating extruded from aluminum alloy 6063- T6. Plank shall be extruded in 6 inches wide units with integral I-Beam ribs with approximately 3 inches x 5/8 inches cutouts on 4 inch centers between ribs. Top flange of the I-Beam Ribs shall have integral longitudinal ribs. Transverse ribs or an upset pattern along edges of cutouts shall be formed in the grating tread surface to prevent skidding in the longitudinal direction. Six (6) inch units shall be welded together to form panels of 3 feet width unless shown otherwise on the plans. Banding bars shall be welded to ends and around all openings. Acceptable type is rectangular upset pattern Style B, by IKG Industries, a Division of the Harsco Corporation and Rectangular Upset Punch Pattern Style, as manufactured by Ohio Gratings, Inc., Canton, Ohio, or equal.

B. Aluminum grating frames for embedded concrete applications shall be an extruded frame with continuous ledge to accommodate clips or other fasteners. Acceptable type is by Ohio Gratings, Inc., Canton Ohio, or equal.

C. Grating supported by structural members shall be connected to them using standard clips recessed below top of grating, and using self-tapping S.S. screws or machine screws.

2.07 STEEL STAIRS (GALVANIZED)

A. General Requirements - Contractor shall provide steel stairs and aluminum handrails of type specified at locations indicated on the drawings. Except where other loads are designated, stairs shall be designed to support a minimum live load of 100 pounds per square foot and a concentrated load of 300 pounds with a safety factor of four. Fabrication and erection shall comply with the state and local Building Codes, ANSI G-41.5, latest revision, and ANCI B125.1, latest revision. All anchors, bolts, angles, supports, and other accessories required for a complete working installation shall be provided. Stairs shall be erected plumb and level and secured in place as detailed on the drawings and approved shop drawings. Welding shall be as outlined in Section 05010 of these Specifications.

B. Steel Stair Treads - Stair treads shall be galvanized 1" x 3/16" welded steel grating with 3/16" checkered plate nosing.

C. Stair and Platform Handrails - Aluminum handrails shall meet all current OHSA requirements and be supplied with a four-inch kick plate. Handrails shall be Aluminum "Quick rail" as described below. Railings shall be fabricated and erected plumb, straight and true with tight joints. Welding shall be as outlined in Section 05010 of these Specifications.

2.08 BAR GRATING

Bar grating shall be rectangular welded with bearing bars on 1-3/16" centers and cross bars on 4" centers. Bar grating shall be hot-dip galvanized. Sizes of bearing bars are designated on the drawings. All edges of grating to be banded including edges of round or rectangular openings.

2.09 ALUMINUM HANDRAILS

A. Design Requirements and Product - Handrails shall be "Quickrail" as manufactured by Aluminum or approved equal. Aluminum railing as shown on the Drawings shall be component type made to meet the conditions shown and as required to meet the as-built conditions. Handrails shall be designed to withstand a 200 lb. load placed anywhere on the system and shall be designed to meet loadings required by any applicable codes. Railings shall be an all welded aluminum pipe rail with a 1.9 inch O.D. and minimum wall thickness of .145 inch, rails and posts shall be alloy 6063-T6

Die-cast Reinforcing inserts to meet the structural requirements shall be included. Fittings shall be die cast form ASTM S-383 aluminum alloy. All joints shall be coped, mitered, etc; butt welded and ground smooth. Welding wire shall be Type 40-43 if mill finish. For anodized, use welding wire specified by Aluminum Association for color match. Crystallized joints will not be permitted. Railings shall be designed to meet requirements of OSHA regulations. Slip joints in handrail shall be provided every 20 feet and at structure expansion joints. Aluminum rail shall have anodized finish. Fittings shall be polished and sealed with lacquer as recommended by the Aluminum Association.

B. Toe Plate - Aluminum rail on walkways, platforms, and miscellaneous walking surfaces where the surface is 4 feet or more above the adjacent ground or walking surface shall be furnished with a 4 inch universal extruded aluminum channel toe plate. Toe plate shall be a minimum of 0.09 inch thick with a minimum weight of 0.475 lb/ft. Toe plate shall be attached to an extruded aluminum toe plate bracket located on the post. Bracket shall be a minimum of 0.125 inch thick with a minimum weight of 0.528 lb/ft. Bottom of toe plate shall be 1/4 inch above structure surface.

C. Rail and Post Spacing - Post spacing shall not exceed 5 feet on center. Unless shown otherwise on the drawings, the top rail shall be located at a height of 3 feet 6 inches except as follows:

1. Stair runs shall have top rail at a height of 2 feet 9 inches.
2. Enclosed stair landings shall have top rail at a height of 3 feet 6 inches.
3. Open stair landings shall have top rail at a height of 3 feet 6 inches except that this may be reduced to 3 feet 0 inches when the landing is 4 feet 0 inches or less above any adjacent surface.
4. Intermediate rails shall be located half of height of top rail.

D. Anchors and mounting bolts shall be stainless steel grade A304 or A316.

2.10 HOT DIPPED GALVANIZED STEEL CHANNEL

The valve support channel at the Sludge Chamber shall be C12 x 20.7 and hot dipped galvanized, ASTM A36.

2.11 ALUMINUM ACCESS DOORS

Aluminum access doors shall be Type K as manufactured by Bilco, or equal, where indicated on the Drawings. Doors shall be built to withstand a live load of 150 pounds per

square foot, and shall be supplied with a snap lock and removable handle. A neoprene cushion shall be provided to prevent metal-to-metal contact.

2.12 ACCESS HATCH/DOOR AT PUMP STATION AND VALVE VAULT

Plant Pump Station Access frames and hatches shall have a ¼" thick one-piece mill finish, extended aluminum frame, incorporating a continuous concrete anchor. Door panel shall be ¼" aluminum diamond plate, reinforced to withstand a live load of 300 lbs psf. Door shall open to 90E and automatically lock with a stainless steel hold open arm with aluminum release handle. Door shall close flush with the frame.

Hinges and all fastening hardware shall be stainless steel. Unit shall lock with a non corrosive locking bar. A bituminous coating shall be applied to these surfaces which will be in contact with concrete surfaces to protect against galvanic corrosion by the manufacturer. The access frame and hatches shall be manufactured by Halliday Products of Orlando, Florida (407) 298-4470 or approved equal and shall be sized as follows:

Lift Station	Location	Quantity	Halliday Model No.	Size Clear Opening	Size Clear Opening
*	Wet Pit	1	W1S3648	36" x 48"	1
*	Valve Vault	1	W1S3048	30" x 48"	1

2.13 PIPE BOLLARDS

Bollards shall be as detailed on the Drawings and fabricated of Schedule 40 Steel Pipe, ASTM A36.

2.14 PIPE SUPPORTS AND HANGERS

A. Adjustable pipe saddle supports shall be screwed or welded to the corresponding size 150 lb. Companion flanges or slip on welding flanges respectively. Pipe shall be Schedule 40 steel pipe, ASTM A36. Each flange shall be secured to concrete floor by a minimum of two (2) expansion bolts. Saddle supports shall be Grinnel Figure No. 264. Where used under base fittings, a suitable flange shall be substituted for the saddle.

B. Pipe hanger shall be heavy duty steel wall brackets conforming to Federal Specification WW-H-171 (type 34) capable of supporting the pipe at any position along the support. The pipe hanger shall be Model 353 size 4 as manufactured by Michigan Hanger Company, Inc. of Hubbard Ohio, telephone 216-534-1177 or approved equal.

The pipe hanger shall also be supplied with a stainless steel clevis hanger Model No.406 size 14" and sufficient 7/8" stainless steel all thread rod to suspend pipe as shown on the Drawings.

C. Material shall be stainless steel where indicated on the drawings.

2.15 STEEL SLEEVES AT EQUIPMENT PADS

Sleeves shall be steel tubing or pipe with washers detailed and suitable for the intended purpose.

2.16 UNISTRUT FRAME AND RACK FOR CONTROL PANELS

A. The frame for the control panels shall be constructed of three (3") inch Schedule 40 galvanized steel pipe.

B. The frame shall be attached to the hot dipped galvanized channel. The channel shall be 10O x 10O x 12 gauge, Mode P1000 manufactured by the Unistrut Corporation of Wayne, Michigan, (313) 721-4040.

C. The frame and channel shall be connected with pipe clamps. The pipe clamps shall have an electro-galvanized finish. The clamps shall be eleven (11) gauge, Model P1121 manufactured by the Unistrut Corporation of Wayne, Michigan (313) 721-4040.

2.17 STEEL LINTELS

Fabricate structural lintels from steel angles and shapes of size indicated. Size lintels for equal bearing of 1 inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated. Paint as specified in Section 09010 - Painting. Steel lintels located in exterior walls shall be galvanized.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, and free from distortion or defects.

B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on Drawings.

D. Perform field welding in accordance with AWS D1.1.

E. Obtain Engineer approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 PROTECTION OF ALUMINUM

Aluminum that will be in contact with grout or concrete shall be protected from galvanic or corrosive action by being given a coat of bituminous paint conforming to Mil. Spec. MIL-C-18480 or shall be given a coat of zinc-chromate primer and a coat of aluminum paint. Aluminum in contact with structural steel shall be protected against galvanic or corrosive action by being given a coat of zinc-chromate primer and a coat of aluminum paint. The zinc-chromate primer shall conform to Fed. Spec. TT-P-645. The aluminum paint shall consist of aluminum paste conforming to Fed. Spec. TT-P-320, thinner compatible with the varnish and spar varnish conforming to Fed. Spec. TT-V-119, mixed in proportion of two (2) pounds of paste to not more than one pint of thinner to one gallon of spar varnish. The paste, thinner, and varnish shall be field mixed.

3.05 FINISHES

A. Unless otherwise specified, aluminum items shall have standard mill finish.

B. Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.

3.06 ERECTION

Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in

contact with concrete.

3.07 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

TECHNICAL SECTION
DIVISION 5 – METALS
SECTION 05501 – MISCELLANEOUS METALS - STEEL AND ALUMINUM

DIVISION NINE

FINISHES

9

TECHNICAL SECTION
DIVISION 5 – METALS
SECTION 05501 – MISCELLANEOUS METALS - STEEL AND ALUMINUM

PART 1 - GENERAL

1.01 SCOPE

This Section includes the furnishing of materials, equipment and labor for the fabrication and erection of metal and shop built items shown on the Drawings and not covered elsewhere.

1.02 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. Federal Specifications (Fed. Spec.)

TT-P-645	Primer, Paint, Zinc Chromate, Alkyd Type
TT-P-320D	Pigment, Aluminum; Powder and Paste for Paint
TT-V-119D	Varnish, Spar, Phenolic Resin
FF-B-575C	Bolts, Hexagon and Square

B. American Society for Testing and Materials (ASTM) Publications

A 123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
A 386	Zinc Coating (Hot-Dip) on Assembled Steel Products.
A 653	Steel Sheet, Zinc-Coated (Galvanized) OR Zinc-Iron Alloy Coated (Galvanized) by the Hot-Dip Process.

C. American Welding Society (AWS) Publication

D1.1	Structural Welding Code - Steel

D. Military Specifications (mil spec.)

AM 3	Docks
MIL-C-18480A	Coating Compounds, Bituminous Solvent, Coat Tar

E. American Institute for Steel Construction (AISC)

AISC	Manual of Steel Construction

1.03 General Requirements

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A123, A386, or A623, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely

shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.04 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected as covered in paragraph 3.4 Protection of Aluminum contained herein.

1.05. SUBMITTALS

A. Submit eight (8) copies of complete shop drawings and material product sheets, etc. in accordance with Section 01340 - Shop Drawings, Project Data and erection Samples. Shop drawings shall indicate material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions and templates.

Shop drawings shall be submitted for the following items:

1. Hot dipped galvanized hose bibb rack.
2. Ship ladders.
3. Aluminum rectangular weirs.
4. Aluminum grating and grating angles.
5. Aluminum handrails.
6. Hot dipped galvanized steel framing.
7. Access doors for pump stations and flow meter vaults.
8. Steel and stainless steel pipe supports.
9. Steel and stainless steel pipe hangers.
10. Steel pipe, uni-struts, and metal roofing.
11. Grating angles for FRP grate supports.
12. Weirs, weir plates and mounting angles.
13. WAS pump/chute support.
14. Clarifier weir plate, supports, uni-strut
15. Bridges, walkways and stairs.
16. Bridge, walkway and stair supports.
17. Clarifier velocity control baffles
18. Steel pipe brackets.
19. Stainless steel pipe brackets.
20. Mechanical bar screw chute supports.
21. Grit removal system chute supports.
22. FRP grating supports.

23. Stainless steel chlorine pipe supports.
24. Mechanical bar screen chute support brackets.
25. Grit conveyor support brackets.
26. Mooring frame for floating weir at sludge digester.
27. Mooring supports for floating weir at sludge digester.
28. Control panel sheds.
29. Bayou protection system galvanized rod tie backs.

Materials product information shall be submitted for the following:

1. Anchors, bolts, and fastening devices.
2. Pipe bollards
3. Steel sleeves.
4. Steel pipe supports
5. Stainless steel pipe supports.
6. Steel pipe hangers.
7. Stainless steel pipe hangers.
8. Aluminum ladders.

B. Submit Manufacturer's Mill Certificate certifying that products meet or exceed specified requirements.

C. Submit Welder's Certificates certifying welders employed on the Work, verifying AWS qualifications within the previous twelve (12) months.

1.06 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is indicated as being permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or metered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.07 ANCHORAGE

Anchoring systems shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when

approved for concrete; toggle bolts and through bolts, lag bolts, and screws for wood.

PART 2 - PRODUCTS

2.01 ANCHORS, BOLTS AND FASTENING DEVICES

A. Anchors, bolts, etc. shall be furnished as necessary for installation of the work of this Section.

B. Compound masonry anchors shall be of the type shown or required and shall be equal to Star Slugin compounded masonry anchors manufactured by Star Expansion Industries, equal by Phillips Drill Company, Rahlplug, or equal. Anchors shall be minimum "two unit" type.

C. The bolts used to attach the various members to the anchors shall be the sized shown or required. Aluminum and stainless steel shall be attached to concrete or masonry by means of stainless steel machine bolts and iron or steel shall be attached with steel machine bolts unless otherwise specifically noted.

D. For structural purposes, unless otherwise noted, expansion bolts shall be Phillips Drill Company "Wedge Anchors", Hilti "Kwik-Bolt", or equal. When length of bolt is not called for on the Drawings, the length of bolt provided shall be sufficient to place the wedge portion of the bolt a minimum of 1-inch behind the reinforcing steel within the concrete. Material shall be as noted on the Drawings. If not noted, provide galvanized steel. Bolts shall be supplied with nuts, flat washers, and lock washers as required and shall be of the same material as the bolt.

E. Bolts and nuts shall conform to Federal Specification FF-B-575. Bolts and nuts shall be hexagon type. Stainless steel bolts, nuts, screws, washers, and related appurtenances shall be equal to AISI Type 302. All exposed portions of anchor bolts installed in concrete shall be greased, wrapped in burlap or plastic sleeve, and tied.

F. Toggle bolts shall be Diamond, Keystone, Star, or equal.

2.02 HOT-DIPPED GALVANIZED HOSE BIBB RACK

The rack shall be made of Schedule 40 steel pipe and hot dipped galvanized after fabrication conforming to the detail on the Drawings; ASTM A53.

2.03 SHIP LADDERS

The ship ladders are to be fabricated of steel plate as detailed on the Drawings and hot-dipped galvanized after fabrication, ASTM A36.

2.04 ALUMINUM WEIRS

Aluminum weir plates shall be made of 1/4" thick aluminum plate with lip edge as detailed on Drawings, Alclad 3003.

2.05 STAINLESS STEEL ATTACHMENT ANGLES

The weirs are to be attached to the structure with 2" x 2" x 1/4" angles made of stainless steel, AISI Type 304 or Type 302.

2.06 ALUMINUM GRATING AND GRATING ANGLES

A. Aluminum grating shall be a plank type grating extruded from aluminum alloy 6063- T6. Plank shall be extruded in 6 inches wide units with integral I-Beam ribs with approximately 3 inches x 5/8 inches cutouts on 4 inch centers between ribs. Top flange of the I-Beam Ribs shall have integral longitudinal ribs. Transverse ribs or an upset pattern along edges of cutouts shall be formed in the grating tread surface to prevent skidding in the longitudinal direction. Six (6) inch units shall be welded together to form panels of 3 feet width unless shown otherwise on the plans. Banding bars shall be welded to ends and around all openings. Acceptable type is rectangular upset pattern Style B, by IKG Industries, a Division of the Harsco Corporation and Rectangular Upset Punch Pattern Style, as manufactured by Ohio Gratings, Inc., Canton, Ohio, or equal.

B. Aluminum grating frames for embedded concrete applications shall be an extruded frame with continuous ledge to accommodate clips or other fasteners. Acceptable type is by Ohio Gratings, Inc., Canton Ohio, or equal.

C. Grating supported by structural members shall be connected to them using standard clips recessed below top of grating, and using self-tapping S.S. screws or machine screws.

2.07 STEEL STAIRS (GALVANIZED)

A. General Requirements - Contractor shall provide steel stairs and aluminum handrails of type specified at locations indicated on the drawings. Except where other loads are designated, stairs shall be designed to support a minimum live load of 100 pounds per square foot and a concentrated load of 300 pounds with a safety factor of four. Fabrication and erection shall comply with the state and local Building Codes, ANSI G-41.5, latest revision, and ANCI B125.1, latest revision. All anchors, bolts, angles, supports, and other accessories required for a complete working installation shall be provided. Stairs shall be erected plumb and level and secured in place as detailed on the drawings and approved shop drawings. Welding shall be as outlined in Section 05010 of these Specifications.

B. Steel Stair Treads - Stair treads shall be galvanized 1" x 3/16" welded steel grating with 3/16" checkered plate nosing.

C. Stair and Platform Handrails - Aluminum handrails shall meet all current OHSA requirements and be supplied with a four-inch kick plate. Handrails shall be Aluminum "Quick rail" as described below. Railings shall be fabricated and erected plumb, straight and true with tight joints. Welding shall be as outlined in Section 05010 of these Specifications.

2.08 BAR GRATING

Bar grating shall be rectangular welded with bearing bars on 1-3/16" centers and cross bars on 4" centers. Bar grating shall be hot-dip galvanized. Sizes of bearing bars are designated on the drawings. All edges of grating to be banded including edges of round or rectangular openings.

2.09 ALUMINUM HANDRAILS

A. Design Requirements and Product - Handrails shall be "Quickrail" as manufactured by Aluminum or approved equal. Aluminum railing as shown on the Drawings shall be component type made to meet the conditions shown and as required to meet the as-built conditions. Handrails shall be designed to withstand a 200 lb. load placed anywhere on the system and shall be designed to meet loadings required by any applicable codes. Railings shall be an all welded aluminum pipe rail with a 1.9 inch O.D. and minimum wall thickness of .145 inch, rails and posts shall be alloy 6063-T6

Die-cast Reinforcing inserts to meet the structural requirements shall be included. Fittings shall be die cast form ASTM S-383 aluminum alloy. All joints shall be coped, mitered, etc; butt welded and ground smooth. Welding wire shall be Type 40-43 if mill finish. For anodized, use welding wire specified by Aluminum Association for color match. Crystallized joints will not be permitted. Railings shall be designed to meet requirements of OSHA regulations. Slip joints in handrail shall be provided every 20 feet and at structure expansion joints. Aluminum rail shall have anodized finish. Fittings shall be polished and sealed with lacquer as recommended by the Aluminum Association.

B. Toe Plate - Aluminum rail on walkways, platforms, and miscellaneous walking surfaces where the surface is 4 feet or more above the adjacent ground or walking surface shall be furnished with a 4 inch universal extruded aluminum channel toe plate. Toe plate shall be a minimum of 0.09 inch thick with a minimum weight of 0.475 lb/ft. Toe plate shall be attached to an extruded aluminum toe plate bracket located on the post. Bracket shall be a minimum of 0.125 inch thick with a minimum weight of 0.528 lb/ft. Bottom of toe plate shall be 1/4 inch above structure surface.

C. Rail and Post Spacing - Post spacing shall not exceed 5 feet on center. Unless shown otherwise on the drawings, the top rail shall be located at a height of 3 feet 6 inches except as follows:

1. Stair runs shall have top rail at a height of 2 feet 9 inches.
2. Enclosed stair landings shall have top rail at a height of 3 feet 6 inches.
3. Open stair landings shall have top rail at a height of 3 feet 6 inches except that this may be reduced to 3 feet 0 inches when the landing is 4 feet 0 inches or less above any adjacent surface.
4. Intermediate rails shall be located half of height of top rail.

D. Anchors and mounting bolts shall be stainless steel grade A304 or A316.

2.10 HOT DIPPED GALVANIZED STEEL CHANNEL

The valve support channel at the Sludge Chamber shall be C12 x 20.7 and hot dipped galvanized, ASTM A36.

2.11 ALUMINUM ACCESS DOORS

Aluminum access doors shall be Type K as manufactured by Bilco, or equal, where indicated on the Drawings. Doors shall be built to withstand a live load of 150 pounds per

square foot, and shall be supplied with a snap lock and removable handle. A neoprene cushion shall be provided to prevent metal-to-metal contact.

2.12 ACCESS HATCH/DOOR AT PUMP STATION AND VALVE VAULT

Plant Pump Station Access frames and hatches shall have a ¼" thick one-piece mill finish, extended aluminum frame, incorporating a continuous concrete anchor. Door panel shall be ¼" aluminum diamond plate, reinforced to withstand a live load of 300 lbs psf. Door shall open to 90E and automatically lock with a stainless steel hold open arm with aluminum release handle. Door shall close flush with the frame.

Hinges and all fastening hardware shall be stainless steel. Unit shall lock with a non corrosive locking bar. A bituminous coating shall be applied to these surfaces which will be in contact with concrete surfaces to protect against galvanic corrosion by the manufacturer. The access frame and hatches shall be manufactured by Halliday Products of Orlando, Florida (407) 298-4470 or approved equal and shall be sized as follows:

Lift Station	Location	Quantity	Halliday Model No.	Size Clear Opening	Size Clear Opening
*	Wet Pit	1	W1S3648	36" x 48"	1
*	Valve Vault	1	W1S3048	30" x 48"	1

2.13 PIPE BOLLARDS

Bollards shall be as detailed on the Drawings and fabricated of Schedule 40 Steel Pipe, ASTM A36.

2.14 PIPE SUPPORTS AND HANGERS

A. Adjustable pipe saddle supports shall be screwed or welded to the corresponding size 150 lb. Companion flanges or slip on welding flanges respectively. Pipe shall be Schedule 40 steel pipe, ASTM A36. Each flange shall be secured to concrete floor by a minimum of two (2) expansion bolts. Saddle supports shall be Grinnel Figure No. 264. Where used under base fittings, a suitable flange shall be substituted for the saddle.

B. Pipe hanger shall be heavy duty steel wall brackets conforming to Federal Specification WW-H-171 (type 34) capable of supporting the pipe at any position along the support. The pipe hanger shall be Model 353 size 4 as manufactured by Michigan Hanger Company, Inc. of Hubbard Ohio, telephone 216-534-1177 or approved equal.

The pipe hanger shall also be supplied with a stainless steel clevis hanger Model No.406 size 14" and sufficient 7/8" stainless steel all thread rod to suspend pipe as shown on the Drawings.

C. Material shall be stainless steel where indicated on the drawings.

2.15 STEEL SLEEVES AT EQUIPMENT PADS

Sleeves shall be steel tubing or pipe with washers detailed and suitable for the intended purpose.

2.16 UNISTRUT FRAME AND RACK FOR CONTROL PANELS

A. The frame for the control panels shall be constructed of three (3") inch Schedule 40 galvanized steel pipe.

B. The frame shall be attached to the hot dipped galvanized channel. The channel shall be 10O x 10O x 12 gauge, Mode P1000 manufactured by the Unistrut Corporation of Wayne, Michigan, (313) 721-4040.

C. The frame and channel shall be connected with pipe clamps. The pipe clamps shall have an electro-galvanized finish. The clamps shall be eleven (11) gauge, Model P1121 manufactured by the Unistrut Corporation of Wayne, Michigan (313) 721-4040.

2.17 STEEL LINTELS

Fabricate structural lintels from steel angles and shapes of size indicated. Size lintels for equal bearing of 1 inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated. Paint as specified in Section 09010 - Painting. Steel lintels located in exterior walls shall be galvanized.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, and free from distortion or defects.

B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on Drawings.

D. Perform field welding in accordance with AWS D1.1.

E. Obtain Engineer approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 PROTECTION OF ALUMINUM

Aluminum that will be in contact with grout or concrete shall be protected from galvanic or corrosive action by being given a coat of bituminous paint conforming to Mil. Spec. MIL-C-18480 or shall be given a coat of zinc-chromate primer and a coat of aluminum paint. Aluminum in contact with structural steel shall be protected against galvanic or corrosive action by being given a coat of zinc-chromate primer and a coat of aluminum paint. The zinc-chromate primer shall conform to Fed. Spec. TT-P-645. The aluminum paint shall consist of aluminum paste conforming to Fed. Spec. TT-P-320, thinner compatible with the varnish and spar varnish conforming to Fed. Spec. TT-V-119, mixed in proportion of two (2) pounds of paste to not more than one pint of thinner to one gallon of spar varnish. The paste, thinner, and varnish shall be field mixed.

3.05 FINISHES

A. Unless otherwise specified, aluminum items shall have standard mill finish.

B. Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.

3.06 ERECTION

Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in

contact with concrete.

3.07 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

TECHNICAL SECTION
DIVISION 5 – METALS
SECTION 05501 – MISCELLANEOUS METALS - STEEL AND ALUMINUM

TECHNICAL SECTION
DIVISION 9 - FINISHES
SECTION 09015 – PILES AND STRUCTURES PROTECTIVE COATINGS

PART 1 – GENERAL

1.01 GENERAL

The Work described in this Section of the Specifications includes the furnishing of all paint, materials, equipment, and labor to completely paint and finish the piles, ladders, and platforms as shown on drawings.

1.02 GENERAL PAINTING REQUIREMENTS

The Contractor shall submit sample panels of all paint finishes to the Engineer for approval, and change and resubmit the sample finishes if required until they are approved. It shall be understood that "color to be selected" shall permit the Engineer to select any color, not necessarily one of the manufacturer's standard colors. The approved sample finishes shall be accurately followed for formula, texture and color. Each panel shall be prepared in "step-down" fashion and will show the varying shades of all coats; the priming or sealer coat covering seven-eights (7/8) of the face, and the finish coat covering three-quarters (3/4) of the face, thus leaving portions of the priming and body colors exposed. These samples shall be prepared on close grained plywood panels six (6) by six (6) inches square and labeled on the back with all information concerning the finish, including the brand names of all materials.

PART 2 – PRODUCT

2.01 SURFACE PREPARATION

Prepare surface to Near-White Blast Cleaning, SSPC-SP 10 with profile depth of 1½ to 2 mils. To receive good results, be sure that all slag and weld splatter is removed. Measure profile depth, using Kseane-Tator profile comparator or other suitable means, approved by Owner.

2.02 COATING SYSTEM

1st Coat – Tnemec Series 90G-1K97 Tneme-Zinc 2.5-3.5 dry mils or approved equal

2nd Coat – Tnemec Series 46H-413 Tneme-Tar 16-20 dry mils or approved equal

Piles shall be coated 10 feet below mud line and up.

2.03 COLOR

The color of the finish coats shall be black.

PART 3 – EXECUTION

3.01 FIELD PAINTING

There will be no sandblasting for field touch-up.

3.02 APPLICATION

All coats shall be applied uniformly and in a workmanlike manner. Paint shall be thoroughly mixed and applied according to manufacturer's instructions. Each coat shall be evenly applied free from runs, sags, pinholes and other defects.

3.03 IMPERFECTIONS

Film imperfections such as "orange peel" and "dry overspray" are unacceptable and shall be corrected.

END OF SECTION

DIVISION ELEVEN

EQUIPMENT

11

TECHNICAL SECTION
DIVISION 11 – EQUIPMENT
SECTION 11000 – GENERAL

PART 1 – GENERAL

1.01 SCOPE

This Section of the specification details general requirements for all equipment for this Project. All equipment stated in Division 11 shall conform to the requirements of this Section.

1.02 APPROVED EQUALS

In the development of a design of this project, the Engineer had to depend on a product he selected for the Owner that would be best suited to meet the Owner's needs. If a manufacturer seeks to be approved as an "approved equal", the Engineer will state that the manufacturer is capable of meeting the terms of the specification. By approval of the Engineer, the Engineer is not allowing the substitute product to that manufacturer's general product specification; however, it must be modified to meet the specifications as stated. Any exemptions from the specifications for approved equal equipment must be made in writing by the Engineer prior to approval of the equipment supplier.

Any changes to the drawings required by the substituted equipment will be made by the approved equal equipment supplied. Costs for those changes shall be paid by the substitute equipment supplier.

1.03 HANDLING OF EQUIPMENT

The Contractor shall store, transport, install, and operate all mechanical equipment specified in Division 11 in accordance with manufacturers recommended practices.

1.04 COORDINATION WITH ELECTRICAL DESIGN

A. Unless otherwise specified, the Contractor shall be responsible for furnishing all controls including magnetic starters with overload and under voltage protection, pushbutton stations, timers, limit switches, H-O-A switches, enclosures and other items as required by particular equipment in accordance with manufacturer's recommendations and as shown on the Drawings.

B. The vendors of the various pieces of equipment shall refer to the electrical specifications Division 16 and the electrical drawings to supplement the specification of this Section. The vendor shall furnish any additional equipment shown in the electrical plans and specifications that is not specifically specified in this Section. The most common items overlooked by vendors are motor starters and control power transformers. The plant electrical

system is custom designed to the specific requirements of the Owner and the Engineer using a sophisticated control system. The vendors shall custom design their electrical equipment and panels to match these electrical requirements. This means that it is highly unlikely that the vendor's standard panels and electrical equipment will be compatible with the requirements of this Project. Shop drawings shall be submitted showing external wiring terminals and shall properly identify the devices that they are to be interconnected with. At a minimum the drawings shall be prepared with the same engineering effort as can be expected to be utilized in motor control center class 2B wiring. Any drawings submitted where it is obvious that no effort was made to properly prepare them for easy checking by the Engineer will be rejected.

END OF SECTION

TECHNICAL SECTION
DIVISION 11 – EQUIPMENT
SECTION 11000 – GENERAL

TECHNICAL SECTION
DIVISION 11 - EQUIPMENT
SECTION 11011 - CHLORINATION EQUIPMENT & ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

The Contractor shall furnish and install chlorination equipment and appurtenances necessary to complete work shown on the plan drawings or as specified herein. The chlorination equipment shall be manufactured by Capitol Controls, Inc., Wallace & Tiernan, or approved equal.

Codes, specifications, and standards referred to by number or title shall for a part of this specification to the extent required by the references thereto. Latest revisions shall apply, unless otherwise shown or specified.

1.02 SUBMITTAL

Submittals shall be furnished in accordance with Division 01300; Submittals and Section 01340; Shop Drawings, Product Data, and Samples.

1.03 RELATED WORK

Refer to the referenced divisions of these Specifications for related work not specifically described in this section:

A. Division 1 - General Requirements

B. Division 9 - Finishes

C. Division 16 - Electrical

1.04 QUALITY ASSURANCE

The equipment and materials to be furnished under this Contractor shall be new and of first quality. The complete disinfection system shall be by one manufacturer having complete system responsibility for the operation of the system.

A. The chlorination equipment shall be manufactured and tested under ISO Certification meeting the following standards: BS5750: Part 1:1987 ISO 9001-1987 EN 29001-1987 ANSI/ASQC Q91-1987.

B. Perform field tests specified in accordance with manufacturer's recommended practices.

PART 2 - PRODUCT

2.01 CHLORINATION

Chlorination shall be capable of feeding a maximum of 50 pounds per day. In the manual control unit, a solenoid valve shall be installed prior to the ejector to open/close with the operations of the water well/RO System. When these units shut down, the manual chlorinator ceases operation.

2.02 AUTOMATIC GAS CONTROL VALVE PANEL

Quantity *Two (2)*

A. The gas control wall panel shall contain a gas control valve, meter panel, and vacuum gauge mounted and pre-piped requiring gas vacuum inlet and gas vacuum outlet connection only. The control valve and meter panel shall be sized for 50 PPD maximum capacity.

B. The automatic gas control valve shall be an electromechanical servo type design to automatically control the gas feed rate. The gas flow shall be totally linear from the fully opened to the fully closed position. The valve shall be electrically driven by a bi-directional motor housed in chemical resistant enclosure complete with all control electronics.

C. The manual dosage adjustment shall provide for gas flow rates to be 20% of maximum feed rate (minimum dosage) with a 100% input signal to 100% of the vacuum regulator capacity (maximum dosage) with a 50% signal.

D. A self-contained controller shall automatically control the gas feed system in proportion to a flow signal. A self-contained LED bar graph indicator shall display 0-100% of full valve capacity on the face of the valve housing. An alarm contract, rated 0.5 Amp @ 240-Vac maximum shall be provided to indicate a fully closed valve condition.

E. The automatic gas control valve shall accept a 4-20 mAdc signal directly form a separate flow transmitter without the use of a signal converter.

F. The power requirements shall be 120-Vac, 50/60 Hertz, single phase.

G. The automatic gas control valve panel shall be Capital Controls Company, Inc. Series WP1411C, Wallace & Tiernan, or approved equal.

2.03 REMOTE GAS DETECTOR

Contractor shall supply one (1) remote gas detector, Series 50-135 with NEMA 4x enclosure, remote senator unit, and battery back-up by Wallace & Tiernan, or approved equal.

2.04 REMOTE EJECTOR/CHECK VALVE

Quantity *Two (2)*

A. The chlorine ejector shall be the chlorine-water solution feed type. Ejector shall create the vacuum necessary for operation.

B. The chlorine ejector shall have spring-assisted diaphragm check valve to prevent backflow of water into the chlorine feed system. The check valves shall have replaceable seats and diaphragms.

C. The chlorine ejector shall be capable of feeding 50 PPD maximum rate of chlorine. The ejector shall use a remote diffuser for chemical injection.

D. The chlorine ejector shall be as manufactured by Capital Controls, Wallace & Tiernan, or approved equal.

2.05 VACUUM REGULATOR WITH AUTO SWITCHOVER

Quantity *Two (2)*

A. The chlorine vacuum regulator shall be of the vacuum operated, solution feed type. The vacuum regulator shall have a maximum capacity of 50 PPD of chlorine and shall be equipped with an integrally mounted gas flow meter of 50 PPD capacity.

B. The vacuum regulator shall provide for conveying the gas under vacuum from the vacuum regulator to the spring-loaded ejector/check valve assembly to insure complete system safety.

C. The vacuum regulator shall be fitted with a corrosion-resistant yoke assembly with a metallic inlet valve and filter capsule, which is field replaceable. The coating on the yoke assembly shall be fusion-bonded epoxy.

D. The vacuum regulator shall be equipped with a gravity-actuated loss of gas indicator. Pressure shall be prevented from building in the system by means of a spring-loaded, diaphragm actuated pressure relief valve located at the vacuum regulators. There shall be no vent connections in the system except for gas feeder vent outlets.

E. The vacuum regulator shall be a Capital Controls Model NXT300, Wallace & Tiernan, or

approved equal, suitable for direct mounting on a cylinder.

PART 3 - EXECUTION

3.01 INSTALLATION

Contractor shall remove equipment from protective shipping packing and install in accordance with manufacturers instruction and specification guidelines and as shown on the drawings.

3.02 START-UP

The manufacturer shall provide the service of a factory trained field engineer for the purpose of installation inspection, equipment start-up, performance testing and training of plant personnel regarding proper operation and maintenance of the equipment for period of one (1) 8-hour day in one (1) trip.

3.03 SPARE PARTS

Spare parts shall be as recommended by the manufacturer.

END OF SECTION

TECHNICAL SECTION
DIVISION 11 – EQUIPMENT
SECTION 11049 – VERTICAL MULTI-STAGE PUMPS

PART 1 - GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required and install, place in operation one prefabricated duplex pumps completely integrated, variable speed pumping station designed to provide constant pressure at required flow rates with automatic lead/lg capability. The pumping station will include complete duplex vertical multi-stage pumps with stainless steel impellers and shaft and cast iron volute with appropriate variable speed controllers. It is the manufacturer's reasonability to include all necessary appurtenances to provide for a complete, automatic, smooth operating, and reliable pumping system. The manufacturer shall supply a complete set of general arrangement drawings, electrical power schematics, and control schematics in the operations and service manual, to include the complete pump and variable speed controller instruction manuals. All equipment shall be supplied by a single supplier to ensure system component compatibility.

1.02 SUBMITTALS

Submittals shall be furnished in accordance with Division 01300; Submittals and Section 01340; Shop Drawings, Product Data, and Samples.

1.03 REFERENCES

A. American Water Works Association (AWWA)

B. American National Standards Institute (ANSI)

C. American Standards for Testing Materials (ASTM)

D. Hydraulic Institute (HI)

E. American Society of Mechanical Engineers (ASME)

F. Underwriters Laboratories (UL)

G. International Standards Organization (ISO)

1.04 SYSTEM DESCRIPTION

A. The pump station shall utilize duplex Goulds eSV series vertical multi-stage pumps in conjunction with the Aquavar ® variable speed pump controller as manufactured by Xylem, Inc. or approved equal. Appropriate check and shutoff valves, pressure transducers, suction/discharge piping, pump and electrical protection shall be integrated into the pump controller package.

B. Conditions of Service: The pump station shall provide 150 GPM at 65 PSIG with a suction pressure of 0 PSIG (flooded suction). AquaForce ™ pumping station model shall be 10eSV32BBMR10. Total pumping station system friction loss shall not exceed 5 PSIG.

C. Sequence of Operation: The station shall receive a 4-20mA signal from each pressure transducer, as provided by the pumping station manufacturer. A pressure transducer shall be provided for each pump controller. This will provide a complete lead/ lag system coupled with a true back-up control. The pressure transducer will monitor system discharge pressure and provide an analog signal (4- 20mA) to the pump control software, and allow the variable speed pump controller, (Aquavar) to provide a variable Volts/ Hz output to the motor. Once the pressure drops below the set system pressure, the pump will start and provide system pressure (as determined by the station operator), if this pressure cannot be maintained by one pump, the next pump in sequence shall operate in a lead/lag capacity to provide the extra flow and pressure automatically without the use of additional panels or alternators. The sequence of the pumps shall be field adjustable, and completely automatic without additional panels or alternator controls. The variable speed pump controller shall be completely integrated with the VFD. Special type motors will not be allowed (see motor section). Pumps shall alternate based on elapsed run time. All program settings shall be based on centrifugal pump language and centrifugal pumps. Program settings must be field adjustable to provide on-site adjustments. When the system experiences low demand, the variable speed pump controllers will reduce the speed of each pump, until demand has stopped. Pump controllers will stop each pump at zero demand, without the use of external switches or controls.

1.05 QUALITY ASSURANCE

A. The pump station shall be furnished by a single supplier entity, which shall have

responsibility for the complete pumping station.

B. The pumping station manufacturer shall be ISO9001 certified, and shall design, test and assemble pumping stations on a regular basis.

C. Qualifications

1. Manufacturer shall have minimum 20 years experience building pump stations, and over 20 years in active design, production and marketing centrifugal pumps.
2. Manufacturer must demonstrate proof of financial responsibility with respect to pump station delivery and performance.
3. Upon request from the engineer the manufacturer must provide proof or evidence of facilities, equipment and capabilities required to produce the specified station.
4. Provide pumping station certified testing.

PART 2 - PRODUCTS

2.01 STATION MANUFACTURER

The pumping system shall be manufactured by Xylem, Inc. or prior-approved equal. Canariis is an approved equal; however, this product must meet all parameters of this Section with the exception of paragraph 1.05 (b). All systems shall be approved by the engineer prior to bid opening. The station shall be of the model number and capacities as shown in the attached technical data sheet. For consideration of a proposed equal system, the contractor shall furnish the following data to the engineer at least 10 days prior to the date of the bid opening:

1. A complete specification for the pumping system proposed as an equal.
2. A statement of full conformance to the following specifications signed by a corporate officer of the manufacturer.
3. A general arrangement drawing showing overall dimensions and all piping layouts.
4. Complete submittal data for all major equipment (pumps, motors, valves, electrical controls, etc.).
5. An electrical schematic, that provides power and control wiring.
6. A copy of the appropriate Instruction Operation Manual (IOM) for the pump, pump controller, and pumping station.
7. Location of closest factory trained service centers.
8. Manufacturer's system UL files number.
9. ISO9001 certificate

If, in the opinion of the engineer, the data submitted shows the pumping system to be an equal to the system specified, the bidding contractors shall be notified not less than 5 days prior

to the bid opening date.

2.02 STATION COMPONENTS

A. Pumps: Pumps shall be constructed of 304 stainless steel and of vertical multi-stage in-line design. Pumps shall be the manufactured product of a US manufacturer, producing and selling pumps for a minimum of 50 years. Pump case, impellers, diffusers, seal spring, inner bowls, seal spring, shaft sleeve and retainer clip shall all be manufactured from stainless steel. Shaft bushing (if needed) shall be from ceramic. Mechanical seal assembly shall be constructed of Carbon/ Silicon Carbide/ Viton as standard. Seat elastomers and casing o-rings shall be from Viton. Shaft sleeve shall be from stainless steel. Tie rods and nuts shall be from zinc coated steel. Pump curve shall rise continuously to shut off head. Best efficiency point of pump shall lie between 70% and 80% of maximum flow capacity of the pump. Pump connections shall be NPT or ANSI flanged either class 150 or class 300. Maximum pressure rating for class 150 flanges shall be 200 psi and for class 300 shall be 360 psi. Pump shall accept a standard NEMA C-face motor or JM frame and shall not require a specialty motor with special thrust bearings or integrated VFD. Vertical multistage pumps shall have thrust balanced within the pump. All pumps used will have a standard NEMA frame motor, and be readily available from manufacturer.

B. Station Base: The pump station base shall be designed and fabricated to provide proper structural support for all attached equipment, and provide anchor bolt support. The base shall supply sufficient rigidity to withstand the stresses of reasonable and competent transportation to site, off-loading, installation, and operation. Main structural members shall be constructed from heavy weight ¼" or 3/8" flat steel with a reinforcing channel for larger stations. Steel base shall be shot blasted, primed, and then painted as per paint specification. Provisions shall be made in the station base for off-loading and handling the station at the site of installation. Base shall include steel plate mounted under pump and motor and shall be of compact design for most standard doorways.

C. Piping: All piping shall be constructed from 304 stainless steel, schedule 40 type or heavier pipe as required to maintain a 3 to 1 pressure safety factor (including 1/16" corrosion allowance). All piping shall be hydrostatically tested to a minimum 150% of maximum shutoff

pressure generated by the pumping station. Suction and Discharge manifolds shall be designed and constructed for minimal friction loss and compact design for most standard doorways.

D. Valves: Pump isolation valves 2" and below shall be full-port ball valves. Full-port ball valves shall have a brass body, ball shall be chrome plated brass with brass stem. Valves shall be pressure rated to 600 psi WOG. Valves shall conform to MSS-SP-110. Ball valves shall be Watts model FBV-3.

Valves 2-1/2" and above shall be either lug-type butterfly valves or grooved-end butterfly or ball valves. Butterfly valves body shall be constructed of ductile iron with a polyphenylene sulfide coating. Butterfly valves disc shall be aluminum bronze with a 416SS shaft. Butterfly valves shall have lever operators. Butterfly valve face-to-face dimensions shall comply with MSS-SP-67. Butterfly valves shall be pressure rated to 200 psi. Butterfly valves shall be Watts model BF-03. Grooved-end butterfly valves shall be constructed of ductile iron with an elastomer coated ductile iron disc. Grooved-end butterfly valves shall be pressure rated to 300 psi. Grooved-end butterfly valves shall be Victaulic model VIC-300. Grooved-end ball valves shall be constructed of ductile iron with a nickel-plated ball and stem. Grooved-end ball valves shall be pressure rated to 1000 psi for sizes 2-1/2" - 3" and 800 psi for sizes 4" - 6". Grooved-end ball valves shall have lever operators and shall be Victaulic Series 721.

Pump Check Valves: Each pump discharge shall be equipped with a spring-loaded non-slam silent check valve, appropriately sized to allow no greater than 5 psi of head loss at full station rated capacity. Check valves 2" and below shall have a brass body and PTFE Teflon seat. Check valves 2" and below shall be pressure rated to 400 psi WOG. Check valves 2" and below shall be WATTS Series 600. Wafer style valves shall be provided in sizes from 2 ½ to 10" for installation between ANSI B16.5 class 150 or class 300 steel flanges. Wafer check valves shall be Val-Matic ® Series 1440 or 1800 and conform to AWWA standard C508 for leakage rates. The operation of the valve shall not be affected by the position of installation. When pump is retired, valve shall function to close tightly before flow is reversed, and reducing the possibility of water hammer or shock.

E. Pressure Gauges: Pressure gauges shall be liquid filled, bourdon tube type. Gauges shall be supplied for both the suction and discharge manifolds. All gauges shall be bottom mounted and shall be glycerin filled to reduce wear due to vibration. Accuracy shall be within

±1.5%. Gauge diameter shall be 4½". Range shall be at least 30% higher than the highest pressure attainable from the pumps at shutoff head conditions. Gauges shall include stainless steel back and copper alloy internals. Pressure gauges shall be manufactured by Ashcroft or approved equal.

F. Bolts: All bolts used in the assembly of the pumping system shall be zinc plated to retard corrosion and shall be the proper size and gauge for rigid construction.

G. Motors: Motor(s) for the main pump(s) shall be of United States manufacture, C-face or JM frame type with TEFC enclosures 1.15 service factor, Min class F insulation. Motors shall be wound for the starting configuration as called out in the technical data sheet. Design pump brake horsepower shall not exceed 100% of motor horsepower exclusive of service factor. The motor shaft shall be high-strength steel. Motors shall be as manufactured by Baldor Electric Motors. Motors shall comply with EPACT efficiencies and shall be wound with ISR (Inverter Spike Resistant) wire for use with VFD's. Motor manufacturer must provide letter of compatibility of motor with another type of variable frequency or variable speed drive.

2.03 ELECTRICAL

To provide complete main fusible disconnect, variable speed pump controller, pressure transducers, NEMA motors, instrumentation and controls to automatically start, stop and modulate pump speed. To smoothly, efficiently and reliably provide pump variable flow rates at a constant discharge pressure. Pumping station shall provide full pump, motor and drive safety features needed to protect the equipment and piping system.

A. Main Fusible Disconnect Enclosure: Individual fusible disconnects shall be provided to completely isolate individual motors starting equipment from incoming power. Individual disconnects shall have a through door operator, and shall be sized as shown in the technical data sheet. Motor fusible disconnect panel shall be housed in a NEMA 4 enclosure with integral latches. The control enclosure shall be constructed of 12-gauge steel and the back plate assembly shall be constructed of 12-gauge steel. All indicating lights, reset buttons, individual selector switches and the operator interface device shall be mounted on enclosure door and also be rated NEMA 4. All internal components shall be mounted and secured to the removable back plate assembly with rigid steel brackets. Disconnects shall be manufactured by ABB Control Inc or Allen Bradley.

B. Variable Frequency Drive: The pump controller shall be the Goulds Pumps Aquavar® or Aquavar CPC variable speed pump controller. The Aquavar shall provide an adjustable carrier frequency with IGBT power switching, and utilize PWM technology. The drive shall provide noiseless operation of the driving motor, short circuit and ground protection, and work with controlled sinusoidal current synthesis and dynamic over current limitations. The Aquavar controller shall be one complete integrated unit including the variable frequency drive, programmable pump control logic, and include a NEMA 1 (CPC) or NEMA 4 (motor mount version) enclosure. Additional control panels, PLC's or other external devices, shall NOT be necessary to accomplish complete pump programming and variable speed control of pump and motor. Standard variable frequency drives that do not incorporate pump control logic as the primary control software; programming and features directly applicable to centrifugal pump applications shall not be considered equal.

The pumping station controller shall provide a LCD two-line display with 16 characters per line and programming keypad for data entry. Unit(s) shall utilize user-friendly front panel programming in three languages that displays pump and motor language in clear text. Three colored LED's shall signal 'power on', 'pump running' and 'fault'. Program settings shall be changeable and stored in nonvolatile memory. Program settings shall be retained in memory in the event of loss of power to the controller, without the use of a backup battery. System operating pressure shall be clearly displayed in PSI or feet of head for ease of use and to provide an operator friendly interface. Additional parameters, where applicable, shall be displayed in units consistent with pumping systems. Generic control systems adapted from other applications shall not be considered equal.

The settings and program in whole or part may be locked out with the use of an operator selectable password. Standard system hydraulic settings shall include at a minimum the following functions: loss of suction, lack of NPSHa, pump run-out protection, "dead-head" protection, constant pressure setting with variable flow capability, constant flow with variable TDH (pressure) capability, quadratic differential flow calculation, system curve

compensation, multiple pump operation with alternation, pump starting point with allowable, adjustable pressure drop, minimum speed with time delay, pressure of flow sensor error, overpressure shutdown, and low flow shutdown.

C. Pressure Transducer: Pressure transducer shall be utilized for providing all pressure signals for the pump control logic. Pressure transducer shall be a solid-state bonded strain gage type with an accuracy of plus/minus 0.20% and constructed of 17-4 pH stainless steel. Transducer shall be rated for station discharge pressure as shown on technical data sheet, and shall provide gauge pressure output, rather than an absolute. Pressure transducer constructed of plastic is not acceptable. Pressure transducer shall be 4-20mA analog type with 7- 33 VDC supply range and utilize a packard type connector to prevent moisture intrusion. Transducer shall be manufactured by Texas Instruments.

D. Controls and Enclosure: The control panel with controls shall be built in accordance with the NEC, and shall comply with UL standards. Pump station manufacturer shall be authorized under UL508A to manufacture its own control panels, and the control panel shall be manufactured by the pump station manufacturer. All equipment and wiring shall be mounted within the enclosure and each device shall be labeled for proper identification. All adjustments and maintenance shall be accessible from the front of the control enclosure. A complete wiring circuit diagram and legend with terminals, components, and wiring completely identified shall be provided. Main disconnect shall be interlocked with door.

Panel face switches and lights:

- Reset—Acknowledges pump station alarms (Alarm package option).
- Individual pump disconnects.
- Individual pump run and alarm lights (Alarm package option).
- Alarm horn (Alarm package option).
- Low suction pressure reset (Low suction switch option, boost only).

The pump station, including electrical components and enclosure, shall be UL labeled as a completed assembly with manufacturer's UL label applied to the pump station.

PART 3 – EXECUTION

3.01 INSTALLATION OF EQUIPMENT

Pumps, piping, controls, valves, and associated items, all as shown on the drawings, shall be assembled and constructed in accordance with the manufacturer's recommendations.

3.02 PRODUCT HANDLING

A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

B. All equipment and parts must be properly protected against any damage during a prolonged storage period at the site.

C. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.

D. Finished surfaces of all exposed pump openings shall be protected by wooden blanks, strongly built and securely bolted thereto.

E. Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

F. Each box or package shall be properly marked to show its net weight in addition to its contents.

3.03 WARRANTY

A. All equipment supplied under this section shall be warranted for a period of one (1) year by the Contractor and the pump manufacturer.

B. The equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period, it shall be replaced in the machine and the unit restored to service at no expense to the Owner.

C. The manufacturer's warranty period shall be 18 months from shipment or 12 months from start-up, whichever comes last.

3.04 INSTALLATION AND TESTING

The Contractor shall provide the services of a factory service engineer to supervise the installation and alignment of all equipment and materials provided under this Subsection. Upon

completion of the installation and alignment, the service engineer shall certify to the Engineer, in writing, that the equipment furnished has been installed and aligned in accordance with all requirements, recommendations, and advisory instruction of the equipment manufacturer.

3.05 INSTRUCTION AND OPERATION MANUALS

A. Instruction: The Manufacturer shall supply the services of the factory service engineer for one (1) day in addition of factory service engineers for one (1) day in addition to the time described above to provide onsite instruction to the Owner's personnel in the operation, routine maintenance and "trouble shooting" for each piece of equipment furnished under this Subsection.

B. Operating Manuals: The Manufacturer shall provide five (5) bound copies of a manual fully explaining the operation, routine maintenance and "trouble shooting" for all equipment provided under this Subsection. The manual shall include copies of all approved shop drawings with all required revisions. This manual must be submitted to the Engineer for his approval prior to acceptance.

3.06 SPARE PARTS

Contractor shall furnish the following spare parts:

None.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 11 – EQUIPMENT
SECTION 11635 – FIBERGLASS PUMP BUILDING

PART 1 – GENERAL

1.01 SCOPE

Contractor is to provide an 8'x10' fiberglass housing for the high service pumps. The fiberglass housing shall be as manufactured by Associated Fiberglass Enterprises or approved equal.

1.02 SUBMITTAL

Submittals shall be furnished in accordance with Division 01300; Submittals and Section 01340; Shop Drawings, Product Data, and Samples.

PART 2 – PRODUCTS

2.01 FIBERGLASS BUILDING

A. The fiberglass building shall be ten (10) feet in width, eight (8) feet in depth, and a minimum of seven (7) feet in height. All building parts shall be fiberglass or stainless steel.

B. The building shall be of molded fiberglass construction, factory pre-assembled to make a bonded unit with no external seams or joint covers. The walls and roof shall be integral. There shall be a three-inch wide mounting flange around the entire lower perimeter.

C. The walls and roof shall be of sandwich construction consisting of 1/8" thick fiberglass skins and a one-inch thick rigid isocyanurate foam core (R value = 6.7). The door shall be of fiberglass sandwich construction 1-1/4" thick.

D. The fiberglass laminate shall consist of polyester resin reinforced with a minimum of 25% by weight E-glass. The minimum physical properties of the laminate shall be as follows:

Tensile strength	14,000 psi (ASTM D638)
Flexural strength	25,000 psi (ASTM D790)
Flexural strength	1,000,000 psi (ASTM D790)

E. Both the exterior and interior of the building shall be finished in white polyester gel coat.

F. The building shall be furnished with the following standard equipment and accessories:

2 double 3'0' swing doors with lockable equipment
1 single 3'0' personnel door with lockable equipment
Pre-wired using 12-gauge wiring
U.L. listed non-metallic conduit
125A main lug 8-branch circuit panel
Duplex outlets (115V)
Interior vapor resistant light
Fiberglass intake or exhaust fan with screened hood
Outside weatherproof switch for fan and light
Fixed ventilation louvers
Locking door knob
Cadmium plated removable lifting eye
Door gasket
Spring cushioned crash stop on door
Fiberglass awning above door
Equipment mounting board laminated in wall with FRP
Electric heaters with thermostat

G. Building is to have eight (8) stainless clips to anchor fiberglass structure to foundation.

PART 3 – EXECUTION

3.01 INSTALLATION

Building shall be installed in accordance with manufacturer's recommendations.

3.02 BUILDING FOUNDATION

Fiberglass building to be bolted on a new 13'x15' concrete slab. All anchor bolts from fiberglass building to be stainless steel. Anchor bolts to be located at each corner of building.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 11 – EQUIPMENT
DIVISION 11640 – REVERSE OSMOSIS EQUIPMENT AND ACCESSORIES

PART 1 - GENERAL

1.01 SCOPE

Contractor shall furnish and install a skid mounted reverse osmosis water treatment system complete with all accessories capable of producing a minimum of 50 gpm of potable water from a water well.

1.02 SUBMITTALS

Submittals shall be furnished in accordance with Section 01300 – Submittals and Section 01340 – Shop Drawings, Product Data, and Samples.

1.03 RELATED WORK

Refer to the referenced divisions of the specifications for related work not specifically described in this section:

A. Division 1 – Requirements

B. Division 9 – Finishes

C. Division 16 – Electrical and Instrumentation

1.04 PRODUCT HANDLING

A. Protection: Contractor shall use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades.

B. Delivery and Storage: All materials and equipment shall be delivered to the job site in their original containers with all labels intact and legible at time of use. Equipment and materials shall be stored in strict accordance with the manufacturer's recommendations as approved by the Engineer.

C. Replacements: In the event of damage, Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

1.05 EQUIPMENT

The manufacturer of the Reverse Osmosis (RO) System shall furnish all labor, materials, and equipment as specified herein for design, fabrication, testing, shipment, startup, commission, train, and make completely ready for operation a containerized RO Package System for Pleasure Bend in St. John the Baptist Parish.

1. All equipment specified in this section will be located inside an ISO standard shipping container. Ambient exterior temperatures will range from 20 degrees Fahrenheit to 110 degrees Fahrenheit. Relative humidity will range from 1% to 100%.
2. The equipment for the RO Package System includes the following:
    - **a.** ISO shipping container with insulation and HVAC
    - **b.** Cartridge filter
    - **c.** High pressure pump with VFD
    - **d.** Brine discharge valve
    - **e.** Membrane pressure vessels
    - **f.** Anti-scalant dosing system
    - **g.** Chemical day tanks and metering systems as noted
    - **h.** NF/RO membrane elements
    - **i.** Instrumentation, monitoring, and control devices
    - **j.** Piping, fittings, and valves
    - **k.** Epoxy coated carbon steel support frame
    - **l.** AB PLC based control panel with 10” HMI and UL stamp
    - **m.** Remote monitoring hardware and software
    - **n.** All other components as shown on the drawings and as indicated in this specification.

The manufacturer shall provide a complete and operable system including the following components, with responsibilities for each as generally described below:

1. The RO containerized units, including high pressure feed pump and motor assembly, cartridge filter housings complete with cartridge filters, membrane pressure vessels, chemical system, vent, all internal valves, piping manifolds, fittings, supports, design, startup training, and service. Installation of the skid mounted units.
2. RO membrane elements, element loading.
3. RO system shall be designed to provide single point connections to the container including: power, feed water, product water, and brine (reject) water. No other connections shall be required.

4. Instrumentation and control system for the RO skid with remote monitoring ability, water

quality monitors, flow meters, pressure gauges, differential pressure gauges, conductivity meters, and other process instruments.

5. Vendor will supply all required motor starting equipment and VFD's with the container providing for a single point power connection from a local disconnect.
6. Power required for the RO Unit is 480V, 3 phase, 60 Hz. To facilitate electrical installation, Contractor is responsible for furnishing, installing, and connecting the conductors to the designated points of connection within the container. The power supplied to the RO Unit will be 240v, single phase, 60 Hz. The RO Unit manufacturer is responsible for providing an inverter and transformer to convert the 240v, single phase to 480v, 3 phase, 60 Hz system.
7. All interconnecting piping outside of the skid limits and other connections within the project limits.
8. Operation and maintenance manuals (before plant startup) and field training during the commissioning period.

The containerized RO system is composed of standard-engineering equipment and components with no parts or hardware which are unique to the manufacturer. It is the responsibility of the vendor to closely coordinate with the Engineer during the submittal phase to assure that any differences between the system as specified and that as proposed by the vendor are appropriate for the application and that all related work is fully included in the vendor's bid. The containerized RO system drawings and P&ID's included in the contract drawings delineate the minimum system required; changes or recommendations for modifications to the system as shown and specified must be completely described in the shop drawings and submitted for approval by the Engineer.

It is intended that all equipment be provided with all piping, valves, fittings, instruments, and other components so as to provide a complete system which will be fully functional once connected to points as indicated on the drawings.

All instruments, valves, and other items which require routine maintenance shall be located within six feet of finished floor within the container. Include air vents or air release valves at all high points with gravity drains to the exterior of the container as required.

Skid dimensions shown on the drawings are considered maximum dimensions needed to accommodate the specified equipment. Clearances between skids shall be specified by the manufacturer and maintained to allow working access by operations and maintenance staff.

1.06 QUALITY ASSURANCE

A. All equipment shall be designed, manufactured, and tested in accordance with the latest standards of:

1. International Mechanical Code (UMC)
2. American Society of Mechanical Engineers (ASME)
3. American Society of Testing Materials (ASTM)
4. Occupational Safety and Health Act (OSHA)
5. Underwriter's Laboratories (UL)
6. American National Standards Institute (ANSI)
7. National Electrical Manufacturers Association (NEMA)
8. NFPA 70 National Electric Code (NEC)
9. American Water Works Association (AWWA)

PART 2 – PRODUCT

2.01 SYSTEM CONFIGURATION

A. The plant must be designed to operate unattended 24 hours per day, 365 days per year at maximum capacity. The RO System will be automatically controlled from a programmable logic controller (PLC). The RO System must be capable of automatic shutdown upon a fault condition and shall have only manual restart capabilities.

B. The RO System shall be capable of shutting down operations for up to 48 hours without requiring extensive maintenance procedures or membrane pickling.

C. The Owner or Contractor will provide a 100% supply bypass to feed their processes during periods where the RO System is out of service or for finished water blending if desired.

D. The RO System skid will be controlled by one PLC furnished and programmed by vendor. The PLC will control operation of the RO membrane skid and exercise supervisory control over the CIP system provided by the vendor. Ethernet communication shall be coordinated with the Owner. The PLC shall be capable of Ethernet communication with the Plant SCADA system.

E. The pressurized feed water is routed to the RO membrane elements installed within the vessels on the RO System. The pressurized feed is routed through a single or multi stage array. The system shall discharge concentrated brine from the system. During this discharge, permeate will still be produced at a reduced rate. Permeate from the system is routed to a permeate header and discharged into a product water storage tank provided by others. Permeate shall carry a residual pressure of no less than 30 PSIG.

F. The RO System as specified herein shall be provided by Desalitech, Inc. or approved equal.

2.02 RO SYSTEM DESIGN CRITERIA

A. Primary Reverse Osmosis Package System Design Criteria: The system shall receive water from the local municipal potable water system and/or nearby groundwater wells.

1. The system shall be a packaged system, appropriately self-contained in an ISO Standard Shipping Container.
2. The footprint and layout of the RO System shall be coordinated by the vendor and approved by the Engineer. See attached preliminary design.
3. The membrane system shall meet the following minimum design criteria:
    - **a.** Total Permeate Capacity: 50 gpm
    - **b.** Reverse Osmosis System
        - **i.** Number of trains: 1
        - **ii.** Permeate capacity per train: 50 gpm average
        - **iii.** Average flux rate: <15 gfd
        - **iv.** Recovery range of system (adjustable): Min. 75% - Max. 95%

B. Reverse Osmosis System Performance Conditions: Including the above design criteria, the RO System shall also be capable of meeting the following design conditions:

1. Concentrate pressure at RO discharge (downstream of concentrate control valve) shall be at least 30 psi residual pressure.
2. Permeate pressure at RO and RO permeate discharge (downstream of permeate control valve) shall be a minimum of 30 psi.
3. The feed water pressure will be provided by feed water poster pump supplied by the vendor and integrated within the container.

C. Additional Services Required of Vendor:

1. Feed water quality is to be analyzed and submitted as listed in Table 1 below, Projected and Required Water Characteristics. Minor variances on the projected feed water quality are to be expected.
2. Anti-scalant Recommendations at 75% recovery as well as a maximum recovery achievable for the analyzed water are to be made by the vendor and submitted.

Table 1 – Projected and Required Water Characteristics to be submitted by vendor

PARAMETER	UNIT	FEED WATER (WELL WATER)	REQUIRED RO PRODUCT WATER
NH_4	mg/L	4	
K	mg/L	0	
Na	mg/L	172	
Mg	mg/L	26.6	<5
Ca	mg/L	57.3	<5
Sr	mg/L	0	
Ba	mg/L	0	
HCO_3	mg/L	456	
NO_3	mg/L	0	
Cl	mg/L	185	
F	mg/L	0	
SO_4	mg/L	1	
SiO_2	mg/L	25.8	<5
Boron	mg/L	0	
CO_2	mg/L	12	
Fe	mg/L	1.18	<=0.2
TDS	mg/L	930	<=120
Temperature	F°	15-25	
pH	-	7.0-8.0	6.5-8.5

2.03 FEED, CONCENTRATE, AND PERMEATE PIPING

A. 304 Stainless Steel Piping (Sch 10):

1. Shall be utilized for the primary RO feed: high-pressure pumps to concentrate valves.

B. Schedule 80 PVC Piping:

1. Shall be utilized for the low-pressure water system upstream of the acid injection quill in the primary RO system and permeate lines for both the primary RO systems (less than 80 psi).
2. Finish shall be dark gray in color. Apply coatings and labels as specified.
3. Flanges shall be ANSI/ASME B16.5 Class 125.

C. Schedule 80 CPVC Piping:

1. Shall be utilized for the low-pressure systems not specifically defined under Schedule 80 PVC (less than 80 psi). Used in areas that are in contact with concentrated chemicals.
2. Finish shall be white in color.
3. Flanges shall be ANSI/ASME B16.5 Class 125.

D. Stainless Steel Pipe Flanges shall be as follows:

1. Pressures 0-150 psi
   - **a.** AWWA C207 Class D, or
   - **b.** ANSI/ASME 16.5 Class 150
2. Pressures 150-275 psi
   - **a.** AWWA C207 Class E, or
   - **b.** ANSI/ASME 16.5 Class 150
3. Pressures 275-300 psi
   - **a.** AWWA C207 Class F, or
   - **b.** ANSI/ASME 16.5 Class 300
4. Pressures 300-675 psi
   - **a.** ANSI/ASME 16.5 Class 300 (Use ring gaskets)
5. Pressures 675-900 psi
   - **a.** ANSI/ASME 16.5 Class 400 (Use ring gaskets)

E. Manifolds and piping shall incorporate flanges or grooved coupling joints to allow installation and connection to valves, appurtenances, and instrumentation elements as required.

2.04 VALVES

A. The vendor shall furnish and install all membrane system valves shall be fully constructed of 316 and rated for the pressures at least equal to the adjoining piping. PVC valves may be utilized in conjunction with low pressure piping.

B. Submit valve specification and chemical resistance specifications for approval by the Engineer. Materials used for construction of the valve body, seats, and seals shall be explicitly noted in submittals.

2.05 MOTORIZED ACTUATORS

A. All valves that require automatic control shall be provided with electric actuators furnished and installed. Valve positioners shall be provided where required for control purposes. Outlet valves shall be provided. Include limit switches to indicate full open and full closure of isolation valves.

2.06 CONTAINERIZED MEMBRANE SYSTEMS

A. RO skid, pumps, pressure vessels, piping, cartridge filter housings, chemical dosing system, and all other components shall be factory assembled in container and supporting structure of corrosion resistance materials.

B. RO skid and supporting structure shall be welded carbon steel, free of weld slag and finished with an epoxy. Mounting hardware and fasteners shall be 316 stainless steel. The use of any material other than 316 SS must be approved by the Owner.

C. Skid dimensions shall fit in the space available, see drawings.

D. Container shall be set on concrete pad designed by others. Any anchors shall be supplied and specified by others.

2.07 MEMBRANE ELEMENTS

A. Membrane elements shall be the spiral wound type, 8” in diameter and 40” long. Elements must be NSF 61 approved.

B. Membrane elements shall be rated for continuous operating within the manufacturer’s warranty condition requirements at temperatures of up to 45 degrees C (113 degrees F) and within a feed pH range of 3 to 9.

C. Manufacturer will submit membrane performance projections and any applicable anti-scalant performance projections with the bid showing membrane and anti-scalant selected and minimum and

maximum RO recovery.

D. Membrane element manufacturers allowed shall be Dow Filmtec, Toray, Hydranautics, or approved equal.

2.08 MEMBRANE PRESSURE VESSELS

A. Configuration: Pressure vessels housing membrane elements shall meet the following service rate and configuration requirements:

1. Vessel dimensions shall be suitable to contain standard 8" diameter by 40" long spiral wound membrane elements.
    - **a.** Primary RO membrane pressure vessels shall be single stages for operation in a semi-batch operation.
        - **i.** Pressure vessels shall contain no more than 4 elements per vessel.
        - **ii.** Vessels shall have a maximum working pressure of not less than 300 psi at a temperature up to 40 degrees C.
2. Vessels shall be painted with a high-quality, high-gloss, two-part polyurethane paint to reduce light transmittance.
3. Vessel sizes shall be standardized and capable of accepting all brands of membrane elements.

B. Construction: Vessels shall be designed and constructed in accordance with the latest edition of ASME Boiler and Pressure Vessel Code – Section X, Fiberglass – Reinforced Plastic Pressure Vessels. The vessel manufacturer shall be certified by ASME under this section.

C. Manufacturers or approved equal:

1. Code Line Divisions, Structural North America
2. Progressive Composite Technologies, Inc. (ProTec)

2.09 CARTRIDGE FILTER

A. The manufacturer shall provide 1 pre-treatment Cartridge Filter Housing complete with complete sets of 5 microns nominally rated filter cartridges per skid. The cartridge filter housing shall be manufactured of 316 stainless steel.

B. The filter housing shall be installed in orientation to allow for easy removal of the cartridge filters.

C. The cartridge filter shall be installed within the container. The cartridge filter shall be furnished

with a filter housing, inlet and outlet manual isolation valves, vent, rinse, and a drain valve. Inlet and outlet pressure gauges (0-100 psi liquid filled, %" MNPT) with %" isolation valves and sample port valves to be installed to monitor each housing individually. Filtration rate shall not exceed 5 gpm per 10" of filter.

D. Manufacturer or Engineer approved equal:

1. Fil-trek Corporation
2. Parker
3. Shelco
4. Cuno

2.10 MEMBRANE SYSTEM HIGH PRESSURE FEED PUMPS

A. Manufacturer shall provide high pressure feed pump(s) and motor(s) for each skid. The pump(s) shall be sized for the flow rate and pressure specified herein. The final responsibility of pump pressure required to operate the membrane system shall be provided by the manufacturer and membrane element manufacturer and indicated in the membrane system performance projection to be submitted.

B. Pump and motor requirements are as follows:

1. Primary RO High Pressure Feed Pumps:
    - **a.** Number of pumps per skid: 1
    - **b.** Vendor to specify horsepower of pump
    - **c.** Design flow: as required to meet full range of RO operating requirements
    - **d.** Design head: as required to meet full range of operating requirements
    - **e.** Pump shall operate at a minimum of 75% efficiency
    - **f.** Pump shell, shaft, and inlet and outlet connections – 316 stainless steel
    - **g.** Internal components shall be 316 stainless steel. Other parts to be compatible with indicated service.
    - **h.** Manufacturer's standard mechanical coupling with coupling guard.
    - **i.** VFDs shall be provided by manufacturer as part of the control panel.
    - **j.** Pump shall be positive displace type or centrifugal.

    - **k.** Manufacturer or Engineer approved equal:
        - **i.** Grundfos
        - **ii.** Goulds
        - **iii.** Flowserve

C. Unit shall be provided with discharge check valves and all other mechanical, electrical, and instrumentation components required for a complete installation.

D. Installation by manufacturer.

2.11 FEED CHEMICAL DOSING

A. Sodium bisulfite chemical storage, piping, and metering system are provided by the manufacturer as shown on the drawings as standalone day tank and metering system dosing RO system. Manufacturer is responsible for controlling the sodium bisulfite feed.

B. Antiscalant chemical day tank storage pumping and piping are provided by the manufacturer. Manufacturer is responsible for controlling the antiscalant dosing system mounted on each skid.

1. Manufacturer to specify the following with bid:
    - **a.** Manufacturer and name of antiscalant
    - **b.** Dose
    - **c.** Specific gravity
    - **d.** Flow (GPH)

C. Manufacturer is responsible for the skid mounted day tank and controlling the caustic soda feed for membrane cleaning and pH adjustment as required.

D. Manufacturer is to submit any additional recommendation for additional chemical feed systems based on water analysis. When possible, pH adjustment is to be avoided.

2.12 CLEAN-IN-PLACE SYSTEMS

A. The manufacturer shall supply the CIP system including the associated connections to the RO Package System. Vendor shall provide the manifold piping, valving, and controls on the RO skids for cleaning the membranes with the cleaning solution into and out of all the membrane element pressure vessels.

1. RO – CIP System Design Criteria:
    - **a.** Volume: manufacturer selected
    - **b.** Flow: manufacturer selected
    - **c.** Pressure: 60 psi

2.13 INSTRUMENTATION AND CONTROLS

A. All instruments and controls shall be provided by the manufacturer. Installation shall be skid mounted unless indicated otherwise. Instruments shall monitor, as a minimum:

1. Cartridge filter inlet and outlet pressures
2. Feed pressure
3. Pressure drop access each membrane stage
4. Final concentrate pressure
5. Permeate pressure
6. Feed conductivity
7. Feed temperature
8. Permeate conductivity
9. Feed pH
10. Concentrate pH
11. Permeate pH
12. Permeate flow
13. Concentrate flow
14. Pressure switches on high pressure feed pumps

B. In addition to the instruments listed above, flow meters, tank levels, pump status, and chlorine level status I/O signals shall be interfaced into the RO Unit PLC. Sufficient spare capacity in the PLC shall be provided to accommodate these inputs. Approximately 6 analog and 4 digital I/O shall be interfaced into the RO Unit PLC for this project, vendor to confirm and is responsible for providing sufficient I/O in the PLC for these external signals. The PLC shall have 25% additional spare capacity of each type of I/O for future expansion of this system. The vendor shall configure the RO Unit supplied PLC to perform the following:

Ground Storage Tank

1. Configure ground storage tank pressure switch
2. Add logic for the following
    - Low pressure (level) – start well pumps, start RO Unit
    - Normal pressure (level) – stop well pumps, shutdown RO Unit

C. The equipment shall include all instrumentation related to the RO System as identified in the specifications, as shown on the drawings, and as necessary to measure and display the process parameters described herein.

D. The RO System control panels shall be NEMA 12 enclosures. The panel shall be PLC based

with HMI and contain process indicators and other devices related to the respective membrane skid. All power and instrument cables shall be terminated at the manufacturer supplied control panel located on the RO System.

1. The following process variables, as minimum, shall be displayed on the face of the RO membrane skid control panel.
   - **a.** Feed water supply pressure (measured at inlet and outlet of cartridge filter housing).
   - **b.** RO membrane feed water pressure (measured at the discharge of the high pressure feed pump).
   - **c.** Total concentrate water flow from the skid.
   - **d.** Total permeate water flow from the skid.
   - **e.** Feed water pH (measured upstream of the feed water acid dosing inlet).
2. The following alarm conditions, as minimum, shall be furnished and indicated:
   - **a.** Low feed water pressure: Adjustable; sensor is mounted in the feed line after the cartridge filter housing. Should the pressure be less than the set point, the RO skid will shut down. Ensures a positive pressure to the RO feed pump.
   - **b.** High pressure: Should the pressure exceed the set point, the RO skids will immediately shut down.
   - **c.** Membrane antiscalant system low flow switch: Should switch be in the off position, the RO skids will immediately shut down.
   - **d.** Membrane emergency shutdown pushbutton: Shuts down the RO skid and associated equipment.
3. A skid that has shut down under one of the above conditions shall not automatically restart when the alarm condition clears. It shall be necessary to reset the skid's shutdown status locally from the skid control panel before the skid can resume automatic operation.

2.14 SPECIAL TOOLS AND SPARE PARTS

A. General: Special tools and spare parts shall be furnished by the manufacturer of the respective equipment item. Spare parts shall be suitable packages labeled with respect to their contents and delivered to the Owner. Indicated quantities below do not include installed items.

B. Spare parts:

1. The manufacturer is to submit a recommended spare parts list with shop drawings.

2.15 ASSEMBLY AND TESTS

A. Installation of RO Package System Skids and Membrane Elements:

1. Installation of the components on the skid shall be by the Contractor unless otherwise noted.
2. Pressure vessels shall be installed by the manufacturer, after Functional Testing, in conformance with the vessel manufacturer's recommended procedures, instructions, and the shop drawings. Manifolds and vessel supports shall be adjusted to achieve the indicated port coupling alignments.
3. Membrane elements shall be installed by the Contractor in conformance with the vessel manufacturer's recommended procedures, instructions, and the shop drawings. The position of each element shall be recorded by element serial number by the manufacturer. If the manufacturer has specified a loading order based on element type or test data, the elements shall be installed in that order.
4. The complete RO System shall be installed by the Contractor in conformance with the manufacturer's recommended procedures, instructions, and shop drawings in the presence of a representative of the manufacturer.

B. Reverse Osmosis Package System Testing:

1. Testing Protocol: The manufacturer shall submit to the Owner a proposed testing protocol 30 days prior to the initiation of the membrane system performance testing. The testing protocol shall have written approval by the Owner prior to commencement of the testing program. The testing protocol shall include, as a minimum, water quality sampling parameters, sampling locations, projected dates of the performance testing, laboratory for the water sample analysis, and time of sampling relative to time zero. Time zero for the membrane system performance testing is the time of the first sample.
2. Duration of Performance Test: The membrane train shall be tested for 2 consecutive days (48 hours). The manufacturer shall be fully responsible for every aspect of the performance test. Qualified representatives of the manufacturer and the manufacturer shall be on-site during the entire performance test. Representatives of the Engineer and Owner may also be in attendance during the performance test. The vendor shall provide a 2 week advance notice of the test date.
3. Performance Testing Conditions: The membrane train shall be tested under the following conditions. These conditions must be maintained during the entire performance test.
    - **a.** Membrane feed water quality shall be listed in the Projected and Required Water Characteristics table.
    - **b.** Water recovery as proposed by manufacturer (minimum 70%)
    - **c.** Permeate flow, 50 gpm average
    - **d.** The use of antiscalant

4. Data Collection During Performance Test: The following continuous data shall be collected

hourly (for each skid) unless otherwise indicated during the performance testing:

a. Water Quality:

- **i.** Feed water temperature
- **ii.** Feed water conductivity
- **iii.** Feed water pH
- **iv.** Permeate conductivity
- **v.** Concentrate conductivity
- **vi.** Feed water Silt Density Index, once per day
- **vii.** Feed water turbidity
- **viii.** First concentrate pH

b. Mechanical Data:

- **i.** Feed water pressure
- **ii.** Final concentrate pressure
- **iii.** Permeate pressure
- **iv.** Permeate flow
- **v.** Final concentrate flow
- **vi.** Permeate flow control valve position, if applicable, and feed flow control valve position, if applicable.

c. Concentrate flow control valve position

2.16 FIELD ENGINEERING SERVICES

A. Primary Reverse Osmosis Package System Training:

1. The manufacturer shall have a qualified RO equipment manufacturer's representative furnish the services of personnel for 1 work-day to instruct the Owner's staff on proper operation, installation, sampling, cleaning, and maintenance for the membrane system.
2. The manufacturer shall have a qualified RO equipment manufacturer's representative furnish an operator refresher training at the plant site 6 months after the date of Substantial Completion. The refresher training sessions shall last one day (8 hours of classroom time).
3. The first cleaning of the membranes by the Owner's personnel will occur within 12 months of the date of Substantial Completion. The manufacturer shall have a qualified RO equipment manufacturer's representative be present on-site for a maximum of 2 days to assist with the membrane cleaning.
4. The control system training program shall cover the contents of the operation and maintenance manual prepared for the project. The training shall also cover general theory, systems operation, data collection, data interpretation, automatic and manual operations, control strategies, safety, and maintenance of complete system. The control system training shall cover the specific PLC and graphic interface configuration specific to this project. The PLC program code and graphic interface object and maintenance/future programming

options.

5. All training will be at dates and times agreed upon between the Owner and the manufacturer.

B. Manufacturer's Presence

1. The manufacturer shall have qualified RO equipment manufacturer's representative present during critical activities throughout the project at no additional cost to the Owner.
2. In addition to the services required under these specifications, the manufacturer, at no additional cost to the Owner, shall have a qualified RO equipment manufacturer's representative present for a minimum for 3 days total for required inspections, testing, and training.
3. All costs for the qualified RO equipment manufacturer's representative participation in these activities, including travel, lodging, and any incidentals, are to be included by the manufacturer.

2.17 WARRANTIES

A. General

1. The manufacturer shall warrant all equipment in the RO Package System, including the membrane elements, to be free from defects in materials and workmanship, and comply with performance guarantees in accordance with the requirements of this Section.
2. The warranty period shall commence upon successful completion of startup testing.
3. The warranty conditions shall be valid under the conditions specified in these specifications.

B. RO Package System Equipment Warranty

1. For a period of 12 months after the Substantial Completion date, commencing from the date of successful completion of startup testing, the manufacturer guarantees the following that all work, materials, equipment, and products provided by the manufacturer, exclusive of the membrane modules, will be free from faulty materials, workmanship, or defect at the time of delivery, provided that the equipment is used, cleaned, and maintained in accordance with the procedures defined in the manufacturer system operation and maintenance technical manuals.
2. The manufacturer shall make, or have made at the expense of the manufacturer, repairs, adjustments, replacements, or other corrective work necessary to restore or bring into full compliance with the requirements of the specifications any part of the work, materials, or equipment, which during the warranty period is found to be deficient with respect to any provision of the Specification, provided that the equipment is used, cleaned, and maintained in accordance with the procedures defined in the manufacturer system operation and maintenance technical manuals.

2.18 NAMEPLATES, TAGS, AND MARKERS

A. Shall be manufacturer's standard.

2.19 WIRING FOR INSTRUMENTS AND POWER

A. All wiring raceways exposed in the process space shall be PVC coated Rigid Galvanized Metal Conduit.

B. Raceways

1. All wiring raceway installation shall conform to all applicable codes and electrical specifications.
2. Conduit Sizing: Minimum size conduit shall be 3/4". Conduits shall be sized for 25% future capacity and all conduits larger than 1" shall have a nylon pull string installed with the wire to accommodate pulling future wires.

C. Conductors

1. All 120-volt control wiring shall be a minimum of 12 gauge stranded, THWN insulation and properly protected against overcurrent. Color coding shall be: Black – hot, White – neutral, Green – ground.
2. Control and Instrument Wires: Provide Type THWN control multi-conductor cables, minimum 18 gauge stranded, with PVC jacket, and with at least one spare circuit (two wires) for each conduit run. Color coding shall be: Blue – common, Yellow – signal, Red – 20V AC power.

D. Instrument signal voltage shall be 24 V dc.

PART 3 – EXECUTION

3.01 INSTALLATION

Contractor shall install the skid RO unit in accordance with manufacturer's recommendation.

3.02 CONTROLS

Unless otherwise specified, the Contractor shall be responsible for furnishing all controls including magnetic starters with overload and under voltage protection, pushbutton stations, timers, limit switches, H-O-A switches, enclosures, and other items as required by particular equipment in accordance with manufacturer's recommendations and as shown on the drawings. This work shall meet all provisions of Division 16 of these specifications.

3.03 HYDROSTATIC TESTS

Contractor shall provide a hydrostatic test on all new piping. Test shall be one and one-half times the highest expected pressure on system for a minimum of 2 hours. The hydrostatic test shall utilize a strip chart that will record temperature and pressure for the test duration. The vendor shall provide a calibration certification for all test equipment. The Owner will have the option to witness the test.

3.04 COORDINATION WITH ELECTRICAL REQUIREMENTS

Unless otherwise specified, the Contractor shall be responsible for furnishing all controls including magnetic starters with overload and under voltage protection, pushbutton stations, timers, limit switches, H-O-A switches, enclosures and other items as required by particular equipment in accordance with manufacturer's recommendations and as shown on the Drawings. The vendors of the various pieces of equipment shall refer to the electrical specifications Division 16 and the electrical drawings to supplement the specification of this section. Any additional equipment shown in the electrical plans and specifications that is not specifically specified in this section shall be furnished by the vendor. The most common items overlooked by vendors are motor starters and control power transformers. The plant electrical system is custom designed to the specific requirements of the Owner and the Engineer using a sophisticated control system. The vendors shall custom design their electrical equipment and panels to match these electrical requirements. This means that it is highly unlikely that the vendors standard

panels and electrical equipment will be compatible with the requirements of this project. Shop drawings shall be submitted showing external wiring terminals and shall properly identify the devices that they are to be interconnected with. At a minimum the drawings shall be prepared with the same engineering effort as can be expected to be utilized in motor control center class 2B wiring. Any drawings submitted where it is obvious that no effort was made to properly prepare them for easy checking by the engineer will be rejected.

3.05 CERTIFICATION AND TESTING

Unless otherwise specified, the Contractor shall provide the services of a factory service engineer to supervise the installation and alignment of equipment and materials provided under this Section. Upon completion of the installation and alignment, the service engineer shall certify to the Engineer, in writing, that the equipment furnished has been installed and aligned in accordance with all requirements, recommendations, and advisory instructions of the equipment manufacturer. After the installation and alignment is complete, the factory service engineer shall operate the equipment for such a period as to assure proper functioning of same, all auxiliary equipment shall also be operated to demonstrate that it is functioning properly. Any adjustments deemed necessary to place the equipment if proper operating conditions to meet performance criteria will be made. Such adjustments shall be made at the Contractor's expense.

3.06 INSTRUCTION AND OPERATION MANUALS

A. Instruction - Unless otherwise specified, the Contractor shall supply the services of factory service engineers in addition to the time described above to provide on-site instruction to the Owner's personnel in the operation, routine maintenance and "trouble shooting" for equipment furnished under this Section.

B. Operating Manuals - The manufacturer shall provide five (5) bound copies of a manual fully explaining the operation, routine maintenance and "trouble shooting" for all equipment provided under this Section. The manual shall include copies of all approved shop drawings with all required revisions. This manual must be submitted to the Engineer for his approval prior to acceptance.

3.07 START-UP

The manufacturer shall provide the services of a factory-trained field Engineer for the purpose of installation inspection, equipment, start-up, performance testing and training of plant personnel regarding proper operation and maintenance of the equipment for a period of one (1) 8-hour day in one (1) trip.

3.08 OPERATION AND MAINTENANCE MANUAL

Manufacturer shall provide 3 sets of O&M manuals. The manuals shall contain the minimum items:

1. Includes a complete operations and maintenance manuals, maintenance procedures, spare parts list, and field procedures.
2. Operation and maintenance instructions shall be manufacturer's printed instructions for correct operation and maintenance procedures for product, along with data which must accompany manual as directed by current regulations of government agency.
3. Include operating instructions for each piece of equipment.
4. Describe equipment function, operating characteristics, limiting conditions, operating instructions, startup procedures, normal and emergency conditions, regulation and control, and shutdown.
5. Include preventative maintenance instructions.
6. List warranty requirements.
7. Explain and illustrate preventative maintenance tasks.
8. Include lubrication charts, lists of acceptable lubricants, trouble shooting instructions, and lists of required maintenance tools and equipment.
9. List recommended spare parts, their costs, and ordering information for one manufacturer who can supply these parts.
10. Index instructions for easy reference.
11. Include information for installed equipment only.

3.09 SPARE PARTS

Refer to Part II for spare parts.

END OF SECTION

DIVISION FIFTEEN

MECHANICAL

15

TECHNICAL SECTION
DIVISION 15 - MECHANICAL
SECTION 15010 - PIPING

PART 1 – GENERAL

1.01 SCOPE

The Work covered by this Section of the Specifications shall include, in general, furnishing and installation of all interior and exterior piping as indicated on the drawings, including all fittings, painting, hangers, supports, spacers, sleeves, anchors, base plates, collars, straps and other appurtenances as shown on the drawings or as required to provide the Owner with complete and satisfactory piping systems. All pipe and materials shall be new. No used pipe or materials shall be approved.

The responsibility of providing special coatings, detailed layout drawings, storage areas, testing, reports, cleaning and special anchoring of all piping shall be the responsibility of the Contractor.

This Section outlines pipe and fittings. If designated on the drawings Contractor shall apply these standards as outlined on the drawings. If no pipe material or standards are shown on the drawings Contractor Shall provide the pipe and fittings as shown in the Schedule in paragraph 2.01.

A. Related Work Described Elsewhere - Contractor shall perform excavating, trenching, and backfilling for all exterior piping in accordance with pertinent provisions of Division 2 of these Specifications. Contractor shall also refer to Division 3 of these Specifications for additional requirements relating to piping system concrete supports.

For all Work performed under this Section, the Contractor shall comply with all pertinent, applicable specifications, conditions, and provisions presented in Division 1 of these Specifications, and any other applicable Contract requirements of the Owner.

B. Quality Assurance:

1. Standards: Contractor shall comply with standards specified in this Section, and all other applicable Sections of these Specifications.

2. Qualifications of Installers: Contractor shall use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

C. Submittals:

1. Product Data: Within ten (10) calendar days after award of the Contract, the Contractor shall submit to the Engineer for approval:

a. Complete list of all materials and items, which are proposed to be furnished and installed under this Section.

b. Manufacturers' specifications and other data required to demonstrate compliance with the specified requirements.

c. Manufacturers' recommended installation procedures which, when approved by the Engineer, shall become the basis for inspecting and accepting or rejecting actual installation procedures used on the Work.

2. Drawings Required On Contract Work: Before ordering any water, wastewater, or process piping or appurtenances, the Contractor shall furnish to the Engineer six (6) copies of fully dimensioned drawings of the proposed work for approval.

3. Mill Certificates: Mill certificates shall be furnished upon request of the Engineer.

1.02 PRODUCT HANDLING

A. Protection - Contractor shall use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades.

B. Protection of Utilities - Contractor shall protect existing utilities as specified under the General Conditions section of the Contract Documents and Division 1 of these Specifications.

C. Delivery and Storage - All materials shall be delivered to the job site in their original containers with all labels intact and legible at time of use, and shall be stored in strict accordance with the manufacturer's recommendations as approved by the Engineer.

D. Replacements - In the event of damage, Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

E. Care of Pipe Coatings - Pipe shall be handled so that the coating shall not be damaged. Repair of any damage shall be made by the Contractor at no additional cost to the Owner, and shall be made in a manner satisfactory to the Engineer.

PART 2 – PRODUCTS

2.01 PIPE AND FITTINGS SCHEDULE

Unless otherwise indicated on the Contract Drawings or in the Specifications, the following schedule shall apply for piping and fittings:

Application	Pipe Material	Type of End Connection
1. Exterior Yard Piping (except force mains process water lines, chemical feed lines, and gravity sewers)	Ductile Iron	Mechanical Joint
2. Interior Pressure Piping (except process and potable water)	Ductile Iron	Flanged Joint or Victaulic Coupling
3. Floor Drain Lines Interior & Exterior	Cast Iron Soil	Neophrene Gaskets Pipe or Arc
4. Roof Drain Lines Interior	Galvanized Iron, PVC or Steel	Screwed (Galvanized or Steel), Solvent Weld (PVC), Welded or Victaulic Coupling (Steel)
5. Potable Water Lines		
a) Interior - Less than 3" Diameter	Copper - Type L, Galvanized Steel	Solder Joint (Copper) Threaded (Galv. Steel)
3" Diameter or Greater	Ductile Iron	Flanged Joint or Victaulic Coupling
b) Exterior - Less than 3" Diameter	Copper - Type K or PVC	Flared Fitting (Copper) Bell and Spigot (PVC)
3" Diameter or Greater	Ductile Iron, PVC	Bell and Spigot, Mechanical Joint
6. Process and Non-Potable Water Lines		
a) Interior - Less than 3" Diameter	Galvanized Iron or Black Steel	Screwed or Victaulic Coupling
3" Diameter or Greater	Ductile Iron	Screwed or Victaulic Coupling
b) Exterior - Less than 3" Diameter	Galvanized Iron, or PVC	Screwed (Galv.), or Bell and Spigot (PVC)
3" Diameter or Greater	Ductile Iron	Mechanical Joint
7. Chemical Feed Lines	Rigid PVC (Schedule 80)	Solvent Weld except at fittings and valves where union required on each side of fitting or valve or Victaulic Coupling

8. Air Lines		
a) Interior - 3" Diameter and Less	Galvanized Steel	Screwed or Victaulic Coupling
Greater than 3" Iron, or Steel	Ductile Iron, Cast	Flanged or Victaulic Coupling
b) Exterior - 3" Diameter and Less	Galvanized Iron or Black Steel	Screwed
Greater than 3"	Ductile Iron	Mechanical Joint
9. Storm Drainage	Reinforced Concrete or Corrugated Metal	Rubber Gasket (RCP) or Coupling (CMP)
10. Gravity Wastewater Lines		
a) 15" Diameter and Less	PVC Sewer Pipe	Bell and Spigot
b) Greater than 15"	Reinforced - Concrete, Ductile Iron, or PVC Sewer Pipe	Bell and Spigot
11. Force Mains		
a) 8" Diameter and Less	Ductile Iron, PVC Pressure Pipe	Bell and Spigot w/Mech. Joint for Fittings
b) Greater than 8"	Ductile Iron Joint for Fittings	Bell and Spigot w/Mech.

2.02 PIPING AND FITTINGS

A. POLYVINYL CHLORIDE PLASTIC PRESSURE CLASS PIPING (PVC -PC)

1. Pipes - Polyvinyl chloride (PVC) Pressure Class pipe sizes four through twelve-inch (4"-12") shall conform to AWWA C900. Pipe compound shall conform to ANSI/ASTM D1784 with a hydrostatic design-basis (HDB) rating of 4000psi stress in water at 73.4°F (23°C) as determined by ANSI/ASTM D2837 and as established by the Plastics Pipe Institute (PPI) and designated as PVC 1120. The pipe thickness shall be designed in accordance with AWWA C900, as modified hereinbefore. Unless Pressure Class 100 or 200 is designated on the drawings or in the bid proposal, the Pressure Class shall be 150.

Each length of pipe and each coupling shall be hydrostatically tested at a pressure of 4.0 times the rated Pressure Class; i.e., test at 600psi for Pressure Class 150. Furnish pipe in standard laying lengths of twenty (20) feet. Pipe shall have outside diameters equivalent to cast iron (CI-OD) sizes only and I.P.S. sizes will not be permitted.

2. Joints and Materials - Pipe joints shall be CI-OD sizes of the electrometric gasket type in compliance with ANSI/ASTM D3139 and shall be either of the integral bell type or the double bell coupling type. The wall thickness of PVC couplings using elastomeric seals shall be adequate to withstand pressures not less than the Pressure Class rating of the pipe with which they are designed to be used. Rubber gaskets shall comply with ANSI/ASTM F477.

Joints in ductile iron fittings shall conform to ANSI A 21.11/AWWA C111 with either mechanical joint or push-on rubber gasketed joint as designated bolts and nuts for mechanical joints shall be corrosion resistant high strength low alloy steel ("Cor-Ten").

3. Fittings - Fittings for use with PVC Pressure Class pipe in sizes four through twelve inches (4"- 12") shall comply with ANSI/AWWA C110 for standard short-bodied cast iron-fittings. All fittings shall be ductile iron and gray iron shall not be permitted. The minimum pressure rating in these sizes shall be 350psi with ductile iron.

Line fittings with standard thickness cement mortar lining and bituminous seal coating on the inside in accordance with ANSI/AWWA C104.

Fittings shall have an exterior 1-mil thick bituminous coating.

Note: All fittings shall have proper external thrust restraint in the form of concrete thrust blocks or mechanical restrained joints.

B. POLYVINYL CHLORIDE PLASTIC PRESSURE RATED PIPING (PVC - PR)

1. Pipes - Pressure rated polyvinyl chloride (PVC) pipe shall comply with the appropriate standard according to size as follows:

Size	Standard
1/ 2" - 8"	ANSI/ASTM D1785, Schedule 40 and 80
1-1/2" - 12"	ANSI/ASTM D2241, Standard Dimension Ratio - Pressure Rated (SDR-PR)

Pipe compound shall conform to ANSI/ASTM D1784 with a hydrostatic-design-basis (HDB) rating of 4,000psi stress in water at 73.4ºF (23ºC) as determined by ANSI/ASTM D2837 and as established by the Plastics Pipe Institute (PPI) and designated as PVC 1120. The pipe thickness design shall be determined by the method specified hereinbefore, except with de-rating the pipe for operating temperatures above 73ºF, as recommended by PPI.

Pressure ratings and sizes allowed for PVC piping (fittings and pipe) shall be in accordance with the following table.

PRESSURE RATINGS & SIZES ALLOWED

Pressure Rating (PR) psi	Standard Dimension Ratio Pipe SDA 2124	SDA 32.5	SDA	Schedule Fittings or Pipe: Unthreaded Fitting or Pipe Sch. 40	Unthreaded Fitting or Pipe Sch. 80	Threaded Pipe Sch. 40	Threaded Pipe Sch. 60
200	2" -12"	N.A	N.A.	½" - 4"	½" - 8"	N.A.	½"-2"
160	2" -12"	2" -12"	N.A	½" - 8"	½" - 8"	N.A.	½"- 4"
125	2" -12"	2" -12"	2" -12"	½" - 8"	½" - 8"	N.A.	½"- 6"

NOTE: N. A. denotes no approved. Threading of Sch. 40 pipe is prohibited in all sizes and is not approved.

Unless a pressure rating of 125 or 200psi is designated on the Drawings or in the bid proposal the pressure rating of piping shall be 160psi with SDR 26 and Schedule 40 or 80, as appropriate.

All PVC pressure pipe and fittings shall be approved by and bear the seal of certification by the National Sanitation Foundation in lieu of hydro testing.

Furnish pipe in nominal laying lengths of 20' for gasketed joints and 20' or 40' for solvent-cemented joints. Pipe shall have outside diameters equivalent to steel pipe (IPS) sizes.

2. Fittings - PVC fittings shall be injection molded of PVC 1120 material. Socket joint fittings for solvent cementing shall comply with the applicable ANSI/ASTM D2466 for Schedule 40 or ANSI/ASTM D2467 for Schedule 80. Threaded joint fittings shall be Schedule 80 complying with ANSI/ASTM D2464. Gasketed, joint PVC pressure fittings shall be specially designed and long-term pressure rated with a minimum thickness at least 110% of pipe with equal pressure rating.

The pressure rating of a PVC fitting shall be equal to the pressure rating of the pipe with which it is used. Use Schedule 40 fittings on Schedule 40 pipe in sizes eight inch (8") and smaller, on SDR 21 - PR 200 pipe in sizes four-inch (4") and smaller, and on SDR 26 - PR 160 pipe in sizes eight-inch (8") and smaller. Use Schedule 80 fittings on Schedule 80 pipe in sizes eight-inch (8") and smaller and on SDR 21 -PR 200 pipe in sizes six-inch and eight-inch (6" & 8"). Use special pressure rated gasketed fittings compatible with the pipe in limited available sizes in the range of two to eight inch (2"-8").

Cast iron fittings for use with gasketed joint PVC pipe in sizes three through twelve inch (3"-12") shall comply with ANSI/AWWA C110 for standard short-bodied cast iron fittings. All fittings shall be ductile iron and gray iron shall not be permitted. The minimum pressure rating in these sizes shall be 350psi with ductile iron.

Cast iron fittings with standard thickness cement mortar lining and bituminous seal coating on the inside in accordance with ANSI/AWWA C104. Fittings shall have an exterior 1-mil thick bituminous coating.

Note: All fittings shall have proper external thrust restraint.

C. DUCTILE IRON PRESSURE PIPING (DI)

1. Pipes - Pipe sized three inches (3") through fifty-four inches (54") shall be ductile iron conforming to ANSI 21.51/AWWA C151. The thickness of buried pipe shall be designed in accordance with ANSl 21.50/AWWA C150, as modified hereinbefore except with one additional increment of Class thickness (approximately 0.030) added for corrosion allowance in addition to the standard 0.080" in the design. Unless designated otherwise on the Drawings or in the proposal, thickness Classes shall be as follows:

Nominal Size, Inches	Thickness Class
3-4	52
6-12	51
14-16	52
18-20	53
24	54
30-54	55

Flanged pipe in all sizes shall be ductile Iron thickness Class 53 conforming to ANSI A21.15/AWWA C115.

Each length of pipe shall be hydrostatically tested during manufacture at 500psi.

All iron pipes shall have standard thickness cement mortar lining and bituminous seal coating on the inside in accordance with ANSI/AWWA C104.

Coat pipe exteriors with 1-mil minimum thickness of asphalt varnish for buried service or one coat of paint primer for exposed service and subsequent field painting.

Pipe shall be manufactured in nominal laying lengths of 18 or 20 feet.

2. Joints and Materials - Mechanical joints and accessories shall conform to ANSI A21.11/AWWA C111.

The bolts and nuts shall be corrosion resistant high strength low alloy steel ("Cor-Ten"). The pressure rating of mechanical joints shall be the same as the fitting or pipe.

Push-on joints with rubber gaskets shall comply with ANSI A21.11/AWWA C111. The pressure rating of slip-on joints on fittings and pipe shall be as follows:

Size, Inches	Rating, psi
18" and smaller	350
20"	300
24"	250
30"-54"	200

Flanged joints with threaded flanges and their accessories shall be factory fabricated and comply with ANSI A21.15/AWWA C115 with pressure ratings of 250psi. Flanges shall be flat-faced or plain-faced without projection or raised face. The bolt circle and holes shall match those of Class 125 ANSI B 16.1 (iron) or Class 150 ANSI B 16.5 (steel flanges, unless the drawings specifically require special flanges complying with Class 250 ANSI B 16.1 or Class 300 ANSI B 16.5).

Grooved and shouldered ("Victaulic") type joints shall comply with AWWA C 606. Pressure ratings shall be as published by the manufacturer.

Threaded or screwed joints shall comply with ANSI B 2.1 with modification to iron pipe diameters.

3. Fittings - Iron fittings shall comply with A.NSI/AWWA C110 for standard short-bodied fittings.

All fittings shall be ductile iron and gray iron shall not be permitted. The pressure rating for mechanical joint or slip joint fittings shall be 350psi in sizes four through twenty-four inches (4"-24") and 250psi in sizes thirty through fifty-four inches (30"-54") for ductile iron.

The pressure rating for flanged fittings shall be 250psi for all sizes in ductile iron.

Line fittings with standard thickness cement mortar lining and bituminous seal coating on the inside in accordance with ANSI/AWWA C104.

All fittings which are not flanged shall have an exterior 1-mil thick bituminous coating. Flanged fittings shall be given a shop coat or paint primer for exposed service and subsequent field painting.

D. HIGH DENSITY POLYETHYLENE PIPING (HDPE)

1. Pipe - The pipe shall be made of high density, extra high molecular weight polyethylene meeting the requirements of ANSI/AWWA C906-07, AWWA Standard for Polyethylene (PE) or latest revision thereof.

Pressure Pipe and Fittings, 4 inch through 63 inch for water distribution and ASTM D1248 for standard PE code designation of PE 2406, PE 3406, and PE 3408.

Pressure class ratings range form 40 psi (276 kPa) to 198psi (1365 kPa) for both PE 2406 and PE 3406 materials and from 51psi (352 kPa) to 254psi (1751 kPa) for PE 3408 material. As a result of the limiting 3-inch (76-mm) wall thickness, the maximum available pressure class rating is progressively reduced with increasing size for nominal pipe sizes larger than 20 inches (500 mm).

PE pipe, fittings and joints shall be made from PE material with the standard PE code designation as stated below and established in ASTM D3350 and ASTM D2837. In addition the hydrostatic design basis (HDB) shall be as shown below.

Standard PE Code Designation	PE Material, Minimum Cell Classification * ASTM D3350	Hydrostatic Design Basis at 73.4ºF (23ºC) ASTMD2837
PE 2406	PE 213333C	1250 psi (8.62 Mpa)
PE 3406	PE 324433C	1250 psi (8.62 Mpa)
PE 3408	PE 334434C	1600 psi (11.03 Mpa)

*The average of the results of the test values of a property determines the cell number, see ASTM D 3350. The cell numbers given for the second through fourth cells represent minimum cells-the cell number determined by actual test results can be higher than the minimum value for a material to qualify for a given PE code designation. For example, a PE of cell classification 224433C qualifies as a PE 2406.

Pressure Class

Material	PE 2406 PE 3406	PE 3408
Hydrostatic Design Basis (HDB)	1250 psi (8.62 Mpa)	1600 psi (11.03 Mpa)
Hydrostatic Design Stress (HDS)	625 psi (4.31 MPA)	800 psi (5.52 MPA)

Dimension Ratio	psig	(kPa)	psig	(kPa)
32.5	40	(275)	51	(352)
26	50	(345)	64	(441)
21	63	(434)	80	(434)
17	78	(538)	100	(538)
15.5	86	(593)	110	(593)
13.5	100	(689)	128	(883)
11	125	(862)	160	(1103)
9.3	151	(1041)	193	(1331)
9	156	(1076)	200	(1379)
7.3	198	(1365)	254	(1751)

If no pressure class is given on the drawings, Contractor shall use PE3406, DR11 polyethylene pressure pipe.

2. Joints and Materials - Polyethylene piping may be joined by thermal butt-fusion, flange assemblies, or mechanical methods. Polyethylene piping shall not be joined by solvent cements, adhesives (such as epoxies), or threaded-type connection. All joining methods shall be capable of conveying water at not less than the design pressure of the piping system and shall be recommended for use by the pipe manufacturer.

All HDPE pipe, fitting, and joints shall comply with NSF/ANSI 61 Drinking Water System components-Health Effects in addition to the requirements of the Safe Drinking Water Act. To comply with these standards, pipe manufacturer shall stamp each pipe and fittings to illustrate that each pipe and fitting complies with the NSF Standards.

Thermal butt-fusion is the most widely used method for joining large-diameter polyethylene piping. This procedure uses portable field-proven equipment to hold pipe and/or fittings in close alignment while the opposing butt-ends are faced, cleaned, melted, and fused together, and then cooled under fusion parameters recommended by the pipe and fusion equipment supplier.

For each polyethylene material there exist an optimum range of fusion conditions, such as fusion temperature, interface pressure, and cooling time. Before attempting fusion of polyethylene pipe, personnel should verify that they have this information for the material being joined. Thermal fusion shall be conducted only by persons who have received training in the use of the fusion equipment according to the recommendation of the pipe supplier or the equipment supplier.

In situations where different polyethylene piping materials must be joined, both pipe manufacturers should by consulted to determine the appropriate fusion procedures.

A polyethylene flange assembly consists of a metal back-up flange or ring and a polyethylene stub-end or flange adapter. The back-up flange is placed over the pipe profile and the stub-end, or flange adapter is then fused into the plain-end pipe.

Flanged joined methods may be used to make connections to alternate piping materials and to pumps, valves, and other appurtenances.

Other methods to join polyethylene pipe or to make service connections to polyethylene pipe are available. These include compression-type connectors, wraparound clamps, saddle fusion, and various quick-connect devices. Because these methods have certain performance limitations, they should be approved by the Engineer prior to use and after consultation with the pipefitting manufacturer.

3. Fittings - Fittings covered by this standard shall be made from the same material stated above and include all fittings intended to be joined to polyethylene piping by thermal heat fusion. Polyethylene fusion fittings may include one or more parts for effecting a mechanical connection, such as by compression or flange, to other piping. Polyethylene fittings may be molded, thermoformed from pipe sections, or fabricated by heat fusion joining polyethylene sheet or block. Molded fittings shall meet the requirements of ASTM D2683 for socket-type fittings, or ASTM D3261 for butt-type fittings, and the requirements of the AWWA 906 standard.

Fittings shall be homogeneous throughout and essentially uniform in color, opacity, density, and other properties. The inside and outside surfaces shall be semi matte to glossy in appearance and free from sticky or tacky material. The walls shall be free from cuts, cracks, holes, blisters, voids, foreign inclusions, or other defects that are visible to the naked eye and that may affect the wall integrity.

Molded fittings shall conform to the dimensional requirements set forth in the applicable ASTM fitting standard referenced above when measured as specified therein. Fabricated fittings shall meet the minimum dimensional requirements and tolerances of the pipe at the point of fusion.

Each polyethylene fusion fitting shall meet all the material requirements established for the pipe to which the fitting is to be joined. Fittings fabricated from pipe shall be manufactured from pipe stock with a wall thickness not less than 25 percent greater than that of the pipe to which the fitting is to be joined. The wall thickness of an outlet may be the same as the wall thickness of the pipe to which the outlet is to be joined.

In any event, each fitting shall be designed and manufactured to operate at not less than the design pressure of the pipe system for which it is intended. The fitting shall meet the five-second pressure test. The first fitting of a particular size and configuration made during production run of that fitting, and thereafter every fiftieth fitting of that production run, shall be subjected to the five-second pressure test.

E. FIBERGLASS REINFORCED THERMOSETTING RESIN PLASTIC PIPE (FRP)

1. Pipes - Pipe sized one through one hundred forty-four inches (1"-144") shall be glass fiber reinforced plastic pipe that conforms to AWWA C950. Sizes one through three inches (1"-3") shall be steel pipe outside diameter series (IPS - OD), sizes four through twelve inches (4"-12") shall be cast it-on pipe outside diameter series (CI -OD) sizes fourteen-through it sixty inches (14"-60") shall be either CI OD for use with cast iron fittings or net I.D. sizes of metric O.D. sizes for use with fabricated F.R.P. fittings, and sizes larger than sixty inches (60") shall be international metric practice outside diameter series. Sizes four through twelve inch (4"-12") shall be Type I, Grade 1, Liner B (filament wound, glass fiber reinforced, epoxy resin pipe with thermoplastic liner). Pipes shall be designed in accordance with AWWA C950, as modified hereinbefore. Unless designated otherwise on the Drawings, the minimum Pipe Stiffness for all sizes sixty inch (60") and smaller shall be 40psi Pressure Class 50 and 100 shall be prohibited and the minimum Pressure Class shall be 200 unless Pressure Class 250 is designated on the drawings.

Each length of pipe shall be hydrostatically tested at manufacture at a pressure of 2.0 times the Pressure Class; i.e., test at 400psi for Pressure Class 200.

Manufacturers are A. O. Smith-Inland, Armco-Corban, Clow, Johns-Manville, Owens-Corning, or equal.

Furnish pipe in nominal laying lengths of 20 feet.

2. Joints and Materials - Pipe and fitting joints shall be of integral bell-gasketed type conforming to ANSI/ASTM D3139. The long-term pressure rating on the joint shall be equal to that of the pipe. Pipe gaskets shall comply with ANSI/ASTM F477.

Joints in ductile iron fittings shall comply with ANSI A 21.11/AWWA C111 with either mechanical joint or push-on rubber gasketed joints. Bolts and nuts for mechanical Joints shall be high strength low alloy corrosion resistant steel ("Cor-Ten").

3. Fittings - Fabricated fittings shall be equal to the pipe in strengths and other applicable requirements.

Iron fittings shall comply with ANSI/AWWA C110 for cast iron pipe diameters (C.I.-O.D.) for standard short-bodied iron fittings. All fittings shall be ductile iron and gray iron shall not be permitted. The minimum pressure rating shall be 350psi for sizes four through twenty-four inches (4"-24") and 250psi for sizes thirty through fifty-four inches (30"-54") with ductile iron. Fittings shall be standard thickness cement mortar lined and bituminous scaled in accordance with ANSI/AWWA C104. Fittings shall have an exterior 1-mill thick bituminous coating.

Note: All fittings shall have proper external thrust restraint.

F. LARGE STEEL PIPING (STL)

1. Pipes - Steel pipe in sizes 6" and larger shall conform to AWWA C200 or API 5L with dimensions conforming to ANSI/ASTM A53. It shall be fabricated seamless, butt-welded, or spiral or straight-seam mill type pipe. Welding shall be only electric resistance or double submerged arc. Continuous butt-welded will be unacceptable. The grade of steel shall meet or exceed the minimum requirements of ASTM A283, Grade D plate with 33,000psi yield and 60,000 psi tensile strengths. ASTM A36 plate with 36,000 yield and 58,000psi tensile strength, ASTM A570, Grade D sheet with 40,000psi yield and 55,000psi tensile strengths, or A.P.I. 5L, Grade B with 35,000psi yield and 60,000psi tensile. The nominal pipe thickness shall be designed on the basis of the method specified hereinbefore for all pipe materials, except for design stress including surge of 16,500psi, which is approximately a 2.0 safety factor on the yield stress, plus an under thickness tolerance of 0.010" for plate or 12.5% for seamless pipe and sheets, with no corrosion allowance but with corrosion protection as specified hereafter.

When the thickness of the pipe is not designated, the ratio of outside diameter to nominal thickness shall be 115 based on criteria for 5% maximum ultimate design deflection.

Each length of pipe shall be hydrostatically tested at manufacture to 1.33 times the maximum working pressure rating or to a stress, which is 75% of the yield point stress.

All pipes shall be furnished in the longest practical standard lengths of not less than forty feet (40').

The Contractor shall submit six (6) copies of drawings of pipe, fittings and fabricated specials along with data on the pipe, coating and lining and diameters and thickness for approval before pipe delivery.

2. Joints - Buried field joints shall generally be manufacturer's standard bolted steel couplings or full circle stainless steel clamps. Above ground joints shall be butt-welded, flanged or grooved and soldered, as indicated by the drawings. Flanges shall have equal or greater pressure rating as the pipe. Unless designated otherwise on the drawings, steel flanges shall comply with AWWA C207 Class D with minimum pressure rating of 175psi for four through twelve-inch sizes (4"-12") and 150 psi for larger sizes. The diameters, drilling and number of bolts match ANSI B 16.1 (iron flanges) Class 125, and in sizes twenty-four inches (24") and smaller, they also match ANSI B 16.5 (steel flanges) 150psi. They do not match Class 250 of ANSI B 16.1 or 300psi of ANSI B 16.5. Grooved and soldered joints shall conform to AWWA C606.

3. Fittings - Fabricated fittings and specials shall have thickness equal to or greater than the pipe with dimensions conforming to AWWA C208. Manufactured seamless fittings for butt- welding in sizes 6" through 24" shall be Standard Weight in compliance with ASNI B 16.10 with dimensions complying with ANSI B 16.9 with long radius (R-1-1/2D) bends except where space limitations justify special bends complying with ANSI B 16.2B.

G. SMALL ALLOY STEEL PIPING (A.S.)

1. Pipes - Steel pile sized one-half inch through four inch (½"- 4") for operating pressures to 150psi shall be either high-strength low-alloy steel pipe or austenitic stainless steel.

High-strength low-alloy ("Yoloy") steel pipe shall be Class 4 (corrosion resistance approximately 4 times that of plain carbon steel), Grade IV, Type F (continuous welded) conforming to ANSI/ASTM. A714. The pipe shall be standard weight Schedule 40 with bare surface and plain ends for welding flanged connections or with galvanized surface and threaded and coupled ends for screwed connections.

Stainless steel pipe shall conform to ANSI/ASTM. A312, Grade TP 304 or TP 304L with dimensions conforming to ANSI B 36.19. Pipe shall be lightweight Schedule 10 S with plain ends when used for shop prefabricated flanged sections and standard weight

Schedule 40 S with threaded ends for screwed connections.

Each length of pipe shall be hydrostatically mill tested in accordance with the respective standard.

2. Joints - Connecting joints shall be either flanged or screwed unless a preference is shown on the Drawings. Flanged joints shall comply with ANSI B 16.5 for Class 150. Threaded joints shall comply with ANSI B 2.1, American National Standard for Pipe Threads.

3. Fittings - Butt-welding fittings for use with welded high-strength low alloy pipe shall comply in applicable respects with Class 4, Grade IV of ANSI/ASTM A714 as manufactured by Babcock & Wilcox.

Screwed fittings for use with high-strength low alloy pipe shall be galvanized malleable iron Class 300 only conforming to ANSI B 16.3/ASTM A338. Class 150 fittings shall be prohibited. Hot dip galvanizing shall conform to ANSI G 8.14/ASTM A153.

Butt-welded fittings for use with austenitic stainless steel pipe shall be Schedule 10 S and comply with ANSI/ASTM A403, Class CR 304 or CR 304L, and forged or rolled alloy-steel pipe flanges shall comply with ANSI/ASTM A182, Grade F 304 or F 304L.

H. COPPER TUBING AND FITTINGS:

1. Pipe and Fittings: Pipe and fittings for interior installation shall be "Type K", soft temper conforming to ASTM Specification B-88, latest revision, with wrought copper solder joint fittings conforming to ASA B-16.22, latest revision.

Pipe and fittings for exterior installation shall be "Type L", hard temper conforming to ASTM Specification B-88, latest revision, with wrought copper solder joint fittings conforming to ASA B-16.22, latest revision.

2. Joints: Joints shall be made using a 95-5 tin antimony solder, and shall comply with all state and local plumbing codes and regulations. Joints shall be prepared in full accordance with the solder manufacturer's recommendations.

3. Couplings: Couplings shall have 150 psi minimum pressure rating and conform to AWWA C800. Cast brass shall be copper alloy UNS number C 83600 conforming to ASTM B62 or ASTM B584.

I. CAST IRON SOIL PIPE AND FITTINGS:

1. Pipe and Fittings: Pipe and fittings shall be of extra heavy construction conforming to CS 1880 or CS 301, latest revision. Pipe may be of the hub or hubless type.

2. Joints: Joints may be of oakum and soft lead using 12 ounces of lead per inch of pipe diameter or of the hubless type using a stainless shield and clamp assembly with an electrometric sealing sleeve.

J. COPPER TUBING AND FITTINGS:

1. Pipe and Fittings: Pipe and fittings for interior installation shall be "Type L", hard temper conforming to ASTM Specification B-88, latest revision, with wrought copper solder joint fittings conforming to ASA B-16.22, latest revision.

Pipe and fittings for exterior installation shall be "Type L", soft temper conforming to ASTM Specification B-88, latest revision, with wrought copper solder joint fittings conforming to ASA B-16.22, latest revision.

2. Joints: Solder joints shall be made using a 95-5 tin-antimony solder, and shall comply with all state and local plumbing codes and regulations. Joints shall be prepared in full accordance with the solder manufacturer's recommendations. Flared couplings shall comply with AWWA C800, latest revision.

K. REINFORCED CONCRETE SEWER PIPE AND FITTINGS:

1. Pipe and Fittings: Pipe and fittings shall conform in all respects to ASTM Specification C-76, latest revision. Pipe and fittings shall be Class IV unless otherwise indicated on the drawings.

2. Joints: Joints shall be of the tongue and groove type, and shall include a rubber gasket of such texture to assure a watertight and permanent seal. The joints shall conform to ASTM Specification C-361, latest revision.

L. CORRUGATED METAL PIPE AND FITTINGS:

1. Pipe and Fittings: Pipe and fittings shall conform in all respects to AASHO Specification M-36, latest revision. Unless otherwise indicated on the Contract Drawings, or in the Specifications, the pipe shall be designed for a H-20 loading. Pipe and fittings shall be supplied with a bituminous coating inside

and outside.

2. Joints: Joints shall be made with couplings and steel bands, and shall be assembled in accordance with the manufacturer's recommendations.

2.03 PIPE ANCHORAGE AND SUPPORTS

A. Exposed Pipe Hangers and Supports:

1. Piping shall be firmly held in place by adjustable clevis hangers as manufactured by Penn Pipe Hanger Company, Unistrut Corporation or equal. Hangers shall be placed at each offset or change in direction, at ends of braches over 5 feet in length, at riser pipes and along piping as necessary to prevent sags, bends, or vibration. Hangers used in conjunction with steel pipe shall be zinc plated. Hangers used with insulated piping shall be large enough to accommodate the pipe plus insulated pipe support. No piping shall be supported by any wire, rope, wood, plumber's tape, band iron, wire hooks, U-bolts, or other make-shift devices.

2. Inserts in poured concrete slabs shall be cadmium coated wrought iron to receive machine bolt head or nut after installation and permit adjustment of this bolt in the horizontal direction. Beam clamps shall be used to attach hanger rods to structural steel, and lag screws shall be used to attach hangers to wood construction. Vertical risers shall be supported with concealed pipe clamps as required.

3. Insulated pipe supports shall be a shop fabricated or manufactured item consisting of a galvanized sheet metal saddle enclosing the bottom third of the bore coated non-compressible cellular glass insulation when fiberglass pipe insulation is used and non-compressible foam plastic insulation when flexible foam plaster pipe insulation is used, which shall insulate and support the weight of the pipe at each hanger and pipe guide. Insulation shall have a fire retardant, vapor barrier jacket, which shall be bonded to the saddle. Insulation and jacket shall extend a minimum of 2" beyond the saddle.

4. Pipe support shields shall be as manufactured by Unific Products, Inc., Steelton, Pennsylvania; Insul-Coustic Corp, Sayreville, New Jersey; or equal.

5. Concrete supports shall be utilized where shown on the Drawings or as required to assure no pipe movement or settlement occurs. Supports shall be constructed in full accordance with Division 3 of these Specifications.

B. Pipe Anchorage for Buried Lines Under Pressure:

1. All plugs, caps, tees, crosses or bends deflecting 22-1/2 degrees or more on pipelines 3 inches or larger shall be provided with a reaction backing, or movement shall be prevented by attaching suitable metal rods, or clamps as shown on the drawings or directed by the Engineer. Metal harness of tie rods or clamps shall be galvanized or otherwise rust proofed.

2. Reaction backing shall be concrete in accordance with standard drawings. Backing shall be placed between solid, undisturbed ground and the fitting to be anchored; the area of bearing on the pipe and on the ground in each instance shall be as directed by the Engineer. The backing shall, unless otherwise shown or directed, be so placed that the pipe and fitting joints will be accessible for repair.

2.04 MISCELLANEOUS PIPING, DRAINS, APPURTENANCES AND PIPING

Accessories: All miscellaneous piping, drains, appurtenances and piping accessories shown or listed on the Contract Drawings shall be installed in accordance with the Manufacturer's recommendation and as specified herein. It is the intent of this subsection of the Specifications to describe those appurtenances and accessories to be supplied for use with the mechanical process, air, sludge, and potable water piping systems shown on the Contract Drawings; specific plumbing fixtures such as urinals, lavatories, and water closets are described in Division 10 of the Specifications.

A. Strainers - Strainers with perforated monel metal, removable, 100 mesh screens shall be provided and installed in the flushing water seal lines to pumps and as shown on the drawings.

B. Flexible Expansion Joints - Flexible expansion joints shall be furnished and installed at the locations indicated on the drawings. Expansion joints provided shall be of the multiple arch-type designed to absorb mechanical vibration, reduce noise and allow for thermal expansion and contraction. Flexible joints shall be hydrostatically tested to 1.5 times the operating pressure.

Flexible expansion joints furnished shall be protected with a seamless tube, leak-proof lining made of reinforced rubber. The joint body shall be constructed of a synthetic rubber compound, recommended by the manufacturer. The expansion joint body shall be adequately reinforced with fabric reinforcement, wire and/or solid steel rings, as required, to provide joint rigidity and strength for the rated working pressure. The exterior surface of the expansion joint shall be formed from neoprene or other material as recommended by the manufacturer for the application.

Expansion joints shall be flanged with ANSI Class 150 standard drilling pattern. Flanges shall be provided with galvanized steel split retaining rings to be placed directly against the inside of the flanges of the expansion joint to prevent damage to the cover body surface when bolts are tightened. Steel washers shall be used where rings are split.

Expansion joints shall be manufactured by Redflex Division of Red Valve Company, Garlock, Inc., Holtz Rubber Company, or equal. Flexible expansion joints shall be installed and supported in accordance with manufacturer's recommendations for the specific application.

C. Vibration Fittings - Vibration fittings (elbows and spools) shall be installed at locations as shown on the drawings. Fittings shall consist of a rubber tube with nylon fabric reinforcement and synthetic rubber outer covering with steel wire reinforcement. Fittings shall be complete with integral 150-pound ANSI standard flanges. Fittings shall be Redflex or equal.

D. Hose Bibs (Inside) - Inside hose bibs shall be of brass construction, with compression valve and provided with a heavy brass C.P. wing elbow for bolting to the wall. Hose bibs shall be located generally where shown on the drawings, but exact location and height shall be as directed by the Engineer. Hose bibs shall be equipped with vacuum breakers.

E. Hose Bibs (Outside) - Outside hose bibs shall be of the non-freeze type, heavy brass construction with 3/4" hose connection, polished brass face, neoprene washers and tee handle key. Bib shall be No. 1400N as manufactured by Josam, or equal. Hose bibs shall be located generally where shown on the drawings, but exact location and height shall be as directed by the Engineer. Hose bibs shall be equipped with vacuum breakers.

F. Rainwater Conductors - Rainwater conductors inside the buildings shall be galvanized iron, steel or Schedule 40 Polyvinyl Chloride (PVC). Galvanized fittings shall be long turn galvanized cast iron, recessed drainage type. PVC fittings shall conform to ASTM Specification D 2466-73, latest revision. All conductors and fittings shall be insulated as indicated on the Contract Drawings.

G. Roof Drains - Roof drain fittings shall be of cast iron with high dome. The drain shall be suitable for installation on steel roof deck with recessed drainage sump. The roof drain shall be equal to Josam, Series 4550 with removable dome, Neenah, or equal.

H. Floor and Drip Drains - All floor drains shall be equal to Josam, Series 300, Zurn or equal, with cast iron body with lacquer finish. All drip drains shall be equal to Josam 300 EI, Zurn or equal with 7 inch extended rim, tractor grate, and drainage flange.

I. Trench Drains - Trench drain grates and frames shall be cast iron, rectangular type equal to Series VTFG-HD by Vulcan Foundries.

J. Cleanouts - Each vertical soil, waste, vent piping and rainwater conductor shall be fitted with a combination test tee and cleanout fitting. The fitting shall be installed at the floor level. Cleanouts full size up to four inches (4") shall be provided at all changes of direction on horizontal drainage lines at intervals of not greater than 40 feet on straight runs. Cleanouts shall be concealed or brought up to floor level as indicated on drawings. Cleanouts used with extra heavy cast iron soil pipe shall be iron body ferrules, with brass or bronze raised hex head plug. Where cleanouts are to be raised to finished floor level, the cleanouts shall be similar to Zurn Z-1326 series, Josam, or equal. In area of tile, the floor cover shall be recessed; in all other cases cover shall be scoriated bronze cover and frame.

Cleanouts below grade shall be equal to Zurn Z-1326, Josam or equal. Cleanouts above grade shall be Zurn 1326-Z, Josam or equal.

All buried traps shall have cleanout connections on top of trap, which shall be brought to finished floor and be fitted with a Zurn Z-1326 Cleanout with scoriated bronze cover and frame.

All exterior cleanouts shall be brought to grade, 4 inch in size, and terminated with a Zurn 1325-12 Cleanout with scoriated Dura coated cover and frame, and encased in a 16 inch x 16 inch x 8 inch deep concrete pad.

K. Wall Sleeves - Wall sleeves shall be utilized where indicated on the Contract Drawings and shall be caulked type or of the mechanical joint adapter sleeve type. Sleeve shall permit the pipe to pass through the wall. Space between the pipe and sleeve shall be sealed with Link-Seal or equal. All wall sleeves shall be of cast iron construction.

L. Wall Pipe - Wall pipe shall be utilized where indicated on the Contract Drawings, and shall be a solid casting with water stops for all piping three inch diameter and larger passing through the structural concrete. The casting shall be supplied with the type of end connections specified on the Contract Drawings.

M. Storm Drainage Inlet Castings - Shall be Neenah Foundry series R-4030, or equal, for flush installations. Shall be Neenah Foundry series R-4350, or equal, for beehive installations.

N. Pipe Insulation - The Contractor shall furnish and install pipe insulation material as indicated on the drawings. Insulation shall be fiberglass enclosed in preformed aluminum jacket, one inch thick, such as Johns-Manville "Micro-Lok 650" or equal.

O. Sleeve Coupling - Shall be cylindrical steel ring type with resilient gaskets and high strength stainless steel bolts as manufactured by Dresser Industries, Rockwell or equal.

2.05 LEAD FREE PIPING

In accordance with the Louisiana Sanitary Code (LAC 51:XII) Chapter 3, Section 335 (D), all installations of, or repairs to, public water systems or residential and nonresidential plumbing facilities that provide drinking water and which are connected to a public water supply shall be made using lead free piping, solder, and flux. The only exception to this general requirement is that leaded joints necessary for the repair of cast iron pipes may be allowed. For these purposes, lead free, when used with respect to solder and flux, refers to solder and flux containing no more than 0.2 percent lead. Additionally, when used with respect to pipes and fittings, lead free refers to pipes and fittings containing no more than 8 percent lead. Please note that the LA Legislature enacted Act 362 in 2011, which became effective on January 1, 2013, which reduced the term “lead free” from not containing more than 8% lead to no more than a weighted average of 0.25% lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

PART 3 - EXECUTION

3.01 INSTALLATION OF INTERIOR PIPING AND APPURTENANCES

A. Grade and Alignment - All interior piping shall be installed in a workman like manner in accordance with the grade and alignment shown upon the drawings, or as directed by the Engineer.

B. Supports for Pipe Appurtenances - All water, process, chemical and air piping, valves, meters, fittings, controllers and etc., shall be firmly and satisfactorily supported in a neat and professional manner by suitable blocks or pedestals of cast iron or concrete or by steel beams, hangers, columns, or other suitable methods. Where shown by the drawings or where required for stability or where directed by the Engineer, the pipe shall be accurately built into or supported upon approved concrete structures.

C. Installation of Pipe and Appurtenances - All piping shall be assembled in accordance with the layout shown on the drawings, and in accordance with the layout shown on the drawings, and in accordance with the manufacturer's recommendations, with only such modifications as may be necessary to conform to the final detail dimensions of pumps, tanks, valves, meters, existing piping, etc. Any piping modifications required shall be approved by the Engineer, and at no additional cost to the Owner.

All piping shall be assembled so as to be free from strain and shall be securely supported and blocked with concrete, cast iron pedestals, hangers, or other suitable supports, as shown, directed, or as may be necessary to prevent settlement or other movement.

3.02 INSTALLATION OF EXTERIOR PIPING AND APPURTENANCES

A. Grade and Alignment - All exterior piping shall be installed in a workmanlike manner in accordance with the grade and alignment shown on the drawings, or as directed by the Engineer.

B. Supports for Pipe and Appurtenances - Where required or indicated on the drawings, exterior piping, valves, fittings, and etc., shall be firmly and satisfactorily supported in a neat and professional manner by suitable concrete thrust blocks or pads with steel reinforcement rod anchors or other approved methods.

C. Installation of Pipe and Appurtenances - All piping shall be assembled in accordance with the layout shown on the drawings, and in accordance with the manufacturer's recommendations, with only such modifications as may be necessary to conform to the final detail dimensions of connections, valves, fittings, existing pipes, etc. Any piping modifications required shall be approved by the Engineer, at no additional cost to the Owner. All piping shall be assembled so as to be free from strain.

Trench shall be excavated to provide a uniform and continuous bearing for pipes. For backfilling and compaction, requirements for pipe trenches, refer to Division 2 of these Specifications.

D. Installation of Pipe Underground - All ductile iron piping buried shall have a polyethylene encasement conforming to ANSI A21.5/AWWA C105 having a minimum thickness of 0.008 inches minus 10% tolerance.

3.03 COLOR CODING AND PIPING IDENTIFICATIONS

In order to facilitate identification, all exposed interior piping shall be identified and color-coded as specified in Division 9 of these Specifications.

3.04 PIPE TESTING

A. Hydrostatic Testing for Pressure Lines:

1. Leakage Test Requirements:

a. After the pipe has been laid and backfilled as specified, all newly laid pipe, or any valved section thereof, shall be subjected to a pressure of 150 pounds per square inch, or 50% in excess of the normal working pressure, whichever is greater, as directed by the Engineer.

b. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section thereof, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.

c. No pipe installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formula:

$$L = \frac{ND\sqrt{P}}{7400}$$

in which "L" equals the allowable leakage in gallons per hour; "N" is the number of joints in the length of pipeline tested; "D" is the nominal diameter of the pipe, in inches, and "P" is the average test pressure during the leakage test, in pounds per square inch gauge.

d. All pipelines located below concrete slabs or foundations shall be pressure tested prior to the installation of concrete slabs or foundations.

e. A hydrostatic pressure and leak test form shall be completed on each segment of line tested.

2. Duration of Test: The duration of the test under pressure shall be two hours.

3. Procedure: Each valved section shall be slowly filled with water and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The pump, pipe connections, and all necessary apparatus, including gauges, shall be furnished by the Contractor. The Contractor will make all taps into the pipe, and furnish all necessary assistance for conducting the tests.

4. Expelling Air Before Test: Before applying the specified test pressure, all air shall be expelled from the pipe. If hydrants or blow offs are not available at high places, the Contractor shall make the necessary taps at points of highest elevation before the test is made and insert the plugs after the test has been completed. If high point is indicated on drawings, corp stops shall be installed at designated areas.

5. Variation from Permissible Leakage: Should any of pipes laid disclose leakage greater than that specified above, the Contractor shall, at his own expense, locate, repair, and replace the defective joints, pipe or fittings until the leakage is within the specified allowance.

6. Time for Making Test:

a. Asbestos cement pipe shall be filled with water a minimum of 24 hours prior to making any leakage tests. All other pipe may be subjected to hydrostatic pressure and inspected and tested for

leakage at any convenient time after the trench has been partially backfilled except at the joints in accordance with the specifications. The leakage allowance for all mains shall be that specified above.

b. Where any section of a main is provided with concrete reaction backing, the hydrostatic pressure test shall not be made until at least five days have elapsed after the concrete reaction backing was installed. If high early strength cement is used in the concrete reaction backing, the hydrostatic pressure test shall not be made until at least two days have elapsed.

B. Alignment Test for Pressure Lines:

1. Prior to backfilling of pressure lines, the joint alignment shall be inspected to assure the maximum deflection present in each joint does not exceed the manufacturer's recommendations.

2. Pressure lines, which are a portion of a pump discharge system, shall be inspected to assure the line is installed at a constant or increasing grade so as to eliminate the possibility for air accumulation at an intermediate high point.

3. Any and all defects shall be corrected by the Contractor at no additional cost to the Owner and to the satisfaction of the Engineer prior to backfilling. This shall be completed before the work shall proceed and before acceptance of and/or payment therefore shall be made.

C. Alignment, Infiltration and Leakage Testing for Gravity Lines:

1. General: All mains, which are not a portion of a pressured system shall be subjected to alignment and leakage tests as herein specified.

2. Alignment Test:

a. After the mains have been laid and backfill placed to a depth of one and one-half (1-1/2) feet above that of the pipe, a light will be flashed between manholes, manhole locations or the terminus of the main to determine whether the alignment of the main is true and whether any pipe section has been displaced, broken, or otherwise damaged subsequent to laying. This test will again be conducted before acceptance.

b. If a segment of gravity line is determined by the Engineer possibly to be out of alignment, the Contractor will be required to pull a test mandrel to ensure that no pipe shall exceed a deflection of five (5) percent.

c. Any and all defects shall be corrected by the Contractor, and at no additional cost to the Owner and to the satisfaction of the Engineer, before the work shall proceed and before acceptance of and/or payment therefore shall be made.

3. Leakage Tests:

a. Exfiltration Test: Each section of the main between manholes or terminus of the main shall be tested for exfiltration as directed by the Engineer at the Contractor's expense. Leakage from (exfiltration) the main shall not exceed 100 gallons per day, per inch diameter, per mile of pipe when a minimum internal pressure of two feet of water over the crown of the pipe is maintained at the upper location, two feet above high ground water level, or maximum operating water level to which the main will be subjected, whichever is greater. When leakage exceeds the specified amount, corrective action shall be taken by the Contractor to bring it within said limits before acceptance. All sections of the main and its appurtenances shall be properly braced against thrust due to water pressure.

b. Air Testing: The Contractor, at his option, may test each section of main using low-pressure air. The pipe shall be considered acceptable if the air loss rate does not exceed 0.0030 cubic feet per minute per square foot of internal pipe surface when tested at an average pressure of 3.0 psig greater than the average back pressure exerted by the ground water on the backfilled main or the maximum operating water level to which the main will be subjected, whichever is greater. The time for the air pressure to decrease 1.0 psig from 3.5 to 2.5 psig greater than the test pressure specified shall not be less than the time indicated in the following table:

Pipe Diameter	Minutes	Seconds
6"	2	55
8"	3	57
10"	4	43
12"	5	40
15"	7	5
18"	8	30
21"	9	50
24"	11	20
27"	12	45
30"	14	10
36"	17	00
42"	19	50
48"	22	40

If the above rates of leakage are exceeded, corrective action shall be taken by the Contractor to bring it within said limits before acceptance.

A minimum period of 2 minutes shall be provided to allow equilibrium of the air temperature with pipe wall before test readings shall commence. In areas of known high ground water conditions, the Contractor shall determine the height of the ground water above the main by piezometric tube or other methods approved by the Engineer.

The Contractor shall submit to the Engineer for approval the test procedure and list of test equipment he proposes to use prior to testing.

D. Pressure Testing for Air Lines:

1. All air piping and appurtenances shall be tested with air at a pressure of 120 pounds per square inch (psi) for a two-hour test period.

2. Backfilling will be permitted before testing, only where, in the opinion of the Engineer, it is necessary for safety or the protection of property. All leakage apparent on testing must be repaired before backfilling. Pipe shall hold pressure with no more than 1 pound drop per hour at uniform temperature, within 1 degree more or less.

3. While pressure test is on, each joint shall be tested for bubbling air with soapsuds brushed on to form a solid film about pipe and fitting joints. Any leakage shall be stopped before backfilling.

4. After each test and inspection of joints in a section is completed, a 2-inch valve on the laying end of the pipeline shall be suddenly opened to blow dust from the pipe.

5. The Contractor shall furnish all necessary equipment for testing, including air compressor and an accurate pressure gauge.

6. All testing shall conform to the Code for Pressure Piping (American Standard) as approved by the American Standards Association and published in 1942 (ANSI B 31.1), together with current supplements.

3.05 CLEANING AND STERILIZATION

A. General - All water lines shall be flushed and purged of all loose scale and debris prior to installing or connecting new lines. All airlines or gas lines shall be flushed and purged of all lose scale and debris prior to installing equipment. All yard piping, sewers, and force mains shall be flushed and cleaned of all loose material and debris prior to acceptance. All cleaning and sterilization shall comply with LAC51XII.353.A.

B. Sterilization of Potable Water Lines - All water lines noted on the drawings as potable water lines shall be sterilized prior to acceptance. Prior to sterilization, the lines shall be flushed as thoroughly as possible with the water pressure and outlets available. Flushing shall be done after the line pressure test has been made.

The sterilization procedure shall be in accordance with the Slug Method as outlined in AWWA C651-99 AWWA standards for Disinfecting Water Mains or the latest revision thereof. All disinfection procedures shall have a minimum of 50 ppm free chlorine for a period of at least three (3) hours prior to collection of samples by the Health Department. All disinfection procedures shall comply with the state sanitary code and these standards.

Contractor shall obtain from the Board of Health on acceptable test prior to placing the water main in service.

END OF SECTION

TECHNICAL SECTION
DIVISION 15 - MECHANICAL
SECTION 15020 - VALVES & APPARATUS

PART 1 – GENERAL

1.01 SCOPE

All valves and appurtenances shown or listed on the drawings shall be installed as indicated or detailed on said drawings or as directed by the Engineer, and shall be as specified in this Section of the specifications.

1.02 SUBMITTALS

Within ten (10) calendar days after award of the Contract, the Contractor shall submit to the Engineer for approval:

A. Complete list of materials and items proposed to be furnished and installed under this Section.

B. Manufacturer's specifications and other data required to demonstrate compliance with these Specifications.

C. Manufacturer's recommended installation procedure which when approved by the Engineer shall become the basis for inspection and acceptance or rejection of the Work.

PART 2 – PRODUCTS

2.01 VALVES

A. Gate Valves 2 inches and Larger - All gate valves two (2) inches and larger shall conform in all respects to A.W.W.A. Specification C509, Resilient Seat Gate Valves, latest revision. All valves shall be of the non-rising stem type, with iron body full bronze mounted. Gate valves shall be of such design as to maintain the full area of the pipe through the valve when open. Valves shall be pressure rated for 200psi unless otherwise indicated on the drawings.

Valves shall open left (counter-clockwise) and shall be supplied with operators as indicated on the Contract Drawings and specified herein.

1. Exposed manually actuated valves shall be hand wheel actuated unless otherwise indicated on the drawings. Hand wheel operators shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering.

2. Valves installed in overhead pipelines where the centerline of pipe is 8 feet or more above the floor shall be provided complete with geared chain wheel operators. Chain guides shall be provided. Chains shall reach within four feet of the floor. Chains shall be galvanized.

3. Buried valves shall have 2-inch square cast iron operating nuts. Operating nut shall be extended to within 12 inches of finished grade. Each valve shall also be supplied with a roadway type valve box and valve wrench.

4. Where indicated on the drawings, valves shall be provided with extension stems and either cast iron floor boxes or floor stands. Floor stands shall be cast iron, medium duty, with indicators. Extension stems shall be cold rolled steel complete with necessary steady bearings and couplings required to complete the installation indicated. Ratio of total stem length to radius shall not exceed 150.

5. All operating nuts, hand wheels, and chain wheels shall have the direction of opening cast on them.

6. Gate valves installed in buried vertical pipelines shall be provided with bevel gears and enclosed gear cases. Gearing shall be in accordance with the valve manufacturer's recommendations as required to permit easy operation of the valve by one man without excessively large hand wheel or cranks.

Gate valves above grade or exposed shall be supplied with flanged ends in accordance with A.S.A. Class 125, unless otherwise indicated on the drawings, and shall be of the non-rising stem type.

Buried valves shall be supplied with mechanical joint end connections. Valves shall be as manufactured by Crane, Clow, Mueller, Dresser, American Cast Iron Pipe Co., or equal.

B. Gate Valves Smaller than 2 Inches - Valves shall be 150-pound wedge disc non-rising stem brass gate valves with screwed or flanged ends as described in the Drawings. Valves shall be Crane No. 437, or equal. Valves shall be supplied with hand wheel operator.

C. Knife Gate Valves - Valves shall be of the bonnet-less type with fully flanged connections. Flanges shall be drilled to ANSI 125/150 pound standard. Valve pressure rating shall be 150psi in sizes 2 inch through 24 inch and 125psi in sizes 30 inch and 36 inch. Valves shall be by DeZurick or equal.

Knife valves shall have resilient seats. Valve bodies shall have wetted parts of type 304 or 316 stainless steel. The gate shall have a knife-edge and both sides shall be finish ground. The stem shall be stainless steel.

Knife valves shall be supplied with operators as shown on the Contract Drawings.

D. Plug Valves - Valves shall be non-lubricated, eccentric type with resilient faced plug, with screwed, flanged, or mechanical joint ends as shown on the drawings. Port areas shall be at least 80% of the full pipe area. Valve body shall be of semi-steel

unless otherwise noted on the drawings. Body seats shall be 90% nickel. Stem bearings shall be of corrosion resistant material. All nuts, bolts, springs and washers shall be zinc plated. Flanged valves shall be manufactured to ANSI B16.1 Class 125/150 standards, including facing, drilling, and flange thickness. Means of valve operation shall be as indicated on the drawings or as specified hereafter. The valves shall be as manufactured by DeZurik, Milliken or equal.

Plug valves shall be provided with means of operation as indicated on the drawings and as specified herein.

1. Valves four inches and smaller installed in other than buried or submerged locations shall be lever-operated, and a suitable lever shall be either permanently or semi-permanently attached to each valve.
2. Valves larger than four inches that are installed in easily accessible locations, but not included buried or submerged locations, shall be lever operated unless otherwise indicated or specified.
3. Buried valves shall have 2-inch square operating nuts extended to within 12 inches of finished grade. Each valve shall be supplied with a roadway type valve box and valve wrench. Submerged plug valves that are not indicated or specified to be operated from floor stands shall have extension stems, floor boxes, and 2 inch square operating nuts.
4. Submerged valves shall be operated by floor stands where indicated or specified. Where gearing is required for proper operation of submerged valves, the gearing shall be located in enclosed gear cases installed on the floor stand. Gearing shall be in accordance with the valve manufacturer's recommendations as required to permit easy operation of the valve by one man without excessively large hand wheel or cranks. Hand wheels shall not exceed 30 inches in diameter.
5. Extension stems, stem guides, operating levers, and other miscellaneous items required for a complete installation shall be provided in accordance with the requirements and recommendations of the valve manufacturer. Two tee handle valve operating wrenches shall be provided.
6. Gearing shall be provided where either indicated specified or recommended by the valve manufacturer. All gearing shall be provided in enclosed gear cases.
7. Buried plug valves shall be provided with adjustable cast iron valve boxes in accordance with requirements previously specified for valve boxes in connection with gate valves.
8. Valves installed in overhead pipelines where the centerline of pipe is 8 feet or more above the floor shall be provided complete with geared chain wheel operators. Chain guides shall be provided. Chains shall reach within four feet of the floor. Chains shall be galvanized.
9. All plug valves 10 inches and larger in easily accessible locations shall be provided with worm gear operators and hand wheels.

E. Butterfly Valves:

1. Liquid Service Valves: All butterfly valves for liquid service, unless otherwise noted on drawings or specified, shall be of the tight-closing, rubber seat type with rubber seats that are securely fastened to the valve body. Valves shall be bubble-tight at rated pressures with flow in either direction. Valves shall have fully threaded and tapped log type cast iron bodies. All butterfly valves shall meet the full requirements of A.W.W.A. Standard C504-70 for class 150B, and shall be as manufactured by the Henry Pratt Company, Centerline, or equal.

All butterfly valves installed underground shall meet design-for-burial specifications of A.W.W.A. Butterfly valves installed underground shall be Henry Pratt Company "Groundhog" valves, Centerline equivalent, or equal.

2. Air Service Valves: Butterfly valves shall have a Ductile Iron one piece ribbed body, wafer or lug style with Polyester Coating. Disc shall be a streamlined design of 316 Stainless Steel with a high strength Double D drive to ensure a positive shaft to disc connection and enable the disc to float inside the seat. No pins or bolts shall be exposed to the flow. Offset shaft retainers shall mechanically retain the shaft in the body ensuring a blow out proof design. The shafts shall be supported by two self lubricated bronze bearings, utilize triple shaft seals and shall incorporate an environmental shaft seal to keep contaminants from entering the shaft bore. The seat shall be FDA Food Grade EPDM rated to 275 F and shall be of the field replaceable phenolic bonded cartridge design. The seat shall have a primary and secondary flange seal and shall not require additional gaskets or O-rigs. Valves shall be rated to 200 psi, bi-directional, dead end service, and shall be vacuum rated to 29.92” of Mercury as manufactured by Flow Line Valves and Controls, Schriever LA or approved equal.

3. Valve Operators: Butterfly valves shall be supplied with operators as shown on the Contract Drawings and specified in Subsection 2.01-D of the Specifications. Lever operators for valves shall conform in all respects to A.W.W.A. Specification C509-79, latest revision, and shall be designed to hold the valve in any intermediate position between fully open or fully closed without creeping or fluttering.

F. Ball Valves:

1. Ball Valves Two Inches and Larger: All ball valves two inches and larger shall conform to AWWA C507-73, latest revision, Class 150, and shall be supplied with 150-lb. ANSI flanges. The valve body shall be of single-piece construction, and shall be ductile iron with stainless steel trim. The valve seat and all seats shall be TFEE-LOK, or equal.

Valves shall be of absolutely leak-tight construction and of the double seal design as manufactured by Henry Pratt Co., Jamesbury Corporation, Marpac Corporation, or equal.

Valves shall be supplied with operators as indicated on the Contract Drawings and specified in Subsection 2.01-D of the Specifications.

2. Ball Valves Smaller than Two Inches: All ball valves smaller than two inches shall be of all bronze construction, with TFE seals and seat. Valves shall have screwed end connections, and shall be lever operated, unless otherwise specified or shown on the Contract Drawings. Valves shall be Jamesbury Corporation "Clincher," Marpac equivalent, or equal.

3. Plastic Ball Valves: Plastic ball valves shall be utilized on chemical feed and chlorine gas lines, and shall be of PVC construction with Teflon seat and Viton O-ring seals. The shaft couplings shall be cadmium-plated steel. Valves less than three inches shall be supplied with true union or flanged end connections. Valves 3 inches and greater shall be supplied with Schedule 80 flanges faced and drilled to 150-lb. A.S.A. pattern. Valves shall be as manufactured by Chemtrol, or equal.

4. Ball Check Valves for Air Service: Ball check valves shall be rated for maximum operating pressure of 200psi, shall be suitable for air line service and shall operate equally effective in either the horizontal or vertical position. Ball check valves shall be of a design to insure free movement of ball and the ball shall be supported in such a manner as to provide full flow with minimum turbulence and chatter. Only inches of head pressure shall be required to seal and open the ball check valves. Ball check valves provided shall be constructed of materials and shall be furnished with threaded joints, which are compatible for connection to the air line piping provided.

G. Check Valves:

1. Liquid Service Valves Three Inches and Greater: Check valves three inches and larger shall be iron body horizontal swing check valves with outside lever and weight, unless otherwise indicated. Seats, seat rings, pins, bushings, shaft and hinges shall be constructed of bronze. Unless otherwise specified or indicated on the Contract Drawings, check valves shall be supplied with A.S.A. Standard Class 125 flanges.

Valves shall be designed for 150-lb. working hydrostatic pressure, unless otherwise indicated on the drawings and shall be as manufactured by Clow, Mueller, or equal.

2. Liquid Service Valves Less than Three Inches: Check valves less than three inches shall be of all bronze construction, and shall be supplied with threaded end connections. The valves shall be designed for a 150-lb. working pressure and shall be of the swing check type as manufactured by Crane, Kennedy, or equal.

3. Air Service Valves: Check valves to be installed on air lines shall be of wafer type construction, with aluminum intervals and silicone seal members. Valves shall be provided with cast iron body, and shall be provided with standard A.S.A. 125-lb. flanges.

Valves shall be rated for continuous duty at 300ºF, 35 PSIG, and shall be as manufactured by Hoffman Air and Filtration Division of Clarkson Industries, or equal.

4. Flexible Sleeve Check Valves: Flexible sleeve type check valves shall be furnished with cast iron body and flanges conforming to ANSI B16.1, Class 12.5. Sleeve material shall be neoprene with nylon fabric reinforcement. Valves shall be series 33 by Red Valve or equal.

5. Double Door Check Valves: Valves shall be compact design, with fully tapped and threaded lugs by Valve and Primer Corporation or equal.

Doors shall be spring loaded, normally closed, by means of one or more heavy-duty stainless steel torsion springs. Seating shall be resilient and water tight. The sealing element shall be Bune-N molded to the body. Body shall be of cast iron construction, doors shall be cast steel. Springs and shafts shall be T316 stainless steel.

H. Pinch Valves - Pinch valves shall be utilized only where specifically indicated on the Contract Drawings, and shall be a Series 75 valve as manufactured by Red Valve Company, Inc. or equal. The valves shall meet or exceed ANSI B16.10 Specification, and shall be provided with a hand wheel operator. The valve sleeve shall be Bune-N Rubber, and the valve body shall be cast iron.

I. Mud Valves - Mud valves shall be utilized only where specifically indicated on the Contract Drawings, and shall be the non-rising stem type. The valve body shall be cast iron. Stem, stem nut, disc ring and seat ring shall be bronze.

1. Rising stem bench standard shall be cast iron suitable for mounting on tank walls.

2. Floor stands shall be non-rising stem floor stands equipped with indicators. Floor stands shall be of cast iron with steel extension stem. Hand wheels shall not exceed 20-inch diameter.

J. Diaphragm Valves - Valve bodies and bonnets shall be cast iron. Valve bodies shall be lined with neoprene material. Valve bonnets shall be of the indicating-type with travel stop, suitable for hand wheel manual operators. All diaphragm valves shall be furnished with manual hand wheel type operators. Diaphragm material shall be EPT.

Straightway diaphragm valves furnished shall be close-coupled type with flanged ends. Flange drilling shall be in accordance with ANSI B16.5 Standard for Class 150 flanges. All valve joint accessories including gaskets, bolts and nuts shall be furnished with each diaphragm valve.

All straightway diaphragm valves shall be as manufactured by the ITT Grinnell Corporation, Clayton Valve Co., or equal.

K. Solenoid Valves - Solenoid valves shall be full port, normally closed type with current to open. Valves shall have one inch screwed connections, explosion proof solenoids with molded epoxy resin coils and NEMA 4 housing, and shall be designed for operation on 12 volt DC current, unless otherwise indicated. Valves shall be bronze body type with renewable discs, which can be replaced without removing valve body from piping system.

L. Liquid Pressure Reducing Valves - Pressure reducing valves shall be self-contained type all bronze body with screwed connections. Valves shall be capable of reducing pressure on water lines by field adjustments to approximately 5 pounds greater than the shut-off pressure of the pump for which the valve serves. Range of reduced pressure adjustment shall be 10 to 100 pounds.

M. Air Pressure Reducing Valves - Valves shall be self-contained, internal pilot, piston-operated type of cast iron and bronze construction. Valves shall be suitable for intended application in accordance with manufacturer's recommendations, and as per specified equipment requirements. Valves shall be as manufactured by Leslie Company, or equal.

N. Combination Air Release Valves - Combination valves shall consist of an air and vacuum valve and an air release valve rated for 125psi, completely piped and assembled together, with 1-inch gate between. Valve shall be series 1800 by Valve and Primer Company, APCO, or equal.

Air and vacuum valve shall be designed to allow large quantities of air to escape out the orifice when filling a pipeline and to close watertight when the liquid enters the valve. The air and vacuum valve shall also permit large quantities of air to enter thru the orifice when the pipeline is being drained to break the vacuum. The discharge orifice area shall be equal or greater than the inlet of the valve.

The valve shall consist of a body, cover, baffle, float and seat. The baffle will be designed to protect the float from direct contact of the rushing air and water to prevent the float from closing prematurely in the valve. The seat shall be fastened into the valve cover, without distortion, and shall be easily removed, if necessary. The float shall be stainless steel designed to withstand a minimum of 100psi. The float shall be center guided for positive shutoff into the seat.

All materials of construction shall be certified in writing to conform to A.S.T.M. specifications as follows:

Body, cover & baffle	Cast iron	ASTM A48,Class 30
Float	Stainless Steel	ASTM A240
Seat	Buna-N	
Exterior paint	Phenolic primer Red Oxide Steel	FDA Approved for Potable Water Contact

Air release valve shall be designed to release small pockets of trapped air as line fills under pressure. Valve shall be designed to open against internal pressure. Valve shall have cast iron body, stainless steel float; Buna-N seat, and Delrin and bronze linkage. All other internal parts shall be stainless steel or bronze.

O. Air Release Valves - Air release valves, size as indicated on the drawings, shall be as manufactured by Valve and Primer Company or equal.

Valves shall comply in all respects with Air Release Valve component of the Combination Air Release Valves as indicated on the drawings.

P. Telescoping Valves - Telescoping valves shall be of the general design indicated on the Drawings. Valves shall be equal to those manufactured by Walker Process Division of CBI, Envirex, or equal. They shall consist of a brass slip pipe, which slides in a cast iron enclosing pipe with a gland for seal. Clear travel of the slip pipe shall be as shown. Top of slip pipe shall feature 13-1/2 inch diameter (O.D.) flare. A substantial cast iron or steel operating stand shall support the slip pipe through an extension stem rigidly connected to the slip pipe. The slip pipe shall be positioned by a hand operator and the position of the outlet shall be indicated through a brass pointer on a graduated scale.

Q. Flanged Valves - All flanged valves shall be drilled and faced to the American 125-lb. standard template, and in accordance with ASA B16.1., unless otherwise noted on the drawings.

R. Electric Valve Actuators

1. General

a. Equipment Requirements: The actuators shall be suitable for use on a nominal 120V/single phase/60 Hz power supply and are to incorporate motor, integral reversing started, local controls and terminals for remote control and

indication connections housed in a self contained, seal enclosure. The actuator shall include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel irrespective of the connection sequence of the power supply. No special commissioning tools shall be required. In addition, provision shall be made for the protection of configured actuator settings by means of a password.

b. Actuator sizing: The actuator shall be sized to guarantee valve closure at the specified differential pressure. The safety margin of motor power available for seating and unseating the valve shall be sufficient to insure torque switch trip at maximum valve torque with the supply voltage 10% below nominal. The actuator shall be Auma Actuators SAR/GS combination for 90 degree service at 60 seconds operating time.

c. Environmental: Actuators shall be suitable for indoor and outdoor use. The actuator shall be capable of functioning in an ambient temperature ranging from -20°F (-25°C) to +140°F (+70°C), up to 100% relative humidity.

d. Enclosure: Actuators shall be 0-ring sealed, watertight to NEMA 4X/6 (6 feet for 30 minutes) and shall at the same time have a watertight and dustproof plug and socket seal between the terminal compartment and the internal electrical elements of the actuator. Enclosure must allow for temporary site storage without the need for electrical supply connection. All external fasteners shall be of stainless steel. Gear case shall be cast iron, aluminum housings are unacceptable.

e. Motor: The electric motor shall be Class F insulated, with a time rating of at least 15 minutes at 104°F (40°C) or twice the valve stroking time, whichever is longer, at an average load of 35% of maximum valve torque. Electrical disconnection of the motor should be possible by means of a plug and socket. Motor removal shall be possible without the loss of lubricant.

f. Motor Protection: Protection shall be provided for the motor as follows:

(1) The motor shall be de-energized in the event of a stall condition when attempting to move a jammed valve. The motor shall be de-energized after 5 seconds without damage.

(2) The motor shall be de-energized in the event of an over torque condition.

(3) Motor temperature shall be sensed by a thermal device de-energizing the motor in case of overheating.

(4) Lost phase protection.

g. Gearing: The actuator gearing shall be totally enclosed in a grease filled cast iron gear case suitable for operation at any angle. Non-metallic gearing shall be unacceptable. For rising stem valves the output shaft shall be hollow to accept a rising stem, and incorporate thrust bearings of the roller type at the base of the actuator. The design should be such as to permit the opening of the gear case for inspection of disassembly without releasing the stem thrust or taking the valve out of service.

h. Hand Operation: Manual over-ride shall be by hand wheel. Manual operation will be via power gearing to minimize required rim-pull. Declutching from motor operation shall be at the motor shaft gearing to minimize declutching effort. Designs that break the valve load at the worm and worm gear are unacceptable. Return from manual to electric mode of operation will be automatic upon motor operation. A seized or inoperable motor shall not prevent manual operation.

i. Drive Nut: The actuator shall be furnished with a drive nut easily detachable for machining to suit the valve stem or gear box input shaft. Normally the drive nut shall be positioned in a detachable base of the actuator. Thrust bearings shall be lubricated by means of an easily accessible grease fitting.

j. Torque and Turns Capability: Torque and turns capability to be adjustable as follows:

(1) Position setting range 1 to 5,000 turns, with resolution of 2.81 degrees and accuracy to 5.0 degrees of actuator output.

(2) Torque setting: 40% to 100% rated torque. “Latching” to be provided for the torque sensing system to inhibit “torquing out” during unseating or during starting in mid travel against high inertia loads. The electrical circuit diagram of the actuator should not vary with valve type remaining identical regardless of whether the valve is to open or close on torque or position limit.

2.0 **Actuators Controls- Non Intrusive for Variable Position Control: Type "A" Actuators**

a. Remote Valve Position/Actuator Status Indication: Four contacts shall be provided which can be selected to indicate any position of the valve. Provision shall be made for the selection of a normally closed or open contact form. Contacts shall maintain and update position indication during hand wheel operation when all external power to the actuator is isolated. The contacts shall be rated at 5A, 120V AC, 30V DC. As an alternative to providing valve position any of the four above contacts shall be selectable to signal one of the following:

(1) Valve opening, closing or moving.

(2) Thermostat tripped, lost phase.

(3) Motor tripped on torque in mid travel, motor stalled.

(4) Remote selected.

(5) Actuator being operated by hand wheel.

b. Local Position Indication: The actuator shall include a digital position indicator with a display from fully open to fully closed in 1% increments. Five (5) programmable lights shall be provided which include Red, Green and Yellow corresponding to Open, Closed and Intermediate position shall be included on the indicator. End of travel indication colors shall be reversible. The display shall incorporate valve, actuator and control status indication. Provision shall be made to orientate the display through increments of 90°. Provision shall be made in the design for the addition of a contactless transmitter corresponding to actuator output torque for remote indication when required.

c. Remote Analogue Position Indication: The actuator shall include a contactless transmitter to give a 4-20mA analogue signal corresponding to valve travel for remote position indication.

d. Local Controls, Reversing Starter and Transformer: The reversing starter, control transformer and local controls shall be supplied by the actuator manufacturer, and shall be capable of remote mounting. The control enclosure

shall be suitably housed to prevent breathing and condensation. The starter shall be suitable for 1,200 starts per hour and of rating appropriate to motor size. The controls supply transformer shall be fed from two of the incoming three phased and incorporate overload protection. It shall have the necessary tapping and be adequately rated to provide power for the following functions:

(1) Energization of the contactor coils.

(2) 115 VAC output where required for remote controls.

(3) Supply for all the internal electrical circuits.

e. Integral Local Control and Control Mode Selector: The actuator shall incorporate local controls for Open, Close and Stop and a Local/Stop/Remote mode selector switch lockable in any of the following three positions: local control only, stop (no electrical operation), remote control plus local stop only. It shall be possible to select maintained or non-maintained local control. The local controls shall be arranged so that the direction of valve travel can be reversed without the necessity of stopping the actuator. Provision shall be made to orientate the local controls through increments of 90°.

f. Control Facilities: The necessary wiring and terminals shall be provided in the actuator for the following control functions:

(1) Open and close external interlocks to inhibit local and remote valve opening and/or closing control/ Provision shall be made to configure the interlocks to be active in remote control only.

(2) Remote controls fed from an internal 115VAC supply and/or from an external supply between 20V and 120V AC or 20V and 60V DC, to be suitable for any one or more of the following methods of control. It shall be possible to reverse valve travel without the necessity of stopping the actuator. The start contractors shall be protected from excessive current surges during travel reversal by an automatic time delay on energization of the contactor coils. The internal circuits associated with the remote control and monitoring functions are to be designed to withstand simulated lighting impulses of up to 1.1kV.

g. Monitoring Facilities: Facilities shall be provided for monitoring actuator operation and availability as follows: Monitor (availability) relay, having one changeover contact, the relay being energized from the control transformer only when the Local/Off/Remote selector is in the Remote position to indicate that the actuator is available for remote (control room) operation. Where required, it shall be possible to provide indication of Thermostat trip and Remote selected as discreet signals. The actuator shall include a diagnostic module, which will store and enable download of historical actuator operation and torque data to permit analysis of actuator and valve in-service performance. Data download shall be carried out without removing any covers and all shall be available locally to the actuator or remotely via telecom data transfer. Diagnostic and configuration software shall be made for user PC systems.

h. Wiring and Terminals: Internal wiring shall be tropical grade PVC insulated stranded cable of appropriate size for the control and 3-phase power. Each wire shall be clearly identified at each end. The terminals shall be embedded in a terminal block of high tracking resistance compound. The terminal compartment shall be separated from the inner electrical components of the actuator by means of a watertight seal and shall be provided with a minimum of 3 threaded cable entries with provision for a minimum of 4. All wiring supplied as part of the actuator to be contained within the main enclosure for physical and environmental protection. External conduit connections between components are not acceptable. A durable terminal identification card showing plan of terminals shall be provided attached to the inside of the terminal box cover indicating:

(1) Serial Number

(2) External voltage values

(3) Wiring diagram number

(4) Terminal layout.

This must be suitable for the Contractor to inscribe cable core identification alongside terminal numbers.

3. Actuator Controls for Open/Close Control: Type "B" Actuators

a. All actuators in open/close service will be furnished with integral motor controls consisting of reversing starters, control transformer, automatic phase correction, monitor relay (to signal fault conditions thermal switch trip, mid travel torque switch trip, phase failure).
b. An interface with the control system must be furnished with optical isolators to separate incoming voltage signals from the internal motor controls.
c. Each actuator shall be provided with a local control station. The station shall include "open-stop-close" pushbuttons, "local-off-remote" selector switch, red and green indicating lights in addition to a 3rd Amber light for fault identification. It shall be possible to position the local controls at 90 degree increments so that the pushbuttons and indicating lights face the operator. Local control stations shall be capable of remote mounting.

4. Electric Actuator Start-up and Test Reports

a. Start-up Kit: Each actuator shall be supplied with a start-up kit comprising installation instruction manual, electrical wiring diagram.

b. Performance Test Certificate: Each actuator must be performance tested and individual test certificates shall be supplied free of charge. The test equipment should simulate a typical valve load, and the following parameters should be recorded.

(1) Current at maximum torque setting.

(2) Torque at maximum torque setting.

(3) Flash test voltage.

(4) Actuator output speed or operating time.

In addition, the test certificate should record details of specification such as gear ratios for both manual and automatic and second stage gearing if provided, drive closing direction wiring diagram number.

c. Actuator Set-up: In order to maintain the integrity of the enclosure, setting of the torque levels, position limits and configuration of the indication contacts etc. shall be accomplished without removing covers from the actuator control assemblies or housing. Settings shall be made by entering the set up mode and following menu prompts appearing in the LCD window. The LCD window shall have four lines of data clearly indicating the set up options. Set up shall

be accomplished by using the actuator integral selector switch and without the need for a hand-held setting device.

d. Electric Actuator Manufacturers: All actuators shall be manufactured by AUMA Actuators, Inc. of Canonsburg, Pennsylvania, or approved equal.

e. Warranty: All actuators shall have a five (5) year warranty.

2.02 HYDRANTS

A. Fire Hydrants - Fire hydrants shall be cast iron body, fully bronze mounted, suitable for working pressure of 150psi and shall meet all requirements of the latest AWWA C502. Each hydrant shall be given a 300psi hydrostatic test in the shop.

Hydrants shall be Mueller Co. Improved AWWA type or equal.

The waterways of hydrants shall be as free as possible of obstructions, sharp turns, corners, or other cause for resistance. The base of the hydrant shall have a mechanical joint connection.

The hydrants shall have a 6-inch mechanical joint connection to street main with auxiliary gate valve, two 2½-inch brass nozzles with threads for hose connections and 1 pumper nozzle together with caps fastened securely to each hydrant with steel chain and threaded to fit nozzles. The bottom valve of the hydrant shall not be less than 5¼" inches in diameter and 7-inch minimum I.D. riser barrel. Threads for hose and steamer connections shall match existing hydrants and shall be opened by turning in a counter-clockwise direction.

The hydrant main valve shall be of the compression type, closing with pressure. The valve shall be faced with rubber, or other approved material.

Drain valves shall be automatic and positive acting. When the main valve is closed, drain valves shall automatically open, insuring rapid and complete drainage of the hydrant riser. They shall close automatically when the main valve is opened.

Hydrants shall have a safety "breakable" section located above ground line. The distance from the ground line of the hydrant to the top of the hydrant head shall not be less than 30 inches. Hydrants shall come with one shop coat of primer. After installation, skinned or scratched surfaces of hydrants shall be wire brushed and touched up with one coat of primer. Two coats of Sonneborn's Hydrant Enamel shall

be applied in the field. Color shall be determined by the Owner with the first coat having lamp black added to distinguish it from the final coat.

Hydrants shall be placed with pumper nozzle facing street and shall be located as indicated on Plans. Each hydrant shall be placed on a concrete base and shall be secured against dislocation as shown on Plans. A minimum of 7 cubic feet of clean washed gravel shall be placed around each hydrant base. Backfill above gravel shall be thoroughly tamped. Care shall be taken so as to keep the drain holes clear.

B. Yard Hydrants - Yard hydrants shall be 1 1/2" - 4' depth of bury, non-freezing type with aluminum housing, similar to Series 1440-N, as manufactured by Josam Manufacturing Company, an equivalent model by Zurn, or equal.

PART 3 - EXECUTION

3.01 INSTALLATION AND STORAGE

The valves and appurtenances shall be installed in accordance with the installation manual furnished by the valve manufacturer. Extreme care shall be used in the handling, storage and installation of these valves to prevent damage or distortion of the equipment and to insure proper performance.

3.02 PAINTING

All surfaces of each valve body assembly shall be clean, dry and free from grease before painting. All un-machined surfaces of the valve body assembly shall be wire brushed down to clean metal and given two coats of an approved shop primer. Two coats of an asphalt varnish complying with Federal Specifications TT-V 51a shall be applied to all exterior surfaces of valve body assemblies to be buried. All above ground applications shall comply with coating requirements per Section 09010 of these specifications.

3.03 SPARE PARTS AND TOOLS

Repair or service parts for one of each type of valve used in this Work shall be furnished and stored as directed by the Engineer. The equipment shall include, in general the following items: special tools required for maintenance or operation of valves, gaskets, rings, seals, lubricants, bolts, washers, operation manuals, drawings, etc., required to maintain valves in proper operating service.

END OF SECTION

DIVISION SIXTEEN

ELECTRICAL

16

TECHNICAL SECTION
DIVISION 16 – ELECTRICAL
SECTION 16010 – GENERAL SPECIFICATIONS FOR ELECTRICAL INSTALLATION

PART 1 – GENERAL

1.01 SCOPE

The Electrical Drawings and Specifications under this division shall be made a part of the Contract Documents. The drawings and specifications of other Divisions of this Contract, as well as supplements issued thereto, information to Bidders and pertinent documents issued by the Owner's representative are a part of these Drawings and Specifications and shall be complied with in every respect. All the above documents will be on file at the office of the Owner's representative and shall be examined by all Bidders. Failure to examine all documents shall not relieve the responsibility or be used as a basis for additional compensation due to omission of details of other Sections from the Electrical documents.

The Contractor shall furnish all work, labor, tools, superintendence, material, equipment and operations necessary to provide for complete and workable electrical systems as defined by the Contract Documents. The Contractor shall be responsible for visiting the sites and checking the existing conditions and ascertaining the conditions to be met for installing the work and adjusting his bid accordingly.

It is the intent of the Contract Documents that upon completion of the electrical work, each entire system shall be in a finished, workable condition.

All Work that may be called for in the specifications but not shown on the drawings; or, all Work that may be shown on the drawings but not called for in the specifications, shall be performed by the Contractor as if described in both. Should work be required which is not set forth in either document, but which work is nevertheless required for fulfilling of the intent thereof; then, the Contractor shall perform all Work as fully as if it were specifically set forth in the Contract Documents.

The definition of terms used throughout the Contract Documents shall be as specified by the following agencies:

A. Underwriters Laboratories (UL)
B. National Electrical Manufacturers Association (NEMA)
C. American National Standards Institute (ANSI)
D. Insulated Cable Engineers Association (ICEA)
E. National Electrical Code (NEC)
F. National Fire Protection Association (NFPA)

The use of the terms: "as (or where) indicated"; "as (or Where) shown"; "as (or Where) specified"; or "as (or where) scheduled" shall be taken to mean that the reference is made to the Contract Documents, either on the drawings or in the specifications, or both documents.

The use of the words "furnish," provide," or "install" shall be taken to mean that the item or facility is to be both furnished and installed under this Section unless stated to the contrary that the item or facility is to be either furnished under another Section or under another Contract, furnished under this Section and installed under another Section or under another Contract.

1.02 PERMITS, CODES, AND REGULATIONS

Secure all permits, licenses, and inspection as required by all authorities having jurisdiction. Give all notices and comply with all laws, ordinances, rules, regulations and contract requirements bearing on the Work.

The minimum requirements of the electrical systems installations shall conform to the latest edition of the National Electrical Code as well as state and local codes.

Codes and ordinances having jurisdiction and specified codes shall serve as minimum requirements; but, if the Contract Documents indicate requirements which are in excess of those minimum requirements, then the requirements of the Contract Documents shall be followed. Should there be any conflicts between the Contract Documents and codes, or any ordinances, report these with bid.

Determine the exact requirements for the utility service connections and metering facilities as set forth by the utilities that will serve the Project, and pay for and perform all work as required by those utilities.

1.03 STANDARDS

All materials and equipment shall conform to the requirements of the Contract Documents. They shall be new, free from defects, and they shall conform to the following standards where these organizations have set standards:

A. Underwriters Laboratories, Inc. (UL)
B. National Electrical Manufacturer's Association (NEMA)
C. American National Standards Association (ANSI)
D. Insulated Cable Engineers Association (ICEA)

The same manufacturer shall supply all material and equipment of the same class, unless specified to the contrary.

All products shall bear UL labels where standards have been set for listing.

1.04 SHOP DRAWINGS AND SUBMITTALS

Shop drawings shall be taken to mean detailed drawings with dimensions, schedules, weights, capacities installation details, and pertinent information that will be needed to describe the material or equipment in detail.

Submittals shall be taken to mean catalog cuts, general descriptive information, catalog numbers, and manufacturer's name.

Submit for review in sextuplicate within sixty days after award of Contract, all shop drawings and submittals as hereinafter called for.

Review of submittals or shop drawings shall not remove the responsibility for furnishing materials or equipment of proper dimensions, quantity and quality; nor will such review remove the responsibility for error in the shop drawings or submittals.

Assume all costs and liabilities, which may result from the ordering of any material or equipment prior to the review of the shop drawings or submittals, and no work shall be done until the shop drawings or submittals have been reviewed. In case of correction or rejection, resubmit until such time as they are accepted by the Owner's representative and such procedures will not be cause for delay. After the final review, 6 copies will be supplied if requested.

Shop drawings and submittals will be returned unchecked if the specific items proposed are not clearly marked, or if the general Contractor's approval stamp is omitted.

1.05 ACCEPTANCE AND SUBSTITUTIONS

All manufacturers named are a basis as a standard of quality and substitutions of any equal product will be considered for acceptance unless prohibited under other divisions of these Specifications. The Engineer shall make the judgment of equality of product substitutions.

Substitutions after award of Contract shall be made only within sixty days after the award of Contract. Furnish all required supporting data. The submittal of substitutions for review shall not be cause for time extensions.

Where substitutions are offered, the substituted product shall meet the product performance as set forth in the specified manufacturer's current catalog literature, as well as meeting the details of the Contract Documents.

The details on the drawings and the requirements of the specifications are based on the first listed item of material or equipment; if any other than the first listed materials or equipment is furnished, then assume responsibility for the correct function, operation, and accommodation of the substituted item. In the event of misfits or changes in Work required, either in this section or other sections of the Contract, or in both; bear all costs in connection with all changes arising out of the use of other than the first listed item specified.

Substitutions of products under another section may occur. Make necessary adjustments and additions to Work under this section to accommodate those substitutions. Such adjustments and additions shall be performed in compliance with specifications at no additional charge.

1.06 RECORD DRAWINGS

At the start and during progress of the job, Contractor shall keep one separate set of blue-line prints for making construction notes and mark-ups, and shall:

Show conduit routing and wiring runs as constructed and identify each.
Show all terminal number and schematic changes.
Record all deviations from the Contract Documents.
Submit set of marked-up drawings for review.

1.07 OPERATIONS AND MAINTENANCE MANUALS

Six weeks prior to the completion of the project, compile an operations and maintenance manual on each item of equipment. These manuals shall include detailed instructions and maintenance as well as spare parts lists.

Submit six (6) copies for review.

1.08 AS BUILT DRAWINGS

Within 30 days after final inspection, the electrical contractor shall submit to the Engineer a clearly marked set of as built drawings showing all changes to the project. Included shall be terminal numbers of all cable terminations on the project. Information shall be submitted in a form such that it can be easily interpreted by a computer draftsman and require minimum

engineering input.

1.09 ELECTRICAL EQUIPMENT REQUIREMENTS

The plant electrical system is custom designed to the specific requirements of the Owner and the Engineer using a sophisticated control system. The vendors shall custom design their electrical equipment and panels to match these electrical requirements. This means that it is highly unlikely that the vendor's standard panels and electrical equipment will be compatible with the requirements of this Project. Shop drawings shall be submitted showing external wiring terminals and shall properly identify the devices to which that they are to be interconnected. At a minimum the drawings shall be prepared with the same engineering effort as can be expected to be utilized in motor control center class 2, type B wiring. Wiring and elementary and control drawings shall be prepared using drawing sizes sufficient to show wiring details clearly and shall have the Owner's name and project on each sheet. All options furnished shall be identified. Any item not furnished shall be entirely deleted from the drawing. Drawings that indicate such things as "if supplied" "these models only" "optional" etc. will be rejected. Any drawings submitted where it is obvious that no effort was made to properly prepare them for easy checking by the Engineer will be rejected.

Shop drawings, unless mark-ups are very trivial, will not be returned, "approved as noted". They will be returned for re-submittal as many times as necessary. Therefore make every effort to comply with the requirements of this Project on the first submittal in order to avoid project delays.

The Contractor shall include monies in his bid to strictly adhere to the above.

1.10 CERTIFICATIONS

The General Contractor via his subcontractors shall submit the following certifications upon completion of the Project.

A. All motor overload heaters and circuit breakers have been properly selected and installed. Attach a completed form "Motor Overload Heater and Circuit Breaker Data Sheet".

B. All wiring has been properly connected to all equipment in accordance with the manufacturer's recommendations and the plans and specifications.

C. All electrical systems and subsystems are operating properly and have been

operationally tested by simulations of all possible operating conditions.

D. All electronic instruments and switches are calibrated and functioning properly.

E. The emergency generation system and transfer switch (if specified) is operating properly and has been tested at maximum expected operating conditions.

F. The Graphic Display Panel (if specified) has been tested and is functioning properly.

G. The Distributed Control System (if specified) has been properly connected to all required equipment, is operating properly and has been operationally tested by simulation of all possible operating conditions.

H. Other certifications as to proper electrical operation as deemed necessary by the Engineer.

1.11 ADDITIONAL REQUIREMENTS

Electrical wire and conduit schedules and interconnection drawings are prepared by the Engineer to assist the electrical contractors in estimating the cost of the Project and are based on the latest information available from the vendors at the time of design. Once shop drawings are received, changes may be required on the project external wiring to accommodate their latest design and to make the system function properly.

It shall be the Contractor's responsibility to check with the various vendors before bidding the Project and to include monies in his bid to accommodate these requirements since no changes to the contract price will be allowed for these changes.

PART 2 – PRODUCT

2.01 CONDUIT

Detail specifications will indicate the type of conduit system to be used.

Liquid tight flexible metallic conduit shall be U.L. listed and shall consist of a metallic interlocking core with an extruded thermoplastic cover.

2.02 CONDUIT FITTINGS

Conduit fittings shall be compatible with the conduit system used. Outdoor enclosures shall be weatherproof.

Insulating bushings shall be non-combustible high impact thermosetting phenolic with 150 degrees C temperature rating and shall not support combustion.

2.03 CONDUIT BODIES AND BOXES

Conduit bodies and boxes for pulling and installation of outlets shall be compatible with the conduit system and shall be as follows:

CONDUIT SYSTEM

Item	Galvanized Rigid Steel	Rigid Aluminum
Outlet Bodies	Threaded Zinc Coated	Threaded Copper Free
	Malleable Iron w/ Gasketed Cast Metal Crouse Hinds Form 7 or Equal	Aluminum w/Gasketed Sheet Aluminum Covers Crouse Hinds Form 9 or Equal
Outlet Boxes	Same as Above	Threaded Copper Free
	Except Crouse Hinds FD,FS and DS or Equal. Outdoor or Wet Locations To Have Outdoor Covers.	Aluminum w/Gasketed Cast Aluminum Outdoor Covers Crouse-Hinds FD, FS and DS or Equal

2.04 SUPPORT DEVICES

Single opening slotted channel supports shall be 2" deep x 1 5/8" wide. Double opening slotted channel supports shall be 4" deep x 1 5/8" wide. All slotted channel members shall be manufactured of ASTM 6063-T-6 aluminum. Furnish nuts, clamps, and hardware that shall be compatible with the slotted channel members.

Conduit clamps for use with slotted channel members shall consist of locking aluminum straps with aluminum hardware. All such straps and hardware shall be manufactured of hardened aluminum alloy with less than 0.5% copper content. After-set concrete inserts shall be expansion shield type with stainless steel hardware, 500 pounds minimum pull out resistance.

Beam clamps shall be hot-dipped galvanized malleable iron. Furnish right angle, edge, or parallel types as required. Nest back supports shall consist of one-hole pipe clamp with conduit wall spacer clamp back, all manufactured of hot dipped galvanized malleable iron. One-hole

pipe clamps shall be manufactured of hot-dipped galvanized malleable iron. Surface mounted swivel joints shall be double closed "U" brackets of plated malleable iron with attachment openings top and bottom.

Adjustable screw mounted swinging hangers shall be manufactured of plated steel. Mounting bracket shall have four screw holes. All thread rods shall be stainless steel, 3/8" diameter (min. size).

2.05 WIRE AND CABLE

Wire and cable shall be as follows:

A. Single Conductor - All single conductor wire for power and control 480 volts and below shall be stranded copper 600 volts U.L. type THW or THWN. Wire for 120 volt general lighting may be solid copper 600-volt type THW or THWN.

B. Multi-Conductor - Control cable shall be stranded copper 600-volt U.L. type TC 75 Degrees C wet, 90 degrees C dry and shall consist of individual color-coded conductors insulated with 15 mils pvc insulation and 4 mils clean nylon jacket, moisture resistant fillers, lapped core tape and overall pvc jacket.

C. Instrument Cable - Instrument cable for 4-20 man service unless specified otherwise herein or on drawings shall be single twisted pair stranded copper 90 degree C 600-volt U.L. with 21 mils pvc insulation and nylon jacket, aluminum polyester shield tape and 45 mils overall jacket. Size shall be #16 AWG unless shown otherwise or on drawings.

D. High Voltage Cable - High voltage cable shall be as specified in another section of these specifications.

2.06 CONNECTORS

Mechanical connectors shall be copper alloy bolted pressure type with bronze hardware. Such connectors unless otherwise indicated shall be Square D, OZ/Gedney, T&B, or equal.

TYPE	MANUFACTURER
Single conductor to flat plate connector	Square Type LU OZ Type XLH, or equal
Multiple conductors to flat place connector	Square LU Series T&B Type 32000 DB, or equal

One-bolt parallel connector	Type T or equal
Split-bolt parallel connector	Square D Type CPS, T&B Type TP or equal
Two-bolt parallel connector	Square D Type K.R., OZ Type 5TS or equal
Splice connector	Square D Type SS OZ Type XW or equal
Cross-connector	Square D Type XP OZ Type T, or equal
Ground rod connector	Square D Type CG OZ Type ABG, or equal
Flush floor connector	Square D Type GCJ OZ Type VG, or equal

Insulated spring wire connectors shall be plated spring steel with thermoplastic jacket. Connectors shall be rated at 150 degrees C continuous. Insulated set-screw connectors shall consist of copper body with flame retardant, 600-V class insulated shell that threads over set screw body.

Terminal connectors for flathead terminal screws shall be locking spade type with vinyl insulated compression indent tubular wire shaft. Terminal strip connectors shall be channel-mounted type with tin plated solderless box lugs contained within nylon insulated separable carriers. Furnish terminal strips complete with channels, channel mounting hardware, and closures, and fitments.

2.07 INSULATING PRODUCTS

General-purpose electrical tape shall be 7-mil thick stretchable vinyl plastic with pressure adhesive backing, 3M "Scotch #33, Plymouth "Slipknot Grey", or equal.

Insulating void filling tape shall be stretchable ethylene propylene rubber with high tack and fast fusing surfaces. Tape shall be rated for 90 degrees C continuous, 130 degrees C overload and it shall be moisture proof. Void filling tape shall be 3M "Scotch #23," Plymouth "Plysafe", or equal.

Arc-proof tape shall be flame retardant, self-extinguishing compound. Tape shall be resistant to ultraviolet, water, salt water, raw sewage and acids. Arc-proof tape shall be "3M" Scotch #7700, Plymouth "Plyarc", or equal.

Insulation putty filler tape shall be elastic, moisture proof rubber compound suitable for bedding and rounding out irregular surfaces. Conduit insulation putty shall be waterproof, stretchable, non-hardening compound suitable for duct seal.

2.08 IDENTIFYING AND TAGGING

Individual phases and routing of each power and control circuit shall be identified by appropriate identifying permanent tags, at points near each end of the cables. Yellow plastic tags 2 1/2" x 3 1/2" available from Tags Unlimited. New Orleans, LA or others shall be used for cable I.D. A Sanford Sharpie or equal fine point marker shall be used for writing.

All equipment and electrical devices shall be identified. The Contractor and manufacturer shall be responsible for properly identifying and tagging equipment as to safe operation under adverse conditions by personnel normally associated with the proposed facility. Additional signs as the Engineer may require for safety shall be furnished and installed by the contractor at no additional costs.

Voltage warning labels where shown or required by N.E.C or local codes shall be waterproof vinyl with permanent red letters "DANGER 480V (or 240V)", or with other voltage designations. Letters shall be at least 2" high.

2.09 WIRING DEVICES

All wiring devices shall be specification grade and shall meet NEMA WD1-1971 requirements. Furnish types of wiring devices as follows:

A. 2P/3W grounding, 20A/125V, NEMA 6-20R; Single receptacle: Hubbell #5361, Arrow Hart #5361, or equal.

B. GFCI receptacle shall be Square D "GFSR-115-B" with NEMA 5-15R style receptacle or "GFSR-120-B" with NEMA 6-20R style receptacle. GFCI receptacle shall be in duplex configuration; that is, top half shall contain test and reset button and bottom half shall contain protected receptacle.

C. Single-pole, single-throw 20A tumbler switch: Hubbell #1223, Arrow Hart #1992, or equal.

D. Single-pole, double-throw (three-way) 20A tumbler switch: Hubbell #1224, Arrow Hart #1993, or equal.

E. Double-pole, double-throw (four-way) 20A tumbler switch: Hubbell #1224, Arrow Hart #1994, or equal.

F. Double-pole, single-throw 20A, tumbler switch: Hubbell #1222, Arrow Hart #1992

or equal.

G. Single-pole, single-throw, momentary center-off 20A tumbler switch: Hubbell #1556, Arrow Hart #1995, or equal.

H. Manual motor starters shall be furnished complete with overloads and shall be Square D Type KO-Z, Westinghouse MS-TO1, or equal.

I. Furnish other types of wiring devices as may be indicated and specified on the drawings.

2.10 GROUNDING SYSTEM

The Contractor shall furnish and install a complete grounding system as shown on the drawings consisting primarily of bare copper conductor and copper clad steel ground rods. All electrical equipment shall be tied to this system either with cable shown or the metallic conduit system per N.E.C. Attach grounding system to metallic buildings as required by N.E.C. weather specifically shown on drawings or not.

2.11 OVERLOAD HEATERS

The Contractor shall submit to the Engineer a form entitled "Motor Overload Heaters and Circuit Breaker Data Sheet" which shall contain actual nameplate information on the motors and motor starters, which he shall inspect and record. He shall use the appropriate charts and tables supplied with the starting equipment and select, for approval by the Engineer, the manufacturer's recommended overload heaters and circuit breaker settings. Along with the data sheet he shall also submit a copy of the manufacturer's charts and tables. Motors shall not be started until overload heaters and the Engineer approves circuit-breaker settings.

2.12 FLOOR BOXES

Floor boxes where shown on the plans shall be Walker or equal Type RFB with RAKM11 flush access hatch with carpet trim (or tile trim where tile is used). Unless exact dimensions are shown on the drawings, the Engineer shall approve the exact location of the boxes after the furniture type is selected.

Floor boxes shall be complete with all required receptacle, telephone, intercom, computer, etc. internal brackets and divider plates.

2.13 CONNECTING LUGS

In many instances, due to the long distances between equipment and voltage drop limitation, larger wire sizes may be required that would normally be expected for some items of equipment. The Contractor and equipment vendor shall identify these requirements and provide proper lugs to match the wire sizes.

2.14 MANUFACTURING OF ELECTRIC CONTROL PANELS

All electrical control panels including unit motor starters shall be factory assembled. In no case shall the electrician assemble and wire internal components in the field. The only onsite wiring that will be allowed inside panels is connections of external wiring to factory installed terminal strips.

2.15 NAMEPLATES

The electrical contractor shall install nameplates on all electrical equipment and devices including a remote operating station that clearly identifies the device. Nameplates shall be sized appropriately for the device and shall be attached with stainless steel screws of double sided tape suitable for outdoor use, 3M Scotch Brand Very High Bond 4930 or equal. Tape shall cover the entire surface of the nameplate.

A nameplate schedule indicating proposed wording and sizes shall be submitted to the Engineer for approval.

2.16 MISCELLANEOUS MATERIAL

Empty raceway pull cords shall be glass fiber reinforced tape that is foot-marked along its length, Thomas "True Tape", Greenlee "Foot-Marked", or equal.

Conduit thread compound for use with joining dissimilar metals and aluminum threads shall be conductive, non-galling, and corrosion inhibiting lithium based compound.

Cable pulling compound shall be non-injurious to raceways, conductors, and insulation. Compound shall be non-toxic, non-hardening type.

Ground rods shall be copper clad steel in lengths and diameters as indicated and shall be Blackburn, Hubbard, or equal.

PART 3 – EXECUTION

3.01 EXCAVATION AND BACKFILLING

Do all excavating and backfilling necessary for the installation of the work. This shall include shoring and pumping in ditches to keep them dry until the work in question has been installed. All shoring required protecting the excavation and safeguard employees should be properly performed.

All excavations shall be made to the proper depth, with allowances made for floors, slabs, forms, beams, piping, finished grades, etc. Ground under conduits shall be well compacted before conduits are installed. All backfilling shall be made with selected soil, free of rocks and debris and shall be tamped as required to prevent settlement. All excavated material not suitable and not used in the backfill shall be removed to the on site disposal area. Area shall be as directed by the Engineer.

Field check and verify the locations of all underground utilities prior to any excavating. Avoid disturbing these as far as possible. In the event existing utilities are broken into or damaged, they shall be repaired so as to make their operation equal to that before the trenching was started.

Where the excavation required the opening of existing walks, drives, or other existing pavement, these facilities shall be cut as required to install new lines and to make connections to existing lines. The sizes of the cut shall be held to minimum consistent with the work to be installed. After installation of new work is completed and the excavation has been backfilled in accordance with above, repair existing walks, drives or other existing pavement to match existing installation.

3.02 DUCT LINES AND PULL BOXES

The Contractor shall excavate, backfill, remove excess soil, and furnish material for and install duct lines wherever shown on the plans. Conduit encased in concrete shall have three-inch minimum covering of concrete on outside walls of ducts bank, and one-inch minimum of concrete between the outside walls of adjacent conduits. The top of the ducts shall in general be 1'-6" below ground unless specifically shown otherwise on the drawings or is required to be

deeper by N.E.C. or other codes.

It shall be the electrical contractor's responsibility to determine in advance any conflicts of duct banks with underground obstructions of electrical or any other disciplines and report these anticipated conflicts to the Engineer well in advance of operations such that the conflicts can be easily and economically resolved by all parties.

Conduit shall be firmly secured by driving reinforcing rod 12" in ground and tying with No. 10 wire.

Where excavation has been made to a greater depth than that required, backfill shall be tamped solid and level to the required depth. All concrete forms shall be removed after the concrete has set, and all trenches shall be backfilled and tamped.

Pull boxes shall be installed as shown on the plans.

3.03 CUTTING AND PATCHING

Cutting and patching required under this section shall be done in a neat workmanlike manner. Cutting lines shall be uniform and smooth.

Use concrete saws for large cuts in concrete and use core drills for small round cuts in concrete.

Where openings are cut through masonry walls, provide lintel or other structural supports to protect the remaining masonry. Adequate support shall be provided during the cutting operations to prevent damage to masonry.

Where large openings are cut through metal surfaces, attach metal angles around the opening.

Patch concrete openings that are to be filled with non-shrinking cementing compound. Finished concrete patching shall be trolled smooth and shall be uniform with surrounding surfaces.

3.04 WATERPROOFING

Provide waterproof flashing for each penetration of exterior walls and roofs.

Flashing for conduit penetrations through built-up roofs shall be made with pitch pans filled full with pitch. Conduit penetrations through poured concrete roofs shall be made with

sleeves and annulus caulked.

Penetrations through walls at below ground elevations shall be waterproofed by conduit sealing fittings or other methods as indicated. This includes all conduits that is located and/or terminated in areas that can transport sewer gases from raw sewage to control panels and other equipment. All local control panels, control stations and motors shall have conduit-sealing fittings installed.

Interiors of raceways that are likely to have water ingress such as runs from hand holes into below grade installations shall have water stops installed to prevent water from entering into installations.

3.05 INSTALLATION

Except where specifically noted or shown, the locations and elevations of equipment are approximate and are subject to small revisions as may prove necessary or desirable at the time the work is installed. Final locations shall be confirmed with the Engineer in advance of construction.

Where equipment is being furnished under another section, request from the Engineer accepted drawings that will show exact dimensions of required locations of connections. Install the required facilities to the exact requirements of the accepted drawings.

Qualified, careful electricians who are skilled in their trade shall do all work in the best and most workmanlike manner. The standards of work required throughout shall be of the first class only and electricians whose work is unsatisfactory to the Engineer shall be instantly dismissed from the work upon written notice from the Engineer. All work must meet the approval of the Engineer.

Unless shown in detail, the drawings are diagrammatic and do not give exact details as to elevations and routing of conduits, nor do they show all offsets and fittings; nevertheless, install the conduit system to conform to the structural and mechanical conditions of the construction. Unless locations and routing of exposed conduits are shown, confirm locations and routing prior to installation with the Engineer.

Holes for raceway penetration into sheet metal cabinets and boxes shall be accurately made with a hole punch. Cutting openings with a torch or other device that produces a jagged, rough-

cut will not be acceptable.

Cabling inside equipment shall be carefully routed, trained and laced. Cables so placed that they obstruct equipment devices will not be acceptable.

Equipment shall be set level and plumb. Supporting devices installed shall be set and so braced that equipment is held in a rigid, tight fitting manner.

The Contractor shall verify the electrical capacities of all motors and electrical equipment furnished under other sections, or furnished by the Owner, and request wiring information from the Engineer if wiring requirements are different from that specified under this section. Do not make rough-ins until equipment verifications have been received.

The Contractor shall install all controllers, instruments, Distributed Control System Equipment (if specified), terminal boxes, pilot devices, and miscellaneous items of electrical equipment that are not integrally mounted with the equipment furnished under other sections. All such equipment shall be securely mounted and adequately supported in a neat and workmanlike manner.

3.06 PROTECTION

The Contractor shall provide suitable protection for all equipment, work and property against damage during construction.

The Contractor shall assume full responsibility for material and equipment stored at the site.

Conduit openings shall be closed with caps during installation. All outlet boxes and cabinets shall be kept free of concrete, plaster, dirt and debris.

Equipment shall be covered and tightly sealed against entrance of water, dust, dirt and debris.

All dry transformers prior to energization shall be protected against moisture and dirt absorption by a suitable covering. Also, maintain heat inside the covering by suitable means to prevent condensation.

Interiors of electrical equipment shall be kept clean and dry prior to energization.

3.07 COOPERATION

Cooperate with all other trades so as to facilitate the general progress of the work. Allow all other trades every reasonable opportunity for the installation of their work and the storage of their materials.

The Work under this section shall follow the general building construction closely. Set all pipe sleeves, inserts, etc., and see that openings for cases, pipes, etc. are provided before concrete is placed or masonry installed.

Work with other trades in determining exact locations or outlets, conduits, fixtures, and pieces of equipment to avoid interference with lines as required to maintain proper installation of other work.

Make such progress in work that will not delay the work of other trades. Schedule the work so that completion dates as established by the Engineer are met. Furnish sufficient labor or work overtime to accomplish these requirements if necessary or directed to do so.

3.08 CLEAN-UP

Remove all temporary labels, dirt, paint, grease and stains from all exposed equipment. Upon completion of work clean equipment and the entire installation so as to present a first class job suitable for occupancy. No loose parts or scraps of equipment shall be left on the premises.

Equipment paint scars shall be repaired with paint kits supplied by the equipment manufacturer, or with an approved paint.

Clean the interiors of each item of electrical equipment. At completion of work all equipment interior shall be free from dust.

3.09 TESTS

Each run of power and control wiring shall be tested prior to connection of line and load. Make tests with 1000V dc hand-crank megger. Each run of wiring shall be tested phase-to-phase and/or phase-to-neutral, and phase-to-ground. Test results for each test shall be equal to or greater than 5 megohms with 1000V dc applied. Defective wiring shall be replaced and retested. All tests shall be made in the presence of the Engineer.

High voltage cables, where used, shall be Hi-Pot tested in accordance with test procedures as outlined in other sections of these specifications or as directed.

All equipment shall be put through a trial run-in test to ascertain the performance complies

with the intent of the specifications. All run-in tests shall be made in the presence of the Engineer.

3.10 RACEWAY INSTALLATION

Install the raceway system to provide the facility with the utmost degree of reliability and maintenance free operation. The raceway system shall have the appearance of having been installed by competent workmen. Kinked conduit, conduit inadequately supported or carelessly installed does not give such reliability and maintenance free operation and will not be accepted.

Raceway shall be installed for all wiring runs except as otherwise indicated.

Exposed raceways shall be installed with their lines parallel to the lines of the building or structure to which they are attached.

Conduit runs that enter bottom of floor-mounted enclosures that are open on the bottom shall be each equipped with grounding bushing on each conduit. Conduit entries into sheet metal enclosures located inside shall be made with double locknuts and capped with molded bake-lite grounding type bushings. Threaded penetration shall expose enough threads to adequately thread on bushing. Conduit entries into NEMA 3, 3R, 4 or 12 enclosures located outside and in wet or damp location inside, shall be made with field applied watertight hubs. Install locknut inside and cap each conduit with grounding bushing. Conduit runs into boxes, cabinets, and the like shall be set in a neat manner. Vertical runs shall be set plumb. Conduits set crooked or out of plumb shall be replaced.

Conduits entrances into enclosures shall be carefully planned. Cutting away of enclosure structure, torching and/or cutting away sills, braces and structural members of the enclosure will not be acceptable.

Use approved hole-cutting tools for entrances into sheet metal enclosures. Use of cutting torch or incorrect tools will not be acceptable. Holes shall be carefully planned and then cleanly cut and they shall be free from burrs, jagged edges, and torn metal.

Makeup of some conduit runs will require union fittings or split couplings. Install such fittings where required.

Liquid tight conduit shall be used for connections to motors, solenoids, pressure switches, limit switches, unit heaters, fans, motorized louvers, and other devices that may need to be removed for servicing. Each run of liquid tight flex shall be joined with liquid tight flex

connectors. Make up each connection tightly; finished connector shall have minimum of 100 pounds pull out resistance.

Empty conduits shall have pull tape installed the length of each run. Identify each terminal as to location of other end. Use blank waterproof label with waterproof ink. Cap exposed open ends of empty conduits.

Conduit bodies shall be installed in exposed runs of conduit where indicated and also wherever required to overcome obstructions and to provide access to wires. Covers for such fittings shall be accessible and unobstructed by the adjacent construction.

All raceway systems shall be adequately and safely supported. Loose, sloppy and inadequately supported raceways will not be acceptable and shall be replaced. Supports shall be installed at intervals not greater than those set forth under Article 300 of N.E.C. unless shorter intervals are otherwise indicated; or, unless conditions require shorter intervals of supports.

3.11 WIRING INSTALLATION

Conductors for power and control wiring shall be sized as indicated and where no size is given, the conductor size shall be #12 AWG.

Color of power wire insulation and color of phase indicating tape shall be as follows:

Conductor	Wire Color	Tape Color
Phase A	Black or Red	Red
Phase B	Black or Red	Yellow
Phase C	Black or Red	Blue
Neutral	White	-
Equipment Ground	Green	-

All wiring shall be installed in raceways, except as otherwise specified. No wire or cable shall be drawn into a raceway until the raceway run has been completed, swabbed, and outfitted with specified bushings and fitments.

Do not exceed wire and cable manufacturer's recommended pulling tensions. Cable pulling compound shall be used as a lubricant for difficult pulls.

Carefully handle wire and cable, do not kink, scrape or damage conductors or their insulation.

Feeder and branch circuit wiring shall be installed from supply to load without splice, unless otherwise indicated. Branch circuits may be spliced for receptacle, lighting, and small

appliance load inside appropriate junction boxes, and inside lighting fixtures.

Except as otherwise specified, taps and splices with #10 AWG, and smaller shall be made with insulated spring wire connectors. Such connectors in damp or wet locations shall have opening in wire nut filled with silicone rubber cement and then wrapped with a layer of EPR tape or spring wire connectors manufactured for this use shall be used.

Motor connections made with #10 AWG and smaller wire shall be made up with set-screw copper lugs and with threaded on set screw copper lugs and with threaded on insulating jacket. Where motors are located in damp or wet locations, fill opening under jacket with silicone rubber and cover connector with a layer of EPR tape.

Taps and splices in #8 AWG and larger wires shall be made up with copper alloy connectors. Apply over each connector a bedding of insulation putty. Then, apply at least four layers, half lapped each layer of EPR tape. Finally, apply at least four layers half lapped each layer of electrical tape.

Each wiring connection shall be made up tightly so that resistance of connection is as low as one-foot length of associated largest conductor resistance.

Numbered marking labels shall be installed to identify circuit numbers from panel boards and to identify control wiring. Install labels on each wire in each panel board, junction, and pullbox, and device connection. See "Identifying and Tagging" sections of these specifications.

Install numbered marking labels on each control wire termination at each terminal strip. Number selected shall correspond to manufacturer's terminal numbers.

Where control wiring terminates onto flat head type terminals, equip each such wire with crimp type locking spade connector.

All wiring inside enclosure shall be neatly trained and laced. Bundle wires into groups and lace with plastic tie wraps.

Install "DANGER 480V (or 240V)" labels on motor control equipment, and on other enclosures such as safety switches, wire-ways, and large enclosures that contain 480V (or 240V) wiring.

Install wiring devices where indicated. Each wiring device shall be set with axes plumb and installed with its yoke screws so as to adequately support device and provide grounding

means to box. Where ganged devices are shown, install them into ganged boxes.

Each item of equipment shall be adequately and thoroughly grounded. Comply with Article 250 of N.E.C.

Equipment grounding conductors into equipment shall be grounded to equipment ground bus or ground lug. Where no ground lugs are provided install ground lug and bond EGC thereto.

Where grounding bushings are installed, bond EGC there to end and furthermore ground each bushing lug to equipment ground bus or ground lug.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 16 - ELECTRICAL
SECTION 16020 - DETAIL SPECIFICATIONS FOR ELECTRICAL INSTALLATION

PART 1 - GENERAL

1.01 SCOPE

The work covered by this section shall include furnishing and/or installation of all electrical and instrumentation equipment and necessary wiring systems required to provide the Owner with a complete and operating system and shall consist of the following basic items of work:

A. Main Circuit Breaker
B. Manual Transfer Switch
C. Pump Control Panels
D. Disconnect Switches
E. Magnetic Flow Meter and Accessories
F. Gauge pressure indicating transmitters
G. Conduit and Fittings
H. Low Voltage Wire, 600V Wire
I. Area Lighting
J. Grounding System
K. Racks and Supports
L. Junction Boxes
M. Duct Lines and Pull Boxes
N. SCADA System

PART 2 – PRODUCTS

2.01 MAIN CIRCUIT BREAKER

The Contractor shall furnish and install a main circuit breaker as specified below, and as shown on the drawings.

A. 2 pole THERMO MAGNETIC
B. 240 volts
C. Amp rating as shown on drawings
D. NEMA 3R painted steel enclosure
E. NON-ELECTRONIC TRIP
F. Service entrance rated circuits

2.02 MANUAL TRANSFER SWITCH

The Contractor shall furnish and install a manual transfer switch as specified below, and as shown on the drawings.

A. Non fused
B. 2 pole double throw
C. 240 volts
D. Amp rating as shown on drawings
E. NEMA 3R painted steel enclosure
F. Center off position
G. Heavy duty HP rated for motor
H. Cutler Hammer DTxxxURK, Siemens DTNFxxxR or approved equal
I. Install a Quick Connect Tap Box, Trystar GDS-02-S or equivalent for a portable generator connection

Do not submit general duty switches or those that are not rated for the total HP connected.

2.03 PUMP CONTROL PANELS

The Contractor shall furnish and install new control panels with automatic controls as specified in these specifications, and as shown on the drawings. Unless more stringent requirements are required in other sections or articles of these specifications, all control panels shall be manufactured by an Underwriters Laboratory (UL) Certified 508A panel manufacturer. Provide UL Certification number with submittals.

A. General: Panel shall enclose and be wired for all motor branch components, circuit breakers, switches, pilot lights, relays, and other AC and DC control components as shown on diagrams and as required to perform functions as described in this and other sections of the specifications. Terminal strips shall be provided for connection of all external wiring. Terminal strips shall be heavy-duty types with barriers between points. Nameplates shall have white letters on black laminated phenolic plastic background glued to enclosure. Each enclosure, including RTU enclosures (if used) shall be protected with Hoffman or equal corrosion inhibitors. Control equipment shall be Allen Bradley, Cutler Hammer, ABB, SQ.D or equal as follows:

1. Push Buttons – Flush Button, Momentary Contact
2. Selector Switches – Standard Operator, Maintained Contact
3. Toggle Switches – Maintained Contact
4. Pilot Lights – Direct or Transformer Type Push to Test or LED

Each panel shall be furnished with the following spare parts:

1. Two (2) of each size control and power fuses
2. Six (6) of each size indication lights
3. One (1) of each size control transformer

Deliver spare parts to Owner, have Owner sign for them and supply copy of document to the Engineer.

B. Panel: The following operation description is basic and the minimum required. Contractor shall coordinate all panel work with other vendor's equipment to which they interface or control and provide all necessary components such that operation is as desired and recommended by the other vendors. Provide auxiliary contacts and analog outputs wired to terminal strips as shown on drawings to interface with PLC and other equipment if specified. All electrical devices shall be finger safe or have finger safe covers to prevent incidental contact with energized components while troubleshooting an energized panel.

Panels shall consist of the following:

1. NEMA 3, fiberglass enclosure with 3 point or ¼ turn latches.
2. Circuit breaker (thermal magnetic) for each pump with shunt trip to trip on soft start failure.
3. Main distribution block for incoming cables sized as shown on the drawings.
4. Lightning arrester.
5. Hand-Off- Auto switch
6. Elapsed time meter.
7. Auxiliary relays as required
8. Terminals for connection of all external devices. Only one external wire will be allowed in each terminal.
9. Soft start starter with loss of phase and overload protection for each motor – ABB PST series or equal with an SCR in each phase.
10. NEMA rated bypass contactor with overloads
11. Phase monitor operational only when in bypass mode.
12. SOFT START – BYPASS selector switch
13. Control Power Transformer (CPT) with 3 fuses
14. Prelube circuit, if required, that will energize a solenoid valve for 1 minute before the motor starts and de-energize it 1 minute after the motor starts. Both times shall be adjustable.

Control Panel RO: Panel controls RO Unit pumps and is provided pre-wired by the RO vendor. Contractor shall install power and control wiring to panel. See project drawings for panel location.

Control Panel WCP: Panel controls a Water Well pump. Mount all controls and indicators on an inner swing-out panel. No devices shall be mounted on the control panel front door. See project drawings for panel location.

Operation: In AUTO mode, motor will start on low Ground Storage tank level and stop on high Ground Storage tank level.
In MANUAL mode, motor will run continuously, regardless of tank level.
In OFF mode, motor will not run.
Level signal will come from LT-001, level sensor installed on the Ground Storage tank.

Control Panel HSCP: Panel controls High Service pumps and is provided pre-wired on a skid by the HSCP vendor. Contractor shall install power and control wiring to panel. See project drawings for panel location.

Operation: In AUTO mode, motor will start on low pressure and stop on high pressure.
In MANUAL mode, motor will run continuously, regardless of header pressure.
In OFF mode, motor will not run.
Pressure signal will come from PT-003, installed on water distribution header.

Control Panel BCP: Panel controls Blower pump. Mount all controls and indicators on an inner swing-out panel. No devices shall be mounted on the control panel front door. See project drawings for panel location.

Operation: In AUTO mode, motor will operate off of a timer.
In MANUAL mode, motor will run continuously.
In OFF mode, motor will not run.

2.04 DISCONNECT SWITCHES

The Contractor shall furnish and install disconnect switches if and as shown and as sized on the drawings. Switches shall be heavy duty, and horse power rated for the load applied in accordance with NEC. Unless indicated otherwise, all disconnect switches shall be non-fused. Enclosures shall have a hinged door. Switches shall be stainless steel. Switches shall be located in site of and within 50 feet of the load.

2.05 MAGNETIC FLOW METERS AND ACCESSORIES

The contractor shall furnish and install all flow meter equipment as shown on the drawings and as specified herein and as required to provide a complete and operational system.

A. Magnetic flow meters shall be as follows:

The Contractor shall furnish and install all instrumentation equipment as shown on the drawings and as specified herein and as required to provide a complete and operational system. The flow sensor tube shall be made of stainless steel with carbon steel or stainless steel flanges pressure rated as required for the piping system as specified in other sections of the specifications. A wafer style sensor will not be acceptable. The flow sensor shall be to NEMA 6 (IP-68) suitable for permanent submersion to 30 feet. The signal converter shall translate the signal induced in the flow sensor into proportional analog output. There

shall also be provided a digital indicator representing actual flow and total flow. The converter shall be capable of remote mounting. Integral converters are not acceptable. The signal converter shall have automatic zero stability and built-in "zero", "span", and "calibration" check circuitry. There shall be no need for external calibration devices. The flow range shall be digitally adjustable from 0-33 fps with a 1/100th resolution. The output signal shall represent the true volumetric flow with a maximum error under application conditions not only under "reference" or laboratory calibration conditions. Accuracy: ±0.5% of reading for flows 1.0 fps – 33 fps. The converter shall have bi-directional flow capability and provide isolated 4-20 ma and scaleable pulse frequency outputs from separate terminals. A reverse flow indicator shall be provided. The signal converter shall be "user friendly". No programming knowledge shall be required for its operation. The enclosure shall meet NEMA 4X and IP65 standards. Furnish and install grounding rings where they are required or necessary for proper operation of the system such as where they are used in non-conductive piping or non-conductive piping lining systems. The contractor and vendor shall identify these locations and submit the ring drawings and installation instructions with flow meter submittals. Units and all accessories shall be rated for outdoor service with UV exposure. Transmitters should have a dual compartment housing with the terminal block isolated from the electronics compartment.

B. Approved units are as follows:

1. ABB or Rosemount with hard rubber liner and external transmitter or approved equal.

C. Magnetic flow meter shall be guaranteed for a period of 3 years after placing into operation. Flow range shall be as shown below, recommended sizing is provided below, Contractor to verify meter sizing. In no case shall a meter smaller than 2" be installed. Contractor shall notify engineer if velocity falls below 0.2 in./s.

TAG	RECOMMENDED SIZE
MFM-001	4"
MFM-002	4"
MFM-003	6"

2.06 GAUGE PRESSURE INDICATING TRANSMITTERS

A. Gauge pressure transmitters shall be of the piezoresistive type with a process-isolated diaphragm with silicone oil fill, microprocessor-based "smart" electronics, and a field adjustable rangeability of 20:1 input range. Span and zero shall be continuously adjustable externally over the entire range. Span and zero adjustments shall be capable of being disabled internally. Transmitters shall be NEMA 4X weatherproof and corrosion resistant construction with low-copper aluminum body and 316 stainless steel process wetted parts. Accuracy, including nonlinearity, hysteresis and repeatability errors shall be plus or minus 0.1 percent of calibrated span, zero based. The maximum zero elevation and maximum zero suppression shall be adjustable to anywhere within sensor limits. Output shall be linear isolated 4-20 milliamperes 24 VDC. Power supply shall be 24 VDC, two-wire design. Each transmitter shall be furnished with a 5-digit LCD indicator capable of displaying engineering

units and/or milliamps and mounting hardware as required. Overload capacity shall be rated at a minimum of 25 MPa. Environmental limits shall be -40 to 185 degrees Fahrenheit at 0-100% relative humidity. Each transmitter shall have a stainless-steel tag with a calibration data attached to body.

B. The piezoresistive silicon pressure sensor shall be mechanically, electrically, and thermally isolated from the process and the environment, shall include an integral temperature compensation sensor, and shall provide a digital signal to the transmitter's electronics for further processing. Factory set correction coefficients shall be stored in the sensor's non-volatile memory for correction and linearization of the sensor output in the electronics section. The electronics section shall correct the digital signal from the sensor and convert it into a 4-20mA analog signal for transmission to receiving devices. The electronics section shall contain configuration parameters and diagnostic data in non-volatile EEPROM memory and shall be capable of communicating, via a digital signal superimposed on the 4-20 mA output signal, with a remote interface device. Output signal damping shall be provided, with an adjustable time constant of 0-36 seconds. Total Long Term Stability (Frequency of Calibration) shall be no less than 0.10% of URL for 1 year.

C. Where scheduled, gauge pressure indicating transmitters shall be calibrated in feet of liquid for liquid level service.

D. Gauge pressure indicating transmitters shall be **Model 2088** as manufactured by Rosemount, or approved equal.

2.07 CONDUIT AND FITTINGS

The Contractor shall furnish and install all conduit as shown on the drawings and as required. All conduit on this Project shall be of the following types:

A. Underground – Schedule 40 PVC U.L. listed for direct burial. Bury at a depth of 2'-0". Install electrical warning tape above conduit 12" above conduit.

B. Aboveground – Rigid aluminum.

C. Chlorine Building - Schedule 40 PVC pipe. Support with all non-corrosive PVC, fiberglass or stainless steel materials. Support at intervals that will produce no discernable sagging.

2.08 D. Hardware and boxes - All non-corrosive hardware and materials shall be utilized in this project. All switch and receptacle boxes shall be cast.600 VOLT WIRE

The Contractor shall furnish and install all 600-volt wire as shown on the drawings and as required. Wire is specified in the General Specifications for Electrical Installation of these Specifications.

2.09 AREA LIGHTING

Furnish and install the lights as shown on the drawings. Lights shall be provided with both a photocell and switch.

2.10 GROUNDING

The Contractor shall furnish and install a complete grounding system to provide a safe operating environment. Provide ground wire to metal building.

2.11 HEAT TRACE EQUIPMENT

The Contractor shall install heat tracing and insulation on the prelube line. Heat trace cable shall be standard plug-in cable. Insulate with split tube insulation and tape with aluminum tape to keep water out. Owner will plug in the cable every winter. Receptacle cover shall be metallic rated for continuous use.

2.12 SCADA SYSTEM

The contractor shall install a SCADA system with tower that provides line-of-site to Wallace Tower. This will allow for the RO Unit to be monitored remotely from an existing Water Plant control system. Configuration of the existing control system to allow monitoring of the RO Unit, HMI screen development, and system testing shall be included in the quote. The system will consist of inputs from field instrumentation, the SCADA enclosure, and the tower that includes the antenna.

A. SCADA System I/O

The RO Unit PLC shall be interfaced to the SCADA system radio and transmit flow, pressure, level, and pump status to either the Edgard or Lions Water Treatment Plant. The following instrumentation shall be interfaced to the SCADA system:

- MFM 1 – Well Pump Flow
- MFM 2 – Water Well By Pass to Ground Storage Tank Flow
- MFM 3 - Distribution System Effluent Flow and Pressure (PT-003)
- The SCADA enclosure shall be mounted on the rack by the RO Unit.
- Differential Pressure in the RO Treatment Unit
- Ground Storage Tank Levels
- High Service Pump No. 1 Running
- High Service Pump No. 2 Running
- Chlorine Alarm
- Tank Level Alarm

B. SCADA System Enclosure

The SCADA enclosure shall be mounted on the rack by the RO Unit. The enclosure shall contain everything required to monitor the water plant. The enclosure shall be fiberglass, NEMA 4, general area (non-hazardous area classification) design. The panel shall be supplied with 120 VAC from the lighting panel, contain an AC surge suppressor and

24vdc power supply. The PLC shall use Ethernet for communications with the radio. The following, at a minimum, shall be supplied in the enclosure:

- Ethernet switch
- Radio
- 24vdc power supply
- AC surge suppressor
- Circuit breaker
- Terminal strips
- Ground bar
- Fuse blocks

C. SCADA System Tower

The tower shall be a Rohn RSL80L30, R3-R10H, or approved equal. The tower shall have a tower height shall be 80', be constructed of hot dip galvanized metal , meet a wind rating of 130 mph, be self-supporting and have a Yagi 900 MHz or approved equal antenna. The contractor shall install the tower base per manufacturer guidelines and per applicable wind rating, erect the tower and install on the base, install an antenna on the tower, and run wiring from the antenna to the SCADA box. Additional specifications are listed below:

- Tower height – 80'
- Tower material – hot dip galvanized metal
- Wind rating – 130 mph
- Supports – Self-supporting (guy wire not required)
- Base Area – minimum 10'W x 10'L x 4' 4"D or per Manufactures requirements
- Tower construction - sectional
- Step Bolts
- Safety climb kit
- Safety climb system
- Grounding kit
- Lightning rod
- Anti-climb assembly
- Yagi 900 MHz Antenna

PART 3 - EXECUTION

3.01 SUBMITTALS

Submittal data shall include, but not be limited to the following requirements:

A. Complete materials list and items proposed to be furnished and installed.
B. Enclosure dimensions, materials of construction and NEMA ratings.
C. A description of operation for the control system.
D. Circuit Breaker Interrupting Ratings

E. All electrical drawings so that the system can be checked for compatibility with other systems to which it interfaces.

F. One drawing entitled "External Wiring Interface". It shall clearly identify all terminal strips including physical location and terminal numbers and shall also show external wiring and function.

Any submittals that are not complete, causes the Engineer to ponder, or where it is obvious that no effort was made to properly prepare them for easy checking by the Engineer will be rejected in their entirety.

Submittals sent to Engineer for processing that require information on equipment that has not been previously submitted for approval may or may not be reviewed before dependent submittals are sent. An example would be motor starter submittals sent before actual motor nameplate data is submitted on the motors that they are to control.

3.02 SUBSTITUTIONS

On any proposed substitute to the specified item, it shall be the responsibility of the contractor to show proof to the Engineer, that the proposed substitute is equal to the specified item by making written evaluation comparisons on material, performance, workmanship, maintenance features, energy use, durability, appearance, and the effect on compatibility with the other elements of the system with which the item will be used. All changes required in the wiring and other electrical modifications shall be the responsibility of the contractor.

3.03 GUARANTEE

All equipment shall be guaranteed against defects in material and workmanship for a period of one year from date of Owner's final inspection and acceptance, except equipment specifically indicated in these specifications as having an extended warranty period, to the effect that any defective equipment shall be repaired or replaced without cost or obligation to the Owner.

3.04 COORDINATION WITH FACTORY SERVICEMAN

The Contractor shall coordinate his work with the factory serviceman of the various vendors and shall provide whatever assistance is necessary to place the entire system in operation.

3.05 COORDINATION WITH THE POWER COMPANY

All work on the service entrance from weatherhead or pad mounted transformer to utilization equipment shall be per local power company requirements. Where there is conflict with plans and specifications with the power company requirements, the power company requirements shall govern. The contractor shall notify the engineer in advance of making a change for the Engineer's approval. In some instances, larger wire and conduit sizes may be required. The Contractor shall anticipate this requirement and include it in the bid price.

The Contractor shall coordinate all work with the local power company including scheduling and applying for service, furnishing, and/or installing all metering equipment and installing all service entrance weatherheads at elevation as required by power company and NEC.

Seal all conduits entering panels with duct seal where it is possible that water or moisture shown on drawings or indicated in these specifications). Utilize weather heads for all overhead service wire entering conduit. Where service conduit is installed by power company, the Contractor shall furnish a properly sized weather head to the power company to prevent water from entering any panel in which it terminates.

The Contractor shall furnish and install any terminal boxes as may be required by the power company.

3.06 OTHER PROVISIONS

Mechanical and other systems specified and furnished under other sections of these specifications that contain electrical systems shall be connected, wired, and tested by the Contractor in accordance with the drawings or as required by the manufacturer for a complete and operating system.

Electrical wire and conduit schedules, and interconnection drawings are prepared by the engineer to assist the Electrical Contractors in estimating the cost of the project and are based on the latest information available from the vendors at the time of design. Once shop drawings are received, changes may be required on the project external wiring to accommodate their latest design and to make the system function properly. Conduit sizes shown are to be the minimum sizes utilized. Verify that the selected wire and cable will meet the NEC if installed in these conduits; otherwise increase conduit sizes as required. It shall be the contractor's responsibility to check with the various vendors before bidding the project and to include monies in his bid to accommodate these requirements since no changes to the contract price will be allowed for these changes. Also, certain items of equipment shown on drawings that are to be furnished by a specific vendor may actually be furnished by another "or equal" vendor. Wiring changes required by this action shall be done at no additional cost and must be approved by the Engineer.

Where there are conflicts between various sections of the electrical specifications and/or drawings and/or other sections of the specifications, then the more stringent wording for a particular product, material, item of work or guarantee shall apply unless approved otherwise by the Engineer. Should a discrepancy occur, notify the Engineer before proceeding.

Provide a 4" high housekeeping curb beneath all free standing electrical equipment. Provide with 6" horizontal clearance all around.

The electrical drawings show the general locations of the equipment. The Contractor shall refer to the mechanical and civil drawings to obtain more accurate and the latest location of the equipment as well as to scale the drawings for distances.

Should the Contractor deem that a manhole or pull box is required to pull wires and cables then he shall install as shown on the drawings or, if not on drawings, provide a drawing of the proposed installation that meets the requirements of the NEC for the Engineer's approval. Installation shall be at no additional cost to the owner.

All conduit entrances into NEMA 3R, 4, and 4X panels shall be made using Meyer (or equal) hubs with approve gaskets. No penetration into the top of this type of enclosure will be allowed.

Utilize silicon sealant on conduits that exit chlorine areas to prevent gas travel down conduit.

The electrical drawings and specifications contain a design in accordance with the National Electrical Code. Some pump and/or motor manufacturers have additional requirements. The Contractor shall provide all additional electrical devices, equipment, and materials as necessary for any particular manufacturer of equipment supplied on the project to maintain the warranty specified in the plans and specifications. Any changes and/or additions shall be reviewed by the Engineer for conformity with the NEC at the time of shop drawing review. Any and all costs associated with these changes and modifications shall be included in the bid price.

3.07 LIST OF SUBMITTALS REQUIRED FOR E & I REVIEW

The following is a list of submittals that are to be submitted on this project. This list may or may not be complete but is to be used as a guide in preparation of the submittal packages. It in no way shall be construed to identify the only equipment or level of submittal details to be furnished in this project.

A. All Control Panels and Accessories
B. Main Circuit Breaker
C. Light Fixture
D. Manual Transfer Switch
E. MPZ
F. Junction Boxes
G. 600 Volt Wire
H. Conduit
I. Conduit Fittings
J. Motors
K. Any other electrical equipment and devices
L. Instrument Installation and Operations Manual
M. Instrument Cut Sheets

Contractors are cautioned to read and supply to all of his vendors other articles in the electrical sections of the specifications relative to submittals.

END OF SECTION

APPENDICES

APPENDIX A

GEOTECHNICAL REPORT

GEOTECHNICAL INVESTIGATION
PLEASURE BEND
WATER TREATMENT TANK
WEST BANK FIRE STATION
1200 LA HIGHWAY 643
PLEASURE BEND, LOUISIANA
AAI REPORT NO. 16-2891

Ardaman & Associates, Inc.

OFFICES

Orlando, 8008 S. Orange Avenue, Orlando, Florida 32809, Phone (407) 855-3860
Alexandria, 3609 Mac Lee Drive, Alexandria, Louisiana 71302 Phone (318) 443-2888
Bartow, 1525 Centennial Drive, Bartow, Florida 33830, Phone (863) 533-0858
Baton Rouge, 316 Highlandia Drive, Baton Rouge, Louisiana 70884, Phone (225) 752-4790
Cocoa, 1300 N. Cocoa Blvd., Cocoa, Florida 32922, Phone (321) 632-2503
Fort Myers, 9970 Bavaria Road, Fort Myers, Florida 33913, Phone (239) 768-6600
Miami, 2608 W. 84th Street, Hialeah, Florida 33016, Phone (305) 825-2683
Monroe, 1122 Hayes Street, West Monroe, Louisiana 71292, Phone (318) 387-4103
New Orleans, 1305 Distributors Row, Suite I, Jefferson, Louisiana 70123, Phone (504) 835-2593
Port Charlotte, 740 Tamiami Trail, Unit 3, Port Charlotte, Florida 33954, Phone (941) 624-3393
Port St. Lucie, 460 Concourse Place NW, Unit 1, Port St. Lucie, Florida 34986, Phone (772) 878-0072
Sarasota, 78 Sarasota Center Blvd., Sarasota, Florida 34240, Phone (941) 922-3526
Shreveport, 7222 Greenwood Road, Shreveport, Louisiana 71119, Phone (318) 636-3673
Tallahassee, 3175 West Tharpe Street, Tallahassee, Florida 32303, Phone (850) 576-6131
Tampa, 3925 Coconut Palm Drive, Suite 115, Tampa, Florida 33619, Phone (813) 620-3389
West Palm Beach, 2200 North Florida Mango Road, Suite 101, West Palm Beach, Florida 33409, Phone (561) 687-8200

MEMBERS:
A.S.F.E.
American Concrete Institute
American Society for Testing and Materials
Florida Institute of Consulting Engineers

Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

24 January 2017

Environmental Engineering Services, Inc.
610 Belle Terre Boulevard
Laplace, Louisiana 70068

Attention: Donovan Duffy

Geotechnical Investigation
Pleasure Bend Water Treatment Tank
West Bank Fire Station
1200 La. Highway 643
Pleasure Bend, Louisiana
AAI Project No. 16-2891

Gentlemen:

Herein is our report on the results of a geotechnical investigation made for the subject project. We appreciate the opportunity to serve you. Please contact us should you have any questions.

Yours very truly,

ARDAMAN & ASSOCIATES, INC.

R. AUSTIN NALL, E.I.
Assistant Project Engineer

Reviewed By:

NABIL MIKHAIL, P.E., D.GE
Senior Geotechnical Engineer

1305 Distributors Row, Suite I, Jefferson, Louisiana 70123 Phone (504) 835-2593 Fax (504) 835-2982
Louisiana: Alexandria, Baton Rouge, Monroe, New Orleans, Shreveport
Florida: Bartow, Cocoa, Fort Myers, Miami, Orlando, Port Charlotte, Port St. Lucie, Sarasota, Tallahassee, Tampa, West Palm Beach

TABLE OF CONTENTS

		Page No.
1.0	INTRODUCTION	1
2.0	SOIL BORING	2
	2.1. Field Exploration	2
3.0	LABORATORY TESTS	3
4.0	SUBSOIL CONDITIONS	3
	4.1. Geology	3
	4.2. Subsoil Description	4
	4.3. Groundwater	4
5.0	FOUNDATION ANALYSIS	5
	5.1. Shallow Foundations	5
	Estimated Soil Bearing Capacity	5
	Estimated Settlements	6
	Mat Foundations	6
	Fill Materials	7
	Fill and Floor Loads	8
	5.2. Pile Foundations	10
	Estimated Pile Load Capacities	10
	Drag Load	11
	Group Effect	12
	Estimated Settlements	12
	Pile Driving	12
	Auger Cast Pile Installation	13
	Vibrations	14
	Load Test Program	14

FIGURES 1 and 2

APPENDIX

GEOTECHNICAL INVESTIGATION
PLEASURE BEND WATER TREATMENT TANK
WEST BANK FIRE STATION
1200 LA HIGHWAY 643
PLEASURE BEND, LOUISIANA
AAI PROJECT NO. 16-2891

1.0 INTRODUCTION

This report contains the results of a geotechnical investigation made for the subject project. Instructions to proceed with the investigation were received on December 7, 2016 from Donovan Duffy, Project Engineer of Environmental Engineering Services, Inc. A statement of limitations is provided following the text of this report.

The proposed construction will consist of a new water treatment tank and associated Reverse Osmosis (RO) unit to be located at the existing West Bank Fire Station in Pleasure Bend, Louisiana. The tank will be approximately 23 ft. in diameter, 20 ft. tall, and have a 42,000-gallon capacity. The RO unit will be housed in a 20 ft. by 10 ft. Sea-Can container and will weigh approximately 15,000 lbs.

The study included the drilling of one (1) soil test boring to determine subsurface conditions and stratification and the performance of soil mechanics laboratory tests on samples obtained from the boring to evaluate their physical characteristics. Engineering analyses were made, based on the boring and test data to develop criteria to be used in foundation design.

2.0 SOIL BORING

2.1. Field Exploration

One (1) undisturbed sample type soil test boring (B-1) was drilled to a depth of 80 ft. below the existing ground surface at the subject site on December 21, 2016. The boring was made with an ATV mounted drill rig within the footprint of the proposed water treatment tank and at the location approximately shown in plan on Figure 1.

Sampling was performed continuously within the upper 10 ft. and on 5 ft. centers thereafter. Undisturbed sampling was performed in all cohesive or semi-cohesive materials with a three inch diameter thin wall tube sampler in general accordance with ASTM D-1587-93. Representative samples were cut from the cores and placed in moisture proof containers for preservation until laboratory testing could be performed.

When cohesionless material was encountered, which could not be sampled by undisturbed methods, the Standard Penetration test was performed. This test consists of driving a two inch diameter splitspoon sampler 1 ft. (after first seating it 6 inches) with a 140 lb. hammer falling 30 inches. The number of blows required to drive the sampler gives an indication of the density of the material. Recovered samples were transported to AAI's Jefferson laboratory daily. A log of the boring showing the detailed stratification and sample depths is given in the Appendix of this report.

3.0 LABORATORY TESTS

In order to develop the physical properties of the soils, soil mechanics laboratory tests were performed on samples obtained from the boring. This testing consisted primarily of natural moisture content, unit weight, unconfined compression and triaxial compression. Grain size (percent fines passing the No. 200 sieve) were performed on some of the more granular materials and Atterberg limits were performed on selected cohesive samples. All tests were performed in general accordance with the applicable ASTM procedures. The results of all of the laboratory tests are tabulated alongside the boring log given in the Appendix at the appropriate sample and depth.

The unconfined compression and triaxial shear tests give a measure of "skin friction" values used to estimate pile load capacities. The Atterberg limits along with the natural moisture content tests give an indication of the compressibility of the soils and are used empirically to estimate settlements. The grain size tests are used to classify the more granular soils.

4.0 SUBSOIL CONDITIONS

4.1. Geology

Geologically, the project site is located within in area of Holocene era deposits of the St. Bernard delta lobe of the Mississippi River. These deposits generally consist of cyclically

interbedded clay, natural levee silt and clay, and distributary sand. Stiffer soils of the Pleistocene era underlay the Holocene age soils and generally consist of silty clay and clay.

4.2. Subsoil Description

Reference to the log of Boring B-1 shows that beginning at the ground surface there is loose brown sand fill to approximately the 6 ft. depth. This is underlain by 2 ft. of medium stiff gray clay. Beginning at the 8 ft. depth is loose to medium dense gray silty sand to the 22 ft. depth. Below this is soft to medium stiff gray clay to the 57 ft. depth. At the 57 ft. depth, the geologically identified Pleistocene age soils were encountered. The Pleistocene soils consist of stiff to very stiff light gray and tan clay and extend to at least the 80 ft. depth, the maximum depth explored.

4.3. Groundwater

At the time of making the boring, free water was detected at about the 8 ft. depth below the existing ground surface in the boring. After a 15-minute waiting period, the water level remained at the 8 ft. depth. These observations and measurements were made while making the boring and groundwater may not have become fully static at that time. At the 10 ft. depth, the rotary wash method of drilling was used to advance the boring which adds water to the borehole. This precludes an accurate measurement of the groundwater depth. In any event, groundwater could fluctuate due to seasonal precipitation, drainage, prolonged drought, etc. If groundwater is important to construction, it should be measured at that particular time.

5.0 FOUNDATION ANALYSIS

It is understood that the proposed construction will consist of a new water treatment tank and associated RO unit. The tank will be approximately 23 ft. in diameter, 20 ft. tall, and have a 42,000-gallon capacity. The RO unit will be housed in a 20 ft. by 10 ft. Sea-Can container and will weigh approximately 15,000 lbs. It is further understood that up to 3 ft. of fill will be needed to raise the grade in the area of the proposed RO unit.

The near surface soils at the site are only fair in bearing quality and the underlying soils are compressible, even under nominal loading. They are believed capable of supporting the proposed structure on spread footings or a mat foundation provided that some settlements can be tolerated. Consequently, analyses were made in this regard. Analyses were also made with regard to piles for support for comparative purposes and in the event that estimated settlements of shallow foundations are intolerable.

5.1. Shallow Foundations

Estimated Soil Bearing Capacity Based on an analysis of boring B-1, it has been determined that an allowable soil bearing capacity of 2,150 lbs. per sq. ft. is available for design of square spread footings 5 ft. in width. For continuous footings 3 ft. in width, an allowable soil bearing capacity of 1,300 lbs. per sq. ft. is available for design. These allowable soil bearing capacities assume that the footings will be placed at the 2 ft. depth below the existing ground surface elevation at the boring location and are seated in the existing fill material or a

controlled-compacted structural fill, as will be discussed. They contain a factor of safety of about 3.0 against failure which is recommended for design, but do not preclude settlements, as will be discussed.

Estimated Settlements Long term settlements of 5 ft. square spread footings or 3 ft. wide continuous footings and using the recommended allowable soil bearing capacities are estimated to be on the order of ½ to 1 inches. This assumes the sustained load on the footings is up to about 60 to 70 percent of the total. Settlements would increase with the size of the spread footings and, if larger footings are needed for support, detailed settlement analyses should be made. The foregoing estimated settlements are due to structural loads and do not include those due to fill and floor loads, as will be discussed. In addition to the foregoing estimated consolidation settlements, approximately ¼ to ¾ inches of immediate settlements are estimated.

Mat Foundations The near surface soils at the site are believed capable of safely supporting the proposed structural loads on a mat foundation without a shear failure. However, long-term settlements due to consolidation of the underlying subsoils from the load imposed by loads should be expected. Analyses were made to estimate these settlements for a uniform unit load of 1,200 and 200 lbs. per sq. ft. over the area of the proposed water treatment tank and RO unit, respectively. This load should include the foundation, structural dead load and any realistic sustained live load. The results of the settlement analyses are given in the following table.

STRUCTURE	UNIFORM UNIT LOAD (LBS. / SQ. FT.)	MAT FOUNDATION AREA (SQ. FT.)	ESTIMATED SETTLEMENT* (INCHES)	IMMEDIATE SETTLEMENT (INCHES)
RO Unit	200	200 (10 ft. x 20 ft.)	¼ to ¾	¼ to ½
Water Tank	1,200	415 (23 ft. diam.)	1 to 2	¼ to 1

*The estimated settlement does not include the immediate settlement or settlement due to fill placement

Given in the foregoing table are estimated long-term settlements and immediate settlements of the loaded area. The foregoing analyses assume uniform loading over a "rigid" mat foundation. Non-uniform load conditions and intrinsic differences in the subsoils could exist and disrupt this theoretical pattern of settlements. The foregoing estimated settlements are due to structural loads and do not include those due to fill and floor loads, as will be discussed.

Fill Materials Prior to construction, the area of the structure foundation should be stripped of all vegetation, soft or loose surface soils, deleterious materials, etc. and should be well drained. This should be replaced with controlled-compacted structural fill. This structural fill, which could also be used to raise the site grade, could consist of "sugar" sand or "pumped" sand having less than 10 percent fines passing the No. 200 Sieve. It should be compacted to at least 95 percent of Maximum Dry Density at Optimum Moisture Content according to ASTM D-698 Laboratory Compaction Characteristics of Soil Using Standard Effort. In-place density measurements should be taken to assure that this degree of compaction is achieved. For this case,

footings could be seated at a shallower depth in the structural fill using the allowable soil bearing capacities given above.

The existing fill material encountered in Boring B-1 from the 0 to 6 ft. depth appears to have been placed in a controlled-compacted manner. If the structure foundation will be placed in the existing fill material, in-place density measurements should be taken to assure that the existing fill meets the degree of compaction described above. If the existing fill does not meet the compaction criteria, it should be then be compacted and tested in accordance to the guidelines above.

Fill and Floor Loads It is understood that up to 3 ft. of new fill may be required to raise an approximate 20 ft. by 30 ft. area at the location of the proposed RO unit. The near surface soils at the site are believed more than capable of safely supporting the fill and floor loads without a shear failure. However, long-term settlements due to consolidation of the underlying subsoils from the load imposed by the fill and floor should be expected. Analyses were made to estimate these settlements for a uniform unit load of 200 to 400 lbs. per sq. ft. over the area of the proposed structure. This load should include fill load, floor dead load and any realistic sustained live load. The results of the settlement analyses are given in the following table.

UNIFORM UNIT LOAD (LBS. / SQ. FT.)	ESTIMATED SETTLEMENT (INCHES)	
	Center	Edge
200	½ to 1	¼ to ¾
300	¾ to 1¼	½ to 1
400	1 to 1½	¾ to 1¼

Given in the foregoing table are estimated long-term settlements at both the center and at the edge of the loaded area. The difference from center to edge would give an indication of the differential settlements that should be expected. The foregoing analyses necessarily assume uniform loading over a "flexible" foundation. Non-uniform load conditions and intrinsic differences in the subsoils could exist and disrupt this theoretical pattern of settlements. The foregoing settlements due to fill and floor load would be additive to those given above based on the structural load.

In view of the magnitude of the estimated settlements due to both the structural loads and the fill and floor loads, and to bridge any undetected soft or loose areas, it is recommended that good rigidity be assured in the structure foundation to minimize any detrimental effects of differential settlements. This could consist of stiffening grade beams, tying individual foundation elements together and forming a rigid or "waffle-like" pattern. If the foregoing estimated settlements are considered intolerable, piles should be used for support of all structural loads that cannot tolerate settlements including the ground floor slab and any sensitive pavement.

5.2. Pile Foundations

Analyses were also made based on the soil boring B-1 and the laboratory test results to estimate the load carrying capacities of several types and lengths of treated timber piles, in general accordance with ASTM D-25, and concrete auger cast piles. Consideration was given to Class "B" timber piles and 12- and 16-inch diameter concrete auger cast piles. The piles will generally receive their support through "skin friction" along their embedded length, since no stratum was encountered that would offer good additional "point" support.

Estimated Pile Load Capacities The results of the analyses to estimate pile load capacities in compression and tension, or uplift, are given in the following table. Pile lengths given are as measured from the existing ground surface elevation at the boring location, but a pile cutoff of 2 ft. should be of no consequence.

PILE TIP DEPTH IN FEET BELOW EXISTING GROUND SURFACE	ESTIMATED SINGLE PILE LOAD CAPACITY IN TONS* FACTOR OF SAFETY =2.0 IN COMPRESSION FACTOR OF SAFETY =3.0 IN TENSION					
	Class "B" Timber (7" tip dia. – 12" butt dia.)		12" Dia. Auger Cast		16" Dia. Auger Cast	
	Comp.	Tens.	Comp.	Tens.	Comp.	Tens.
40	11	7	13	8	18	12
45	12	8	14	9	19	13
50	13	9	16	10	21	14
55	15	10	18	12	24	16
60	18	12	21	14	29	19
65	21	14	26	16	34	22
70	24	16	30	20	40	26
75	25	17	34	21	46	30

* These are soil-pile related values and consideration should be given to the structural integrity of the pile member.

** Pile compression capacities given, based on a factor of safety of 2.0, assume a static load test is performed as described in the Load Test Program section.

The foregoing estimated pile load capacities contain factors of safety of 2.0 against failure in compression and 3.0 in tension, or uplift, which are recommended for design. They do not consider drag load, group effect or settlements, as will be discussed.

Drag Load When fill is placed on the site, the underlying compressible soils consolidate, resulting in surface settlement. As the compressible soils consolidate, "negative skin friction" or downdrag may be imparted on piles. This could result in an extraneous load, additive to any structural load, on the piles and could increase settlements of the structure. It is our opinion that drag load is dependent on the thickness of fill, compressibility of the soils, time-rate of consolidation and pile length. If up to 3 ft. of new fill or less is required, drag load should be

unimportant to design. However, it is recommended that this fill be placed as soon as practical prior to construction. If more than 3 ft. of new fill is required, further consideration should be given to the effects of drag load.

Group Effect The effect of pile grouping on the single pile load capacities is dependent on pile spacing, pile length and soil characteristics throughout the pile length and below the pile tips. Assuming a minimum center-to-center spacing of 3 ft., group effect should be unimportant for pile clusters of less than 6 to 8 piles. Group effect could become important for larger clusters and should be evaluated when actual pile layout is known as outlined in the criteria given on Figure 2.

Estimated Settlements No detailed pile settlement analyses were made since the design structural loads, pile length, pile layout, etc. are not known at the present time. However, settlement of pile supported footings using the recommended pile load capacities in single widely spaced rows or in clusters of up to 4 to 6 piles are estimated to between ¾ and 1 inch. Settlements would increase with the size for the pile cluster and, if larger clusters of closely spaced piles are needed for support, detailed settlement analyses should be made.

Pile Driving Some discussion with regard to pile driving appears warranted. In general, driving of Class "B" timber piles should be limited to the rate of 25 blows per foot using

a Vulcan No. 1 hammer or equivalent. These recommendations are given in order to minimize possible damage to the piles.

Predrilling through the upper sand (22± ft. depth) may be needed to facilitate pile driving without damaging the piles. For this case, the drill bit diameter should not exceed the timber pile tip diameter. Predrilling should be ceased as soon as the upper sands are fully penetrated and the piles then driven with normal driving effort to the desired pile tip depth.

Auger Cast Pile Installation Our experience indicates that not all deep foundation contractors have the specialized equipment and experience required to successfully install auger cast piles. The selection of a qualified contractor is believed to be essential. The recommendations given herein with regard to auger cast piles are based on the pile installation being performed by a contractor who has proven experience with similar installations. In this regard, it is recommended that the foundation contractor's personnel on the site who are responsible for the installation should have relevant experience with the auguring and pumping equipment as well as experience placing piles under similar site conditions and in similar subsurface conditions. A quality control procedure should be established in conjunction with a testing laboratory to verify that all auger cast piles are installed to the proper dimensions, tip depth, grout volume, etc., and should be in accordance with the guidelines presented in the Deep Foundations Institute's Augured Cast-In-Place Piles Manual, most recent edition

Vibrations Vibrations due to pile driving activities should be expected and they should be monitored during the driving of probe piles and job piles. In general, vibrations should be limited to about 0.25 inch/sec. (peak particle velocity) at all existing nearby sensitive structures. If this value is exceeded, further consideration should be given to the effects of vibrations.

Load Test Program This section provides recommendations with respect to load testing the deep foundation types considered in this report. It should be noted that our recommendations with regard to quantity and frequency of probe/test piles is subject to change once the final structure configurations have been selected.

We recommend driving at least two (2) probe piles at the site once the pile type to be used for production has been selected. If soil conditions encountered during probe pile program appear significantly different from the substation borings, contact our office immediately. More probe piles may be needed, depending on the final structure layout. All probe piles should be installed using the same equipment and techniques to be used in installing the production piles. The probe pile(s) having the lowest driving resistance should be designated as a test pile for a compressive static load test. The test pile should be selected in consultation with our office.

The test pile should then be permitted to "set" for a minimum of 14 days after driving or after an auger cast pile's grout meets its design compressive strength, after which it should be load tested in accordance with ASTM D 1143, or Section 804.11 of the Louisiana

Standard Specifications for Roads and Bridges, latest edition. The test pile program shall be monitored and/or performed by a representative of the geotechnical engineer.

ARDAMAN & ASSOCIATES, INC.

R. AUSTIN NALL, E.I.
Assistant Project Engineer

Reviewed By:

1.24.2017

STATE OF LOUISIANA
NABIL S. MIKHAIL
License No. 35300
PROFESSIONAL ENGINEER

NABIL MIKHAIL, P.E., D.GE
Senior Geotechnical Engineer

LIMITATIONS AND CONDITIONS

The analyses and recommendations presented in this report are based on the provided project information and the results of the investigation. It is always possible that variations can occur away from the borehole location. If it becomes apparent during construction that subsurface conditions differing significantly from those observed in our boring are being encountered, AAI should be notified so their effects can be determined and any remedial measures necessary can be prescribed. Also, should the nature of the project change, the recommendations provided in the report may have to be re-evaluated and may not be valid.

This report has been prepared for the exclusive use of our client for the purpose of constructing the proposed project features as generally described in the report. The recommendations provided in the report are site specific and are not intended for use at any other site or for any other facility. The report provides recommendations for design and construction and should not be used as construction specifications.

VICINITY MAP

NOT TO SCALE

REFERENCE:
SITE IMAGE BY GOOGLE.

NOT TO SCALE

NOTE:
BORING LOCATIONS ARE APPROXIMATE.

Pleasure Bend
Water Treatment Tank

12 LA HWY 643
Pleasure Bend, Louisiana

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ENG	Drawn by:	Checked by:
R.A.N.	R.A.N.	N.M.
File No.: 16-2891	Date: 1/15/17	FIG No. 1

Title: **Soil Boring Location Plan**

G:\Projects\2016\16-2891 (Pleasure Bend Water Treatment Tank)\Site Plan\16-2891 Boring Location Plan.dwg
Jan 18, 2017 – 10:49am

Minimum Pile Spacing

$$SPAC = 0.05\ L_1 + 0.025\ L_2 + 0.0125\ L_3$$

SPAC(ft.) = Center to center spacing of piles = (Min. 3.0 ft.)

L_1 = Pile penetration in ft. up to 100 ft.

L_2 = Pile penetration in ft. from 101 to 200 ft.

L_3 = Pile penetration in ft. from 201 to 300 ft.

Allowable Group Capacity*

$$Q_a = \frac{P \times L \times c}{FSF} + \frac{2.6 \times q_u \times (1 + 0.2\ {}^{w}/_{b}) \times A}{FSB}$$

P = Perimeter distance of pile group (ft.)

L = Length of pile (ft.)

c = Average (weighted) shear strength (½ q_u) of soil throughout pile length (lbs./sq. ft.)

q_u = Unconfined compressive strength of soils below pile tips (lbs./sq.ft.)

w = Width of base of pile group (ft.)

b = Length of base of pile group (ft.)

A = Base area of pile group (sq. ft.)

FSF = Factor of safety for friction area = 2

FSB = Factor of safety for base area = 3

*In no case should the recommended single pile load capacity be exceeded.

Figure 2

APPENDIX

BORING LOG

DESCRIPTION OF TERMS AND SYMBOLS USED ON SOIL BORING LOG

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits			Other	Soil Type	DESCRIPTION
							LL	PL	PI			

5

10

15

20

25

30

35

40

Ground Water Levels

Long-Term Depth
Depth to water after boring is completed (time noted).

Short-Term Depth
Depth to water after initial water encountered prior to proceeding with boring (time noted).

Initially Encountered
Depth where free water was initially encountered during augering.

Sampling/Field Data

3.5 (P) — **Undisturbed**
3" dia. Tube sample

Pocket Penetrometer (P)
Penetration resistance (tons/sq. ft.).

Torvane (T)
Shearing resistance (tons/sq. ft.)

13 b/f (3-7-6) — **Split Spoon**
Std. penetration test

Std. Penetration
No. of blows per foot (blows per each six inch increments).

Auger
Disturbed (auger) collected in accordance with ASTM D-1452.

No Recovery
Sampling attempted but no sample retrieved.

DESCRIPTION

Description
Classifications are based on visual observations by field & lab representatives as well as results of laboratory data (when available).

Laboratory Data

Compressive Strength
Value based on peak compressive strength. Determined by unconfined compression test unless otherwise noted.

Dry Unit Weight
As determined by method similar to ASTM D-2937.

Water Content
As determined by pertinent portions of ASTM D-2216.

Atterberg Limits
LL : Liquid Limit
PL : Plastic Limit
PI : Plasticity Index
(= Liquid Limit - Plastic Limit)

Other
Results of other tests such as consolidation, permeability, grain size or notes associated with testing program.

Soil Type
Graphical representation of soil type. In accordance with USCS Symbols.

Ground Water Level Data	Boring Advancement Method	Notes
	Boring Abandonment Method	

Form LOGTERMS

Strata Boundaries May Not Be Exact

Pleasure Bend WTT
Water Treatment Tank
Pleasure Bend, St. John Parish

LOG OF SOIL BORING B-1

Ardaman & Associates, Inc.

File: 16-2891
Date: 12/21/16
Logged by: Black
Driller: D.Anthony
Rig: Ardco K-1000

Environmental Engineering Services, Inc
610 Belle Terre Blvd.
Laplace, LA 70068

Location: Lat. 29° 55' 8.2"
Long. 90° 37' 41"
Surface Elevation: n/a

FIELD DATA				LABORATORY DATA									
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Percent Passing #200 Sieve	Organic Content (%)	Soil Type	Description
			6 b/f 2-3-3		8					10			Loose brown SAND (SP-SC) with clay (FILL)
			9 b/f 3-3-6		9					2			Loose brown SAND (SP) with trace clay (FILL)
	5		9 b/f 4-4-5		10					1			
▽			7 b/f 4-3-4		31					97			Medium Stiff gray CLAY (CH) with silt and trace sand
	10		1.0 (P)	0.89 t=2.2	32	122							Loose gray SILTY SAND (SM) with clay
			13 b/f 6-6-7		29					39			Medium Dense gray SILTY SAND (SM)
	15												
			15 b/f 5-7-8		25					33			
	20												
			0.5 (P)	0.32 t=6.4	50	107	54	17	37				Soft to Medium Stiff gray CLAY (CH) with trace shell fragment
	25												
			0.5 (P)		38								-with sand
	30												
			0.5 (P)	0.58 t=9.2	57	104							
	35												
			0.5 (P)		40								Soft gray CLAY (CH) with sand
	40												
			0.5 (P)	0.25 t=11.9	39	113							
	45												
			0.5 (P)		64								Medium Stiff gray CLAY (CH)
	50												

Continued Next Page

Ground Water Level Data

▽ Free water first encountered

▼ Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger: 0 to 10 ft.
4" Dia. Rotary Wash: 10 to 80 ft.

Boring Abandonment Method

Borehole grouted with cement/ bentonite upon completion

Notes

t = Lateral Confining Pressure (psi).

Strata Boundaries May Not Be Exact

Pleasure Bend WTT
Water Treatment Tank
Pleasure Bend, St. John Parish

LOG OF SOIL BORING B-1

Ardaman & Associates, Inc.

File: 16-2891
Date: 12/21/16
Logged by: Black
Driller: D.Anthony
Rig: Ardco K-1000

Environmental Engineering Services, Inc
610 Belle Terre Blvd.
Laplace, LA 70068

Location: Lat. 29° 55' 8.2"
Long. 90° 37' 41"
Surface Elevation: n/a

FIELD DATA				LABORATORY DATA									
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Organic Content (%)	Soil Type	Description
	55		1.0 (P)	0.54	57	105							Medium Stiff gray CLAY (CH)
	60		2.5 (P)	1.07	33	120							Stiff to Very Stiff light gray and tan CLAY (CH) with silt lenses
	65		4.0 (P)		31								
	70		2.5 (P)	1.09	31	117	56	20	36				
	75		2.5 (P)		36								
	80		3.0 (P)	2.22	34	116							
	85												Boring completed at 80 ft.
	90												
	95												
	100												

Ground Water Level Data

Free water first encountered

Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger:
0 to 10 ft.
4" Dia. Rotary Wash:
10 to 80 ft.

Boring Abandonment Method

Borehole grouted with cement/ bentonite upon completion

Notes

t = Lateral Confining Pressure (psi).

Strata Boundaries May Not Be Exact

APPENDIX B

LABORATORY ANALYSIS

PETROLEUM LABORATORIES, INC.

333 East Kaliste Saloom Road
Lafayette, Louisiana 70508
337-234-7414

Company: Layne Christensen Co. - Prairieville
Location 1220
PO Box 1652
Prairieville, LA 70769

Attn: Mr. Bruce Duhe

Report Date: 03/17/14

Location: St. John the Baptist
"Addendum Report"

Lab No: LFF-0119
Non-Regulatory

Fresh Water Complete Analysis

Job #28290
Sample Date: 03-07-14

Parameters - units	Results
pH - s.u.	7.70
Turbidity - NTU	6.11
Color - Apparent	20
Calcium Carbonate - mg/l	<0.01
Calcium Bicarbonate - mg/l	233.69
Magnesium Carbonate - mg/l	<0.01
Magnesium Bicarbonate - mg/l	160.80
Sodium Carbonate - mg/l	<0.01
Sodium Bicarbonate - mg/l	197.42
Sodium Sulfate - mg/l	1.48
Sodium Chloride - mg/l	302.55
Nitrogen As Nitrate - mg/l	<0.01
Silica As Silicon Dioxide - mg/l	26
Manganese - mg/l	0.10
Chloride - mg/l	183.6
Iron - mg/l	1.18
Carbonate - mg/l	<0.01
Bicarbonate - mg/l	453.35
Sulfate - mg/l	1.00
Calcium - mg/l	57.70
Magnesium - mg/l	26.80
Sodium - mg/l	173.49
Fluoride - mg/l	0.09
Ammonia Nitrogen	4.03
Phosphorous	1.9
Total Dissolved Solids- mg/l	923.31
Total Hardness Calcium Carbonate- mg/l	254.39
"P" Alkanlinity As Calcium Carbonate- mg/l	<0.01
"MO" Alkalinity As Calcium Carbonate- mg/l	371.6
Total Organic Carbon	3
Langlier Saturation Index	+1.2

Attest: Sham Rathn.

WATER · MINERAL · ENERGY

LFF-0119

PURCHASE ORDER

P.O. No.: 188991

Layne Christensen Company

Bill To:
W229 N5005 DUPLAINVILLE RD
PEWAUKEE WI 53072

Vendor:
PETROLEUM LABORATORIES INC
109 CLEVELAND STREET
HOUMA Louisiana 70363

Shipping Address: ( ) Yard or ( ) Job Site
Layne Christensen Company
15112 Daigle Road
Prairieville Louisiana 70769

ORD DATE	REQ DATE	ORDERED BY	BUYER	FOB	CURRENCY
03/07/14	03/07/14		UJVARI, ELAINE		USD

SHIPPING / DELIVERY INSTRUCTION

JOB CODE/SPECIAL INSTRUCTIONS

St. John the Baptist Job#28290

LINE	REV	QTY	PART NUMBER	DESCRIPTION	UOM	PRICE	EXT PRICE
1.000	0	1.00	SECONDARY	SECONDARY STANDARD ANALYSIS IS NOT DRINKING OR POTABLE	EA	118.00	118.00

The above P.O. Number must appear on all documents and packages pertaining to this order.

Tax	11.00
Totals (USD)	129.00

This Purchase Order is subject to the Terms and Conditions on the reverse of this page.

Assigned Purchaser/Project Manager — Date

PLEASE SEND ORIGINAL BILL OF LADING WITH YOUR INVOICE

Vendor Authorization — Date

IMPORTANT

PLEASE NOTIFY IMMEDIATELY IF YOU ARE UNABLE TO SHIP COMPLETE ORDER BY DATE SPECIFIED

Layne Christensen is an Equal Opportunity Employer

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

September 28, 2015

Donna Bourgeois
Curtis Environmental
185 Belle Terre Blvd., Ste. D
La Place, LA 70068

RE: Project: New Water Well Testing
Pace Project No.: 35206520

Dear Donna Bourgeois:
Enclosed are the analytical results for sample(s) received by the laboratory on September 10, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

Containers were sent to a certified Pace network lab E87605 for 2,3,7,8-TCDD & a certified outside lab for asbestos analysis, reports attached

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Joe Vondrick
joe.vondrick@pacelabs.com
Project Manager

Enclosures

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

CERTIFICATIONS

Project: New Water Well Testing
Pace Project No.: 35206520

Pennsylvania Certification IDs
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
L-A-B DOD-ELAP Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH-0694
Delaware Certification
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana DHH/TNI Certification #: LA140008
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: PA00091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nebraska Certification #: NE-05-29-14
Nevada Certification #: PA014572015-1
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Certification
Wyoming Certification #: 8TMS-L

Ormond Beach Certification IDs
8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

SAMPLE SUMMARY

Project: New Water Well Testing
Pace Project No.: 35206520

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35206520001	**SJOPBW-159174**	Drinking Water	09/09/15 07:15	09/10/15 11:35

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

SAMPLE ANALYTE COUNT

Project: New Water Well Testing
Pace Project No.: 35206520

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35206520001	SJOPBW-159174	EPA 504.1	AYF	2	PASI-O
		EPA 508.1	JTJ	22	PASI-O
		EPA 515.3	LJM	7	PASI-O
		EPA 531.1	WFH	3	PASI-O
		EPA 547	CRT	1	PASI-O
		EPA 549.2	CRT	1	PASI-O
		EPA 200.7	MEW	12	PASI-O
		EPA 200.8	CKJ	5	PASI-O
		EPA 245.1	MEW	1	PASI-O
		EPA 525.2	TWB	6	PASI-O
		EPA 548.1	EAO	1	PASI-O
		EPA 524.2	JLR	24	PASI-O
		EPA 900.0	FCC	2	PASI-PA
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		EPA 908.0	JAL	1	PASI-PA
		SM 2120B	KAM	1	PASI-O
		SM 2150B	MST	2	PASI-O
		SM 2540C	XDP	1	PASI-O
		SM 4500-H+B	KAM	2	PASI-O
		SM 5540C	XDP	2	PASI-O
		EPA 300.0	CMB, KHC	3	PASI-O
		EPA 335.4	AIS	1	PASI-O
		EPA 353.2	BIP	3	PASI-O

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

ANALYTICAL RESULTS

Project: New Water Well Testing
Pace Project No.: 35206520

Sample: SJOPBW-159174 **Lab ID: 35206520001** Collected: 09/09/15 07:15 Received: 09/10/15 11:35 Matrix: Drinking Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
504.1 GCS EDB and DBCP	Analytical Method: EPA 504.1 Preparation Method: EPA 504.1								
1,2-Dibromo-3-chloropropane	**0.0049 U**	ug/L	0.020	0.0049	1	09/16/15 12:30	09/16/15 22:32	96-12-8	
1,2-Dibromoethane (EDB)	**0.0062 U**	ug/L	0.010	0.0062	1	09/16/15 12:30	09/16/15 22:32	106-93-4	
508.1 GCS Pesticides	Analytical Method: EPA 508.1 Preparation Method: EPA 508.1								
Alachlor	**0.034 U**	ug/L	0.20	0.034	1	09/18/15 11:00	09/19/15 05:24	15972-60-8	P2
Atrazine	**0.021 U**	ug/L	0.10	0.021	1	09/18/15 11:00	09/19/15 05:24	1912-24-9	
gamma-BHC (Lindane)	**0.0030 U**	ug/L	0.020	0.0030	1	09/18/15 11:00	09/19/15 05:24	58-89-9	
Chlordane (Technical)	**0.047 U**	ug/L	0.20	0.047	1	09/18/15 11:00	09/19/15 05:24	57-74-9	
Dieldrin	**0.014 U**	ug/L	0.10	0.014	1	09/18/15 11:00	09/19/15 05:24	60-57-1	
Endrin	**0.0020 U**	ug/L	0.010	0.0020	1	09/18/15 11:00	09/19/15 05:24	72-20-8	
Heptachlor	**0.0060 U**	ug/L	0.040	0.0060	1	09/18/15 11:00	09/19/15 05:24	76-44-8	
Heptachlor epoxide	**0.0030 U**	ug/L	0.020	0.0030	1	09/18/15 11:00	09/19/15 05:24	1024-57-3	
Hexachlorobenzene	**0.011 U**	ug/L	0.10	0.011	1	09/18/15 11:00	09/19/15 05:24	118-74-1	
Hexachlorocyclopentadiene	**0.032 U**	ug/L	0.10	0.032	1	09/18/15 11:00	09/19/15 05:24	77-47-4	
Methoxychlor	**0.014 U**	ug/L	0.10	0.014	1	09/18/15 11:00	09/19/15 05:24	72-43-5	
PCB-1016 (Aroclor 1016)	**0.080 U**	ug/L	0.10	0.080	1	09/18/15 11:00	09/19/15 05:24	12674-11-2	
PCB-1221 (Aroclor 1221)	**0.029 U**	ug/L	0.10	0.029	1	09/18/15 11:00	09/19/15 05:24	11104-28-2	
PCB-1232 (Aroclor 1232)	**0.029 U**	ug/L	0.10	0.029	1	09/18/15 11:00	09/19/15 05:24	11141-16-5	
PCB-1242 (Aroclor 1242)	**0.051 U**	ug/L	0.10	0.051	1	09/18/15 11:00	09/19/15 05:24	53469-21-9	
PCB-1248 (Aroclor 1248)	**0.062 U**	ug/L	0.10	0.062	1	09/18/15 11:00	09/19/15 05:24	12672-29-6	
PCB-1254 (Aroclor 1254)	**0.023 U**	ug/L	0.10	0.023	1	09/18/15 11:00	09/19/15 05:24	11097-69-1	
PCB-1260 (Aroclor 1260)	**0.066 U**	ug/L	0.10	0.066	1	09/18/15 11:00	09/19/15 05:24	11096-82-5	
PCB, Total	**0.080 U**	ug/L	0.10	0.080	1	09/18/15 11:00	09/19/15 05:24	1336-36-3	
Simazine	**0.044 U**	ug/L	0.070	0.044	1	09/18/15 11:00	09/19/15 05:24	122-34-9	
Toxaphene	**0.61 U**	ug/L	1.0	0.61	1	09/18/15 11:00	09/19/15 05:24	8001-35-2	
Surrogates									
Decachlorobiphenyl (S)	82	%	70-130		1	09/18/15 11:00	09/19/15 05:24	2051-24-3	
515.3 Chlorinated Herbicides	Analytical Method: EPA 515.3 Preparation Method: EPA 515.3								
2,4-D	**0.081 U**	ug/L	0.10	0.081	1	09/18/15 08:30	09/19/15 02:18	94-75-7	
Dalapon	**0.89 U**	ug/L	1.0	0.89	1	09/18/15 08:30	09/19/15 02:18	75-99-0	
Dinoseb	**0.16 U**	ug/L	0.20	0.16	1	09/18/15 08:30	09/19/15 02:18	88-85-7	
Pentachlorophenol	**0.030 U**	ug/L	0.040	0.030	1	09/18/15 08:30	09/19/15 02:18	87-86-5	
Picloram	**0.094 U**	ug/L	0.10	0.094	1	09/18/15 08:30	09/19/15 02:18	1918-02-1	
2,4,5-TP (Silvex)	**0.16 U**	ug/L	0.20	0.16	1	09/18/15 08:30	09/19/15 02:18	93-72-1	
Surrogates									
2,4-DCAA (S)	83	%	70-130		1	09/18/15 08:30	09/19/15 02:18	19719-28-9	
531.1 HPLC Carbamates	Analytical Method: EPA 531.1								
Carbofuran	**0.35 U**	ug/L	2.0	0.35	1		09/11/15 21:23	1563-66-2	
Oxamyl	**0.43 U**	ug/L	2.0	0.43	1		09/11/15 21:23	23135-22-0	
Surrogates									
Propoxur (S)	101	%	80-120		1		09/11/15 21:23	114-26-1	
547 HPLC Glyphosate	Analytical Method: EPA 547								
Glyphosate	**2.8 U**	ug/L	6.0	2.8	1		09/15/15 13:04		

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

ANALYTICAL RESULTS

Project: New Water Well Testing
Pace Project No.: 35206520

Sample: SJOPBW-159174 **Lab ID: 35206520001** Collected: 09/09/15 07:15 Received: 09/10/15 11:35 Matrix: Drinking Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
549.2 HPLC Paraquat Diquat	Analytical Method: EPA 549.2 Preparation Method: EPA 549.2								
Diquat	**0.27 U**	ug/L	0.40	0.27	1	09/16/15 21:00	09/21/15 13:30	85-00-7	
200.7 MET ICP, DW No Prep	Analytical Method: EPA 200.7								
Aluminum	**0.050 U**	mg/L	0.10	0.050	1		09/18/15 18:47	7429-90-5	
Barium	**0.28**	mg/L	0.010	0.0050	1		09/18/15 18:47	7440-39-3	
Beryllium	**0.00050 U**	mg/L	0.0010	0.00050	1		09/18/15 18:47	7440-41-7	
Cadmium	**0.00050 U**	mg/L	0.0010	0.00050	1		09/18/15 18:47	7440-43-9	
Chromium	**0.0025 U**	mg/L	0.0050	0.0025	1		09/18/15 18:47	7440-47-3	
Copper	**0.0025 U**	mg/L	0.0050	0.0025	1		09/18/15 18:47	7440-50-8	
Iron	**1.2**	mg/L	0.040	0.020	1		09/18/15 18:47	7439-89-6	
Manganese	**0.091**	mg/L	0.0050	0.0025	1		09/18/15 18:47	7439-96-5	
Nickel	**0.0025 U**	mg/L	0.0050	0.0025	1		09/18/15 18:47	7440-02-0	
Silver	**0.0025 U**	mg/L	0.0050	0.0025	1		09/18/15 18:47	7440-22-4	
Sodium	**170**	mg/L	1.0	0.50	1		09/18/15 18:47	7440-23-5	
Zinc	**0.010 U**	mg/L	0.020	0.010	1		09/18/15 18:47	7440-66-6	
200.8 MET ICPMS Drinking Water	Analytical Method: EPA 200.8								
Antimony	**0.00050 U**	mg/L	0.0010	0.00050	1		09/24/15 10:08	7440-36-0	
Arsenic	**0.00050 U**	mg/L	0.0010	0.00050	1		09/24/15 10:08	7440-38-2	
Lead	**0.00050 U**	mg/L	0.0010	0.00050	1		09/24/15 10:08	7439-92-1	
Selenium	**0.00050 U**	mg/L	0.0010	0.00050	1		09/24/15 10:08	7782-49-2	
Thallium	**0.00050 U**	mg/L	0.0010	0.00050	1		09/24/15 10:08	7440-28-0	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00010 U**	mg/L	0.00020	0.00010	1	09/22/15 16:00	09/23/15 15:33	7439-97-6	
525.2 Base Neutral Extractable	Analytical Method: EPA 525.2 Preparation Method: EPA 525.2								
Benzo(a)pyrene	**0.019 U**	ug/L	0.10	0.019	1	09/18/15 11:00	09/21/15 13:02	50-32-8	
bis(2-Ethylhexyl)adipate	**0.38 U**	ug/L	1.6	0.38	1	09/18/15 11:00	09/21/15 13:02	103-23-1	
bis(2-Ethylhexyl)phthalate	**0.50 U**	ug/L	2.0	0.50	1	09/18/15 11:00	09/21/15 13:02	117-81-7	
Surrogates									
1,3-Dimethyl-2-nitrobenzene(S)	102	%	70-130		1	09/18/15 11:00	09/21/15 13:02	81209	
Perylene-d12 (S)	95	%	70-130		1	09/18/15 11:00	09/21/15 13:02	1520963	
Triphenylphosphate (S)	96	%	70-130		1	09/18/15 11:00	09/21/15 13:02	115-86-6	
548.1 GCS Endothall	Analytical Method: EPA 548.1 Preparation Method: EPA 548.1								
Endothall	**4.1 U**	ug/L	9.0	4.1	1	09/15/15 21:15	09/18/15 06:02		
524.2 MSV	Analytical Method: EPA 524.2								
Benzene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	71-43-2	
Carbon tetrachloride	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	56-23-5	
Chlorobenzene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	108-90-7	
1,2-Dichlorobenzene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	95-50-1	
1,4-Dichlorobenzene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	106-46-7	
1,2-Dichloroethane	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	107-06-2	

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

ANALYTICAL RESULTS

Project: New Water Well Testing
Pace Project No.: 35206520

Sample: SJOPBW-159174 **Lab ID: 35206520001** Collected: 09/09/15 07:15 Received: 09/10/15 11:35 Matrix: Drinking Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
1,1-Dichloroethene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	75-35-4	
cis-1,2-Dichloroethene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	156-59-2	
trans-1,2-Dichloroethene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	156-60-5	
1,2-Dichloropropane	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	78-87-5	
Ethylbenzene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	100-41-4	
Methylene Chloride	**0.44 U**	ug/L	0.50	0.44	1		09/16/15 11:14	75-09-2	
Styrene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	100-42-5	
Tetrachloroethene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	127-18-4	
Toluene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	108-88-3	
1,2,4-Trichlorobenzene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	120-82-1	
1,1,1-Trichloroethane	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	71-55-6	
1,1,2-Trichloroethane	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	79-00-5	
Trichloroethene	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	79-01-6	
Vinyl chloride	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	75-01-4	
Xylene (Total)	**0.25 U**	ug/L	0.50	0.25	1		09/16/15 11:14	1330-20-7	
Surrogates									
4-Bromofluorobenzene (S)	96	%	70-130		1		09/16/15 11:14	460-00-4	J(HS)
Toluene-d8 (S)	108	%	70-130		1		09/16/15 11:14	2037-26-5	
1,2-Dichloroethane-d4 (S)	109	%	70-130		1		09/16/15 11:14	17060-07-0	
2120B True Color	Analytical Method: SM 2120B								
True Color	**5.0 U**	units	5.0	5.0	1		09/10/15 16:03		
2150B Threshold Odor Number	Analytical Method: SM 2150B								
Temperature, Water (C)	**46.0**	deg C			1		09/11/15 17:50		
Threshold Odor Number	**1.0 U**	TON	1.0	1.0	1		09/11/15 17:50		Q
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**676**	mg/L	10.0	10.0	1		09/14/15 17:00		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**20.0**	deg C	0.010	0.010	1		09/24/15 11:41		
pH at 25 Degrees C	**7.4**	Std. Units	0.10	0.10	1		09/24/15 11:41		Q
5540C MBAS Surfactants	Analytical Method: SM 5540C								
LAS Molecular Weight, g/mol	**320**				1		09/10/15 17:48		
MBAS, Calculated as LAS	**0.059 U**	mg/L	0.20	0.059	1		09/10/15 17:48		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**163**	mg/L	10.0	5.0	2		09/11/15 02:32	16887-00-6	
Fluoride	**0.12**	mg/L	0.10	0.068	2		09/11/15 02:32	16984-48-8	
Sulfate	**2.5 U**	mg/L	5.0	2.5	1		09/12/15 05:06	14808-79-8	
335.4 Cyanide, Total	Analytical Method: EPA 335.4 Preparation Method: EPA 335.4								
Cyanide	**0.0050 U**	mg/L	0.010	0.0050	1	09/11/15 10:00	09/11/15 17:03	57-12-5	

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

ANALYTICAL RESULTS

Project: New Water Well Testing
Pace Project No.: 35206520

Sample: SJOPBW-159174 **Lab ID: 35206520001** Collected: 09/09/15 07:15 Received: 09/10/15 11:35 Matrix: Drinking Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	**0.025 U**	mg/L	0.050	0.025	1		09/11/15 07:14		
Nitrogen, Nitrite	**0.025 U**	mg/L	0.050	0.025	1		09/11/15 07:14		
Nitrogen, NO2 plus NO3	**0.025 U**	mg/L	0.050	0.025	1		09/11/15 07:14		

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: GCSV/15764 | Analysis Method: EPA 531.1
QC Batch Method: EPA 531.1 | Analysis Description: 531.1 HPLC Carbamate
Associated Lab Samples: 35206520001

METHOD BLANK: 1328394 | Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Carbofuran	ug/L	0.35 U	2.0	09/11/15 15:16	
Oxamyl	ug/L	0.43 U	2.0	09/11/15 15:16	
Propoxur (S)	%	80	80-120	09/11/15 15:16	

LABORATORY CONTROL SAMPLE: 1328395

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Carbofuran	ug/L	10	9.5	95	80-120	
Oxamyl	ug/L	10	9.0	90	80-120	
Propoxur (S)	%			95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1328396 1328397

Parameter	Units	35206283001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Carbofuran	ug/L	<0.35	10	10	7.4	10.5	74	105	80-120	34	20	J(M1), J(R1)
Oxamyl	ug/L	<0.43	10	10	6.2	9.1	62	91	80-120	38	20	J(M1), J(R1)
Propoxur (S)	%						72	102	80-120			J(S0)

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: GCSV/15789
QC Batch Method: EPA 547
Analysis Method: EPA 547
Analysis Description: 547 HPLC Glyphosate
Associated Lab Samples: 35206520001

METHOD BLANK: 1331122
Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Glyphosate	ug/L	2.8 U	6.0	09/15/15 11:05	

LABORATORY CONTROL SAMPLE: 1331123

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Glyphosate	ug/L	50	58.9	118	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1331124 1331125

Parameter	Units	35206679001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Glyphosate	ug/L	2.8 U	50	50	60.9	61.6	122	123	80-120	1	30	J(M1)

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: ICP/15926
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 MET No Prep Drinking Water
Associated Lab Samples: 35206520001

METHOD BLANK: 1335699
Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.050 U	0.10	09/18/15 13:21	
Barium	mg/L	0.0050 U	0.010	09/18/15 13:21	
Beryllium	mg/L	0.00050 U	0.0010	09/18/15 13:21	
Cadmium	mg/L	0.00050 U	0.0010	09/18/15 13:21	
Chromium	mg/L	0.0025 U	0.0050	09/18/15 13:21	
Copper	mg/L	0.0025 U	0.0050	09/18/15 13:21	
Iron	mg/L	0.020 U	0.040	09/18/15 13:21	
Manganese	mg/L	0.0025 U	0.0050	09/18/15 13:21	
Nickel	mg/L	0.0025 U	0.0050	09/18/15 13:21	
Silver	mg/L	0.0025 U	0.0050	09/18/15 13:21	
Sodium	mg/L	0.50 U	1.0	09/18/15 13:21	
Zinc	mg/L	0.010 U	0.020	09/18/15 13:21	

LABORATORY CONTROL SAMPLE: 1335700

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	2.5	2.5	100	85-115	
Barium	mg/L	.25	0.25	99	85-115	
Beryllium	mg/L	.025	0.024	95	85-115	
Cadmium	mg/L	.025	0.025	101	85-115	
Chromium	mg/L	.25	0.24	94	85-115	
Copper	mg/L	.25	0.23	91	85-115	
Iron	mg/L	2.5	2.5	100	85-115	
Manganese	mg/L	.25	0.24	94	85-115	
Nickel	mg/L	.25	0.25	101	85-115	
Silver	mg/L	.025	0.024	94	85-115	
Sodium	mg/L	12.5	11.9	95	85-115	
Zinc	mg/L	1.2	1.3	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1335701 1335702

Parameter	Units	35206961001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	50.0 U ug/L	2.5	2.5	2.4	2.5	96	98	70-130	2	20	
Barium	mg/L	17.9 ug/L	.25	.25	0.26	0.26	98	98	70-130	0	20	
Beryllium	mg/L	0.50 U ug/L	.025	.025	0.022	0.023	89	92	70-130	3	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1335701 1335702

Parameter	Units	35206961001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium	mg/L	0.50 U ug/L	.025	.025	0.024	0.024	97	95	70-130	2	20	
Chromium	mg/L	2.5 U ug/L	.25	.25	0.22	0.23	88	92	70-130	5	20	
Copper	mg/L	2.5 U ug/L	.25	.25	0.23	0.23	94	93	70-130	0	20	
Iron	mg/L	20.0 U ug/L	2.5	2.5	2.4	2.4	96	96	70-130	0	20	
Manganese	mg/L	2.5 U ug/L	.25	.25	0.22	0.22	87	90	70-130	3	20	
Nickel	mg/L	2.5 U ug/L	.25	.25	0.24	0.24	96	95	70-130	2	20	
Silver	mg/L	2.5 U ug/L	.025	.025	0.022	0.022	89	90	70-130	1	20	
Sodium	mg/L	748000 ug/L	12.5	12.5	746	776	-13	231	70-130	4	20	J(M1)
Zinc	mg/L	17.2 I ug/L	1.2	1.2	1.3	1.3	104	101	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1335703 1335704

Parameter	Units	35207089004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.050 U	2.5	2.5	2.5	2.5	98	98	70-130	1	20	
Barium	mg/L	0.0052 I	.25	.25	0.26	0.26	101	100	70-130	1	20	
Beryllium	mg/L	0.00050 U	.025	.025	0.024	0.024	95	94	70-130	1	20	
Cadmium	mg/L	0.00050 U	.025	.025	0.025	0.025	101	100	70-130	1	20	
Chromium	mg/L	0.0025 U	.25	.25	0.24	0.24	96	95	70-130	1	20	
Copper	mg/L	0.0025 U	.25	.25	0.24	0.24	97	96	70-130	1	20	
Iron	mg/L	0.039 I	2.5	2.5	2.5	2.5	97	97	70-130	0	20	
Manganese	mg/L	0.0025 U	.25	.25	0.24	0.24	97	96	70-130	1	20	
Nickel	mg/L	0.0025 U	.25	.25	0.25	0.25	100	99	70-130	1	20	
Silver	mg/L	0.0025 U	.025	.025	0.024	0.024	96	97	70-130	0	20	
Sodium	mg/L	31.2	12.5	12.5	43.3	42.8	97	92	70-130	1	20	
Zinc	mg/L	0.010 U	1.2	1.2	1.3	1.3	102	101	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: ICPM/10777
QC Batch Method: EPA 200.8
Analysis Method: EPA 200.8
Analysis Description: 200.8 MET No Prep Drinking Water
Associated Lab Samples: 35206520001

METHOD BLANK: 1340644
Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	0.00050 U	0.0010	09/24/15 09:46	
Arsenic	mg/L	0.00050 U	0.0010	09/24/15 09:46	
Lead	mg/L	0.00050 U	0.0010	09/24/15 09:46	
Selenium	mg/L	0.00050 U	0.0010	09/24/15 09:46	
Thallium	mg/L	0.00050 U	0.0010	09/24/15 09:46	

LABORATORY CONTROL SAMPLE: 1340645

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	.05	0.047	95	85-115	
Arsenic	mg/L	.05	0.051	102	85-115	
Lead	mg/L	.05	0.049	98	85-115	
Selenium	mg/L	.05	0.051	103	85-115	
Thallium	mg/L	.05	0.050	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1340646 1340647

Parameter	Units	35206519001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	<0.00050	.05	.05	0.047	0.047	93	94	70-130	1	20	
Arsenic	mg/L	0.0048	.05	.05	0.057	0.057	105	105	70-130	0	20	
Lead	mg/L	<0.00050	.05	.05	0.050	0.050	101	101	70-130	0	20	
Selenium	mg/L	0.0045	.05	.05	0.058	0.059	108	108	70-130	0	20	
Thallium	mg/L	<0.00050	.05	.05	0.052	0.052	103	103	70-130	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: MERP/6179
QC Batch Method: EPA 245.1
Analysis Method: EPA 245.1
Analysis Description: 245.1 Mercury
Associated Lab Samples: 35206520001

METHOD BLANK: 1338875
Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.00010 U	0.00020	09/23/15 15:05	

LABORATORY CONTROL SAMPLE: 1338876

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.002	0.0022	109	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1338877 1338878

Parameter	Units	35206399001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.10 U ug/L	.002	.002	0.0021	0.0020	101	100	70-130	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1338879 1338880

Parameter	Units	35207415002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.10 I ug/L	.002	.002	0.0021	0.0021	101	99	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: MSV/16058 | Analysis Method: EPA 524.2
QC Batch Method: EPA 524.2 | Analysis Description: 524.2 MSV
Associated Lab Samples: 35206520001

METHOD BLANK: 1334069 | Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	0.25 U	0.50	09/16/15 10:03	
1,1,2-Trichloroethane	ug/L	0.25 U	0.50	09/16/15 10:03	
1,1-Dichloroethene	ug/L	0.25 U	0.50	09/16/15 10:03	
1,2,4-Trichlorobenzene	ug/L	0.25 U	0.50	09/16/15 10:03	
1,2-Dichlorobenzene	ug/L	0.25 U	0.50	09/16/15 10:03	
1,2-Dichloroethane	ug/L	0.25 U	0.50	09/16/15 10:03	
1,2-Dichloropropane	ug/L	0.25 U	0.50	09/16/15 10:03	
1,4-Dichlorobenzene	ug/L	0.25 U	0.50	09/16/15 10:03	
Benzene	ug/L	0.25 U	0.50	09/16/15 10:03	
Carbon tetrachloride	ug/L	0.25 U	0.50	09/16/15 10:03	
Chlorobenzene	ug/L	0.25 U	0.50	09/16/15 10:03	
cis-1,2-Dichloroethene	ug/L	0.25 U	0.50	09/16/15 10:03	
Ethylbenzene	ug/L	0.25 U	0.50	09/16/15 10:03	
Methylene Chloride	ug/L	0.44 U	0.50	09/16/15 10:03	
Styrene	ug/L	0.25 U	0.50	09/16/15 10:03	
Tetrachloroethene	ug/L	0.25 U	0.50	09/16/15 10:03	
Toluene	ug/L	0.25 U	0.50	09/16/15 10:03	
trans-1,2-Dichloroethene	ug/L	0.25 U	0.50	09/16/15 10:03	
Trichloroethene	ug/L	0.25 U	0.50	09/16/15 10:03	
Vinyl chloride	ug/L	0.25 U	0.50	09/16/15 10:03	
Xylene (Total)	ug/L	0.25 U	0.50	09/16/15 10:03	
1,2-Dichloroethane-d4 (S)	%	110	70-130	09/16/15 10:03	
4-Bromofluorobenzene (S)	%	96	70-130	09/16/15 10:03	
Toluene-d8 (S)	%	109	70-130	09/16/15 10:03	

LABORATORY CONTROL SAMPLE & LCSD: 1332686 1332687

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1,1-Trichloroethane	ug/L	40	41.1	42.3	103	106	70-130	3	40	
1,1,2-Trichloroethane	ug/L	40	34.5	33.6	86	84	70-130	3	40	
1,1-Dichloroethene	ug/L	40	37.1	36.9	93	92	70-130	0	40	
1,2,4-Trichlorobenzene	ug/L	40	34.6	35.5	86	89	70-130	3	40	
1,2-Dichlorobenzene	ug/L	40	33.8	34.6	84	86	70-130	2	40	
1,2-Dichloroethane	ug/L	40	40.3	39.1	101	98	70-130	3	40	
1,2-Dichloropropane	ug/L	40	40.6	40.9	101	102	70-130	1	40	
1,4-Dichlorobenzene	ug/L	40	32.0	32.7	80	82	70-130	2	40	
Benzene	ug/L	40	40.6	41.6	101	104	70-130	3	40	
Carbon tetrachloride	ug/L	40	35.7	36.4	89	91	70-130	2	40	
Chlorobenzene	ug/L	40	35.2	34.6	88	87	70-130	2	40	
cis-1,2-Dichloroethene	ug/L	40	37.6	39.5	94	99	70-130	5	40	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

LABORATORY CONTROL SAMPLE & LCSD: 1332686 1332687

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Ethylbenzene	ug/L	40	37.1	36.4	93	91	70-130	2	40	
Methylene Chloride	ug/L	40	35.1	37.0	88	92	70-130	5	40	
Styrene	ug/L	40	33.6	33.2	84	83	70-130	1	40	
Tetrachloroethene	ug/L	40	35.0	36.6	88	92	70-130	4	40	
Toluene	ug/L	40	34.5	34.8	86	87	70-130	1	40	
trans-1,2-Dichloroethene	ug/L	40	35.9	39.0	90	97	70-130	8	40	
Trichloroethene	ug/L	40	42.3	42.4	106	106	70-130	0	40	
Vinyl chloride	ug/L	40	38.3	41.7	96	104	70-130	8	40	
1,2-Dichloroethane-d4 (S)	%				96	96	70-130			
4-Bromofluorobenzene (S)	%				103	101	70-130			
Toluene-d8 (S)	%				106	106	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: OEXT/24329 | Analysis Method: EPA 504.1
QC Batch Method: EPA 504.1 | Analysis Description: 504 EDB DBCP
Associated Lab Samples: 35206520001

METHOD BLANK: 1332060 | Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2-Dibromo-3-chloropropane	ug/L	0.0049 U	0.020	09/16/15 19:15	
1,2-Dibromoethane (EDB)	ug/L	0.0062 U	0.010	09/16/15 19:15	

LABORATORY CONTROL SAMPLE & LCSD: 1332061 1332468

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2-Dibromo-3-chloropropane	ug/L	.25	0.25	0.26	101	102	70-130	1	40	
1,2-Dibromoethane (EDB)	ug/L	.25	0.23	0.24	94	96	70-130	2	40	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1332469 1332470

Parameter	Units	35206683002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2-Dibromo-3-chloropropane	ug/L	0.0050 U	.44	.44	0.48	0.49	109	113	65-135	4	40	
1,2-Dibromoethane (EDB)	ug/L	0.0063 U	.44	.44	0.49	0.51	112	117	65-135	5	40	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: OEXT/24375 | Analysis Method: EPA 508.1
QC Batch Method: EPA 508.1 | Analysis Description: 508 GCS Pesticide
Associated Lab Samples: 35206520001

METHOD BLANK: 1335246 | Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alachlor	ug/L	0.034 U	0.20	09/18/15 23:43	
Atrazine	ug/L	0.021 U	0.10	09/18/15 23:43	
Chlordane (Technical)	ug/L	0.047 U	0.20	09/18/15 23:43	
Dieldrin	ug/L	0.014 U	0.10	09/18/15 23:43	
Endrin	ug/L	0.0020 U	0.010	09/18/15 23:43	
gamma-BHC (Lindane)	ug/L	0.0030 U	0.020	09/18/15 23:43	
Heptachlor	ug/L	0.0060 U	0.040	09/18/15 23:43	
Heptachlor epoxide	ug/L	0.0030 U	0.020	09/18/15 23:43	
Hexachlorobenzene	ug/L	0.011 U	0.10	09/18/15 23:43	
Hexachlorocyclopentadiene	ug/L	0.032 U	0.10	09/18/15 23:43	
Methoxychlor	ug/L	0.014 U	0.10	09/18/15 23:43	
PCB, Total	ug/L	0.080 U	0.10	09/18/15 23:43	
PCB-1016 (Aroclor 1016)	ug/L	0.080 U	0.10	09/18/15 23:43	
PCB-1221 (Aroclor 1221)	ug/L	0.029 U	0.10	09/18/15 23:43	
PCB-1232 (Aroclor 1232)	ug/L	0.029 U	0.10	09/18/15 23:43	
PCB-1242 (Aroclor 1242)	ug/L	0.051 U	0.10	09/18/15 23:43	
PCB-1248 (Aroclor 1248)	ug/L	0.062 U	0.10	09/18/15 23:43	
PCB-1254 (Aroclor 1254)	ug/L	0.023 U	0.10	09/18/15 23:43	
PCB-1260 (Aroclor 1260)	ug/L	0.066 U	0.10	09/18/15 23:43	
Simazine	ug/L	0.044 U	0.070	09/18/15 23:43	
Toxaphene	ug/L	0.61 U	1.0	09/18/15 23:43	
Decachlorobiphenyl (S)	%	87	70-130	09/18/15 23:43	

LABORATORY CONTROL SAMPLE: 1335247

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alachlor	ug/L	1	0.84	84	70-130	
Atrazine	ug/L	1.2	1.1	84	70-130	
Dieldrin	ug/L	.5	0.47	94	70-130	
Endrin	ug/L	.05	0.048	95	70-130	
gamma-BHC (Lindane)	ug/L	.1	0.099	99	70-130	
Heptachlor	ug/L	.2	0.18	91	70-130	
Heptachlor epoxide	ug/L	.1	0.094	94	70-130	
Hexachlorobenzene	ug/L	.5	0.45	91	70-130	
Hexachlorocyclopentadiene	ug/L	.5	0.38	76	70-130	
Methoxychlor	ug/L	.5	0.49	98	70-130	
Simazine	ug/L	.88	0.85	98	70-130	
Decachlorobiphenyl (S)	%			88	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1335550 1335551

Parameter	Units	92267094001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alachlor	ug/L	ND	2.2	2.2	1.8	1.8	82	79	65-135	4	40	
Atrazine	ug/L	ND	2.8	2.8	2.2	2.2	81	80	65-135	1	40	
Dieldrin	ug/L	ND	1.1	1.1	1.0	0.99	92	89	65-135	3	40	
Endrin	ug/L	ND	.11	.11	0.10	0.10	93	91	65-135	2	40	
gamma-BHC (Lindane)	ug/L	ND	.22	.22	0.22	0.21	99	96	65-135	3	40	
Heptachlor	ug/L	ND	.44	.44	0.40	0.37	89	83	65-135	7	40	
Heptachlor epoxide	ug/L	ND	.22	.22	0.20	0.20	92	89	65-135	3	40	
Hexachlorobenzene	ug/L	ND	1.1	1.1	0.99	0.92	89	83	65-135	7	40	
Hexachlorocyclopentadiene	ug/L	ND	1.1	1.1	0.87	0.73	78	65	65-135	18	40	
Methoxychlor	ug/L	ND	1.1	1.1	1.1	1.0	96	93	65-135	3	40	
Simazine	ug/L	ND	1.9	1.9	1.8	1.8	90	94	65-135	4	40	
Decachlorobiphenyl (S)	%						87	87	70-130		40	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: OEXT/24364
QC Batch Method: EPA 515.3
Analysis Method: EPA 515.3
Analysis Description: 5153 GCS Herbicides
Associated Lab Samples: 35206520001

METHOD BLANK: 1334214
Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
2,4,5-TP (Silvex)	ug/L	0.16 U	0.20	09/18/15 20:37	
2,4-D	ug/L	0.081 U	0.10	09/18/15 20:37	
Dalapon	ug/L	0.89 U	1.0	09/18/15 20:37	
Dinoseb	ug/L	0.16 U	0.20	09/18/15 20:37	
Pentachlorophenol	ug/L	0.030 U	0.040	09/18/15 20:37	
Picloram	ug/L	0.094 U	0.10	09/18/15 20:37	
2,4-DCAA (S)	%	84	70-130	09/18/15 20:37	

LABORATORY CONTROL SAMPLE: 1334215

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2,4,5-TP (Silvex)	ug/L	1	0.78	78	70-130	
2,4-D	ug/L	.5	0.49	99	70-130	
Dalapon	ug/L	5	4.0	80	70-130	
Dinoseb	ug/L	1	0.84	84	70-130	
Pentachlorophenol	ug/L	.2	0.16	81	70-130	
Picloram	ug/L	.5	0.44	89	70-130	
2,4-DCAA (S)	%			85	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1335621 1335622

Parameter	Units	35206818001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
2,4,5-TP (Silvex)	ug/L	<0.16	1	1	0.84	0.84	84	84	70-130	0	40	
2,4-D	ug/L	<0.081	.5	.5	0.55	0.54	109	107	70-130	2	40	
Dalapon	ug/L	<0.89	5	5	4.2	4.3	85	86	70-130	1	40	
Dinoseb	ug/L	<0.16	1	1	0.85	0.86	85	86	70-130	1	40	
Pentachlorophenol	ug/L	<0.030	.2	.2	0.16	0.16	81	82	70-130	2	40	
Picloram	ug/L	<0.094	.5	.5	0.47	0.51	94	101	70-130	7	40	
2,4-DCAA (S)	%						87	89	70-130			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1335623 1335624

Parameter	Units	35206683001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
2,4,5-TP (Silvex)	ug/L	0.16 U	1	1	0.78	0.83	78	83	70-130	7	40	
2,4-D	ug/L	0.081 U	.5	.5	0.54	0.56	108	111	70-130	3	40	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1335623 1335624

Parameter	Units	35206683001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Dalapon	ug/L	0.89 U	5	5	4.6	4.8	88	92	70-130	4	40	
Dinoseb	ug/L	0.16 U	1	1	0.79	0.82	79	82	70-130	4	40	
Pentachlorophenol	ug/L	0.030 U	.2	.2	0.16	0.17	82	86	70-130	4	40	
Picloram	ug/L	0.094 U	.5	.5	0.42	0.46	85	92	70-130	8	40	
2,4-DCAA (S)	%						85	88	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: OEXT/24376 | Analysis Method: EPA 525.2
QC Batch Method: EPA 525.2 | Analysis Description: 525.2 Base Neutral Extractables
Associated Lab Samples: 35206520001

METHOD BLANK: 1335248 | Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzo(a)pyrene	ug/L	0.019 U	0.10	09/20/15 20:06	
bis(2-Ethylhexyl)adipate	ug/L	0.38 U	1.6	09/20/15 20:06	
bis(2-Ethylhexyl)phthalate	ug/L	0.50 U	2.0	09/20/15 20:06	
1,3-Dimethyl-2-nitrobenzene(S)	%	104	70-130	09/20/15 20:06	
Perylene-d12 (S)	%	97	70-130	09/20/15 20:06	
Triphenylphosphate (S)	%	95	70-130	09/20/15 20:06	

LABORATORY CONTROL SAMPLE: 1335249

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzo(a)pyrene	ug/L	.4	0.41	102	70-130	
bis(2-Ethylhexyl)adipate	ug/L	6.4	6.8	106	70-130	
bis(2-Ethylhexyl)phthalate	ug/L	8	8.4	105	70-130	
1,3-Dimethyl-2-nitrobenzene(S)	%			98	70-130	
Perylene-d12 (S)	%			101	70-130	
Triphenylphosphate (S)	%			103	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1335552 1335553

Parameter	Units	92267551001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzo(a)pyrene	ug/L	ND	.8	.8	0.76	0.73	95	92	70-130	3	40	
bis(2-Ethylhexyl)adipate	ug/L	ND	12.8	12.8	13.0	12.9	101	101	70-130	1	40	
bis(2-Ethylhexyl)phthalate	ug/L	ND	16	16	16.5	15.8	102	98	70-130	5	40	
1,3-Dimethyl-2-nitrobenzene(S)	%						102	104	70-130			
Perylene-d12 (S)	%						99	98	70-130			
Triphenylphosphate (S)	%						98	103	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: OEXT/24311 | Analysis Method: EPA 548.1
QC Batch Method: EPA 548.1 | Analysis Description: 548 GCS Endothall
Associated Lab Samples: 35206520001

METHOD BLANK: 1330747 | Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Endothall	ug/L	4.1 U	9.0	09/18/15 00:58	

LABORATORY CONTROL SAMPLE: 1330748

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Endothall	ug/L	50	47.4	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1333104 1333105

Parameter	Units	35206679001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Endothall	ug/L	4.1 U	50	50	8.7 I	10.2	17	20	80-120		40	J(M1)

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1333106 1333107

Parameter	Units	35206238001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Endothall	ug/L	4.1 U	50	50	4.1 U	4.1 U	0	0	80-120		40	J(M1)

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: OEXT/24339
QC Batch Method: EPA 549.2
Analysis Method: EPA 549.2
Analysis Description: 549 HPLC Paraquat Diquat
Associated Lab Samples: 35206520001

METHOD BLANK: 1333504
Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diquat	ug/L	0.27 U	0.40	09/21/15 12:25	

LABORATORY CONTROL SAMPLE: 1333505

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diquat	ug/L	2	2.0	99	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1333506 1333507

Parameter	Units	35206679001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Diquat	ug/L	0.27 U	2	2	1.9	2.3	93	114	70-130	21	30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: WET/32927
QC Batch Method: SM 2120B
Analysis Method: SM 2120B
Analysis Description: 2120B True Color
Associated Lab Samples: 35206520001

METHOD BLANK: 1327410
Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
True Color	units	5.0 U	5.0	09/10/15 16:03	

LABORATORY CONTROL SAMPLE: 1327411

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
True Color	units	20	20.0	100	90-110	

SAMPLE DUPLICATE: 1327412

Parameter	Units	35206520001 Result	Dup Result	RPD	Max RPD	Qualifiers
True Color	units	5.0 U	5.0 U		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: WET/33004 | Analysis Method: SM 2150B
QC Batch Method: SM 2150B | Analysis Description: Threshold Odor Number
Associated Lab Samples: 35206520001

METHOD BLANK: 1331274 | Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Temperature, Water (C)	deg C	44.9		09/11/15 17:50	
Threshold Odor Number	TON	1.0 U	1.0	09/11/15 17:50	Q

SAMPLE DUPLICATE: 1331275

Parameter	Units	35206683001 Result	Dup Result	RPD	Max RPD	Qualifiers
Temperature, Water (C)	deg C	44.6	45.3	2	20	
Threshold Odor Number	TON	1.0 U	1.0 U		20	Q

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: WET/32974
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 35206520001

METHOD BLANK: 1330167
Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	5.0 U	5.0	09/14/15 16:53	

LABORATORY CONTROL SAMPLE: 1330168

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	285	95	90-110	

SAMPLE DUPLICATE: 1330587

Parameter	Units	35206390002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2430	2440	0	5	

SAMPLE DUPLICATE: 1330588

Parameter	Units	35206390003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2320	2360	2	5	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.,

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: WET/33155
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Associated Lab Samples: 35206520001

SAMPLE DUPLICATE: 1341106

Parameter	Units	35206520001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.4	7.4	0	20	Q
Temperature, Water (C)	deg C	20.0	20.0	0	20	

SAMPLE DUPLICATE: 1341613

Parameter	Units	35208513001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.9	7.7	2	20	Q
Temperature, Water (C)	deg C	20.0	20.0	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: WET/32926 | Analysis Method: SM 5540C
QC Batch Method: SM 5540C | Analysis Description: 5540C MBAS Surfactants
Associated Lab Samples: 35206520001

METHOD BLANK: 1327393 | Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
LAS Molecular Weight, g/mol		320		09/10/15 17:48	
MBAS, Calculated as LAS	mg/L	0.059 U	0.20	09/10/15 17:48	

LABORATORY CONTROL SAMPLE: 1327394

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
LAS Molecular Weight, g/mol			320			
MBAS, Calculated as LAS	mg/L	.3	0.30	100	90-110	

MATRIX SPIKE SAMPLE: 1327396

Parameter	Units	35206520001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
LAS Molecular Weight, g/mol		320		320			
MBAS, Calculated as LAS	mg/L	0.059 U	.3	0.31	100	90-110	

SAMPLE DUPLICATE: 1327395

Parameter	Units	35206520001 Result	Dup Result	RPD	Max RPD	Qualifiers
LAS Molecular Weight, g/mol		320	320	0		
MBAS, Calculated as LAS	mg/L	0.059 U	0.059 U		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: WETA/50083 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Associated Lab Samples: 35206520001

METHOD BLANK: 1327775 | Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	2.5 U	5.0	09/10/15 19:24	
Fluoride	mg/L	0.034 U	0.050	09/10/15 19:24	
Sulfate	mg/L	2.5 U	5.0	09/10/15 19:24	

LABORATORY CONTROL SAMPLE: 1327776

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	47.5	95	90-110	
Fluoride	mg/L	5	5.0	99	90-110	
Sulfate	mg/L	50	47.5	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1327777 1327778

Parameter	Units	35206498002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	160	100	100	266	266	106	106	90-110	0	20	L
Fluoride	mg/L	0.16	5	5	5.4	4.8	104	93	90-110	11	20	
Sulfate	mg/L	14.7	50	50	67.0	61.2	105	93	90-110	9	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1328961 1328962

Parameter	Units	30158820001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	41.0	50	50	91.2	92.4	101	103	90-110	1	20	
Fluoride	mg/L	0.18	5	5	4.7	4.9	91	94	90-110	2	20	
Sulfate	mg/L	94.5	50	50	148	150	108	110	90-110	1	20	L

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: WETA/50085
QC Batch Method: EPA 335.4
Associated Lab Samples: 35206520001

Analysis Method: EPA 335.4
Analysis Description: 335.4 Cyanide, Total

METHOD BLANK: 1328076
Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cyanide	mg/L	0.0050 U	0.010	09/11/15 16:53	

LABORATORY CONTROL SAMPLE: 1328077

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide	mg/L	.025	0.023	91	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1328078 1328079

Parameter	Units	35206501001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cyanide	mg/L	<0.0050	.025	.025	0.025	0.024	98	96	90-110	3	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1328080 1328081

Parameter	Units	35206683002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cyanide	mg/L	0.0050 U	.025	.025	0.0050 U	0.0050 U	4	4	90-110		20	J(M1)

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: WETA/50084
QC Batch Method: EPA 353.2
Analysis Method: EPA 353.2
Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Associated Lab Samples: 35206520001

METHOD BLANK: 1328060
Matrix: Water
Associated Lab Samples: 35206520001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	0.025 U	0.050	09/11/15 07:11	
Nitrogen, Nitrite	mg/L	0.025 U	0.050	09/11/15 07:11	
Nitrogen, NO2 plus NO3	mg/L	0.025 U	0.050	09/11/15 07:11	

LABORATORY CONTROL SAMPLE: 1328061

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrite	mg/L	1	1.0	103	90-110	
Nitrogen, NO2 plus NO3	mg/L	2	2.1	103	90-110	

MATRIX SPIKE SAMPLE: 1328063

Parameter	Units	35206520001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrite	mg/L	0.025 U	1	1.1	107	90-110	Q
Nitrogen, NO2 plus NO3	mg/L	0.025 U	2	2.0	99	90-110	Q

MATRIX SPIKE SAMPLE: 1328943

Parameter	Units	35206724001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrite	mg/L	0.025 U	1	1.1	105	90-110	
Nitrogen, NO2 plus NO3	mg/L	0.025 U	2	2.0	102	90-110	

SAMPLE DUPLICATE: 1328062

Parameter	Units	35206520001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Nitrate	mg/L	0.025 U	0.025 U		20	Q
Nitrogen, Nitrite	mg/L	0.025 U	0.025 U		20	Q
Nitrogen, NO2 plus NO3	mg/L	0.025 U	0.025 U		20	Q

SAMPLE DUPLICATE: 1328942

Parameter	Units	35206724001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Nitrate	mg/L	0.025 U	0.025 U		20	
Nitrogen, Nitrite	mg/L	0.025 U	0.025 U		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA

Project: New Water Well Testing
Pace Project No.: 35206520

SAMPLE DUPLICATE: 1328942

Parameter	Units	35206724001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	0.025 U	0.025 U		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: New Water Well Testing
Pace Project No.: 35206520

Sample: SJOPBW-159174 **Lab ID: 35206520001** Collected: 09/09/15 07:15 Received: 09/10/15 11:35 Matrix: Drinking Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 900.0	**2.97U ± 1.84 (2.97)** **C:NA T:NA**	pCi/L	09/21/15 21:47	12587-46-1	
Gross Beta	EPA 900.0	**4.23 ± 1.33 (2.08)** **C:NA T:NA**	pCi/L	09/21/15 21:47	12587-47-2	
Radium-226	EPA 903.1	**0.619 ± 0.447 (0.506)** **C:NA T:99%**	pCi/L	09/23/15 12:52	13982-63-3	
Radium-228	EPA 904.0	**1.29 ± 0.489 (0.914)** **C:70% T:90%**	pCi/L	09/24/15 10:45	15262-20-1	
Total Uranium	EPA 908.0	**0.455U ± 0.249 (0.455)** **C:NA T:63%**	pCi/L	09/21/15 21:48	7440-61-1	

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL - RADIOCHEMISTRY

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: RADC/26056
QC Batch Method: EPA 908.0
Analysis Method: EPA 908.0
Analysis Description: 908.0 Total Uranium
Associated Lab Samples: 35206520001

METHOD BLANK: 952610
Matrix: Water
Associated Lab Samples:

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Total Uranium	0.0782 ± 0.202 (0.385) C:NA T:77%	pCi/L	09/21/15 21:48	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL - RADIOCHEMISTRY

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: RADC/26055 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 35206520001

METHOD BLANK: 952609 Matrix: Water
Associated Lab Samples:

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.195 ± 0.337 (0.736) C:77% T:82%	pCi/L	09/24/15 10:53	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL - RADIOCHEMISTRY

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: RADC/26050
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Associated Lab Samples: 35206520001

METHOD BLANK: 952604
Matrix: Water
Associated Lab Samples:

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.119 ± 0.609 (0.992) C:NA T:67%	pCi/L	09/23/15 11:33	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL - RADIOCHEMISTRY

Project: New Water Well Testing
Pace Project No.: 35206520

QC Batch: RADC/26064 | Analysis Method: EPA 900.0
QC Batch Method: EPA 900.0 | Analysis Description: 900.0 Gross Alpha/Beta
Associated Lab Samples: 35206520001

METHOD BLANK: 952627 | Matrix: Water
Associated Lab Samples:

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Gross Alpha	0.347 ± 0.776 (1.82) C:NA T:NA	pCi/L	09/22/15 06:23	
Gross Beta	-0.389 ± 0.964 (2.42) C:NA T:NA	pCi/L	09/22/15 06:23	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALIFIERS

Project: New Water Well Testing
Pace Project No.: 35206520

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach
PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Compound was analyzed for but not detected.
J(HS)	Estimated Value. Results are from sample aliquot taken from VOA vial with headspace (air bubble greater than 6 mm diameter).
J(M1)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
J(R1)	Estimated Value. RPD value was outside control limits.
J(S0)	Estimated Value. Surrogate recovery outside laboratory control limits.
L	Off-scale high. Actual value is known to be greater than value given.
P2	Re-extraction or re-analysis could not be performed due to insufficient sample amount.
Q	Sample held beyond the accepted holding time.
Q	Sample held beyond the accepted holding time. Analysis initiated more than 15 minutes after sample collection.
Q	Sample held beyond the accepted holding time. Sample was received outside EPA method holding time.

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: New Water Well Testing
Pace Project No.: 35206520

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35206520001	SJOPBW-159174	EPA 504.1	OEXT/24329	EPA 504.1	GCSV/15812
35206520001	SJOPBW-159174	EPA 508.1	OEXT/24375	EPA 508.1	GCSV/15844
35206520001	SJOPBW-159174	EPA 515.3	OEXT/24364	EPA 515.3	GCSV/15846
35206520001	SJOPBW-159174	EPA 531.1	GCSV/15764		
35206520001	SJOPBW-159174	EPA 547	GCSV/15789		
35206520001	SJOPBW-159174	EPA 549.2	OEXT/24339	EPA 549.2	GCSV/15841
35206520001	SJOPBW-159174	EPA 200.7	ICP/15926		
35206520001	SJOPBW-159174	EPA 200.8	ICPM/10777		
35206520001	SJOPBW-159174	EPA 245.1	MERP/6179	EPA 245.1	MERC/6163
35206520001	SJOPBW-159174	EPA 525.2	OEXT/24376	EPA 525.2	MSSV/8468
35206520001	SJOPBW-159174	EPA 548.1	OEXT/24311	EPA 548.1	MSSV/8464
35206520001	SJOPBW-159174	EPA 524.2	MSV/16058		
35206520001	SJOPBW-159174	EPA 900.0	RADC/26064		
35206520001	SJOPBW-159174	EPA 903.1	RADC/26050		
35206520001	SJOPBW-159174	EPA 904.0	RADC/26055		
35206520001	SJOPBW-159174	EPA 908.0	RADC/26056		
35206520001	SJOPBW-159174	SM 2120B	WET/32927		
35206520001	SJOPBW-159174	SM 2150B	WET/33004		
35206520001	SJOPBW-159174	SM 2540C	WET/32974		
35206520001	SJOPBW-159174	SM 4500-H+B	WET/33155		
35206520001	SJOPBW-159174	SM 5540C	WET/32926		
35206520001	SJOPBW-159174	EPA 300.0	WETA/50083		
35206520001	SJOPBW-159174	EPA 335.4	WETA/50085	EPA 335.4	WETA/50119
35206520001	SJOPBW-159174	EPA 353.2	WETA/50084		

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

WO#: 35206520

35206520

est Document

ields must be completed accurately.

Page: 1 Of 2

Section A
Required Client Information:

Company:	Curtis Environmental Service
Address:	185 Belle Terre Blvd., Suite D
	La Place, LA 70068
Email:	
Phone:	Fax:
Requested Due Date:	

Section B
Required Project Information:

Report To:	Jeff Dupuy
Copy To:	
Purchase Order #:	
Project Name:	New Water Well Testing
Project #:	

Section C
Invoice Information:

Company Name:	
Address:	
Pace Quote:	
Pace Project Manager:	joe.vondrick@pacelabs.com
Pace Profile #:	6804

Regulatory Agency	
State / Location	LA

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	NO2 NO3 Cl F SO4 color mg	Asbestos	Metals 200.7 200.8 245.1	Cyanide	Odor	504 G EDB	508.1 Organochlorine Pests	515.3 Chlorinated Herbicides	525.2 Base Neutral Extracts	531.1 Carbamates*	547 Glyphosate	548 Endothall	Residual Chlorine (Y/N)	
1	SJOPBW-159171	DW	G			9/9	7:15		2	X										X													
2									1	X											X												
3									1			X										X											
4									1					X									X										
5									1	X														X									
6									2	X															X								
7									1				X													X							
8									1	X																	X						
9									1				X															X					
10									2									X											X				
11									2	X																				X			
12									1	X																					X		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
SAMPLING KIT-EMPTY		8-14-15	1600							
All Samples were collected at 7:15		9/9/15	9:45		9/10/15	1135	0.9	Y	N	Y
* Preserved with MCAA							T23			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed:

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A — Required Client Information:

Company:	Curtis Environmental Service
Address:	185 Belle Terre Blvd., Suite D
	La Place, LA 70060
Email:	
Phone:	Fax:
Requested Due Date:	

Section B — Required Project Information:

Report To:	Jeff Dupuy
Copy To:	
Purchase Order #:	
Project Name:	New Water Well Testing
Project #:	

Section C — Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote:	
Pace Project Manager:	joe.vondrick@pacelabs.com,
Pace Profile #:	6804

Regulatory Agency	
State / Location	LA

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	549 Diqual/Paraquat by HPLC	VOC 524.2	Gross Alpha Beta by 900.0	Radium 226/228	Uranium	1613 DW DIOX						Residual Chlorine (Y/N)	
13	SJOPBW-159174	DW	G			9/9	7:15		1		X									X													
14									3				X								X												
15									1			X										X											
16									1			X											X										
17									1			X												X									
18									2	X															X								
19																																	
20																																	
21																																	
22																																	
23																																	
24																																	

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
SAMPLING KIT-EMPTY	[signature]	8.14.15	1600							
	[signature]	9/9/15	9:45	SSP	9/10/15	1135	0.9	Y	N	Y
							T213			

SAMPLER NAME AND SIGNATURE	
PRINT Name of SAMPLER:	
SIGNATURE of SAMPLER:	DATE Signed:

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

Pace Container Order #70478

Addresses

Order By :		Ship To :		Return To:	
Company	Curtis Environmental Service	Company	Curtis Environmental Service	Company	Pace Analytical Ormond Beach
Contact	Jeff Dupuy	Contact	Jeff Dupuy	Contact	Vondrick, Joe
Email	labsupervisor@curtislab.com	Email	labsupervisor@curtislab.com	Email	joe.vondrick@pacelabs.com
Address	185 Belle Terre Blvd., Suite D	Address	185 Belle Terre Blvd., Suite D	Address	8 East Tower Circle
Address 2		Address 2		Address 2	
City	La Place	City	La Place	City	Ormond Beach
State	LA Zip 70060	State	LA Zip 70060	State	FL Zip 32174
Phone	9856530000	Phone	9856530000	Phone	386-672-5668

Info

Project Name	New Water Well Testing	Due Date	08/14/2015	Profile	6804	Quote	
Project Manager	Vondrick, Joe	Return		Carrier	FedEx Ground - Ormond Beach	Location	LA

Trip Blanks

- [ ] Include Trip Blanks

Bottle Labels

- [ ] Blank
- [X] Pre-Printed No Sample IDs
- [ ] Pre-Printed With Sample IDs

Bottles

- [ ] Boxed Cases
- [ ] Individually Wrapped
- [X] Grouped By Sample

Return Shipping Labels

- [ ] No Shipper Number
- [ ] With Shipper Number

Misc

- [ ] Sampling Instructions
- [X] Custody Seal
- [X] Temp. Blanks
- [X] Coolers
- [ ] Syringes
- [ ] Extra Bubble Wrap
- [ ] Short Hold/Rush Stickers
- [ ] DI Water Liter(s)
- [ ] USDA Regulated Soils

COC Options

- [X] Number of Blanks 2
- [ ] Pre-Printed

# of Samples	Matrix	Test	Container	# of QC	Total	Lot #	Notes
1	WT	NO2 NO3 Cl F SO4 color mbas TDS	2-1L Plastic Unpreserved	0	2		
1	WT	Asbestos	1-1L Plastic Unpreserved	0	1		
1	WT	Metals 200.7 200.8 245.1	500 mL plastic HNO3	0	1		
1	WT	Cyanide	250mL plastic NaOH	0	1		
1	WT	Odor	1-500mL Amber Glass Unpreserved	0	1		
1	WT	504 G EDB	2-40mL amber glass vial	0	2		
1	WT	508.1 Organochlorine Pests/PCBs	1L Amber Glass w/ HCL	0	1		
1	WT	515.3 Chlorinated Herbicides	1-250mL Amber Glass Unpreserved	0	1		
1	WT	525.2 Base Neutral Extractables	1-1L Amber Glass w/ HCL	0	1		
1	WT	531.1 Carbamates	2-40mL Clear Glass w/ MCAA	0	2		
1	WT	547 Glyphosate	2-40mL Amber Glass Unpreserved	0	2		
1	WT	548 Endothall	1-500mL Amber Glass Unpreserved	0	1		

Hazard Shipping Placard In Place : NO

*Sample receiving hours are Monday through Friday 8:00 am to 6:00 pm and Saturday from 9:00 am to 12:00 pm unless special arrangements are made with you project manager.

*Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you.

*Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage and disposal.

RETURN WITH COC

*Payment term are net 30 days.

*Please include the proposal number on the chain of custody to insure proper billing.

Sample Notes

New Groundwater Source DW testing

Ship Date :

Prepared By:

Verified By:

Pace Container Order #70478

Addresses

Order By :		Ship To :		Return To:	
Company	Curtis Environmental Service	Company	Curtis Environmental Service	Company	Pace Analytical Ormond Beach
Contact	Jeff Dupuy	Contact	Jeff Dupuy	Contact	Vondrick, Joe
Email	labsupervisor@curtislab.com	Email	labsupervisor@curtislab.com	Email	joe.vondrick@pacelabs.com
Address	185 Belle Terre Blvd., Suite D	Address	185 Belle Terre Blvd., Suite D	Address	8 East Tower Circle
Address 2		Address 2		Address 2	
City	La Place	City	La Place	City	Ormond Beach
State	LA Zip 70060	State	LA Zip 70060	State	FL Zip 32174
Phone	9856530000	Phone	9856530000	Phone	386-672-5668

Info

Project Name	New Water Well Testing	Due Date	08/14/2015	Profile	6804	Quote	
Project Manager	Vondrick, Joe	Return		Carrier	FedEx Ground - Ormond Beach	Location	LA

Trip Blanks

- [ ] Include Trip Blanks

Bottle Labels

- [ ] Blank
- [x] Pre-Printed No Sample IDs
- [ ] Pre-Printed With Sample IDs

Bottles

- [ ] Boxed Cases
- [ ] Individually Wrapped
- [x] Grouped By Sample

Return Shipping Labels

- [ ] No Shipper Number
- [ ] With Shipper Number

COC Options

- [x] Number of Blanks 2
- [ ] Pre-Printed

Misc

- [ ] Sampling Instructions
- [x] Custody Seal
- [x] Temp. Blanks
- [x] Coolers
- [ ] Syringes
- [ ] Extra Bubble Wrap
- [ ] Short Hold/Rush Stickers
- [ ] DI Water Liter(s)
- [ ] USDA Regulated Soils

# of Samples	Matrix	Test	Container	# of QC	Total	Lot #	Notes
1	WT	549 Diquat/Paraquat by HPLC	1-1L Amber Plastic H2SO4	0	1		
1	WT	VOC 524.2	3-40 ml HCl	0	3		
1	WT	Gross Alpha Beta by 900.0	1L plastic HNO3	0	1		
1	WT	Radium 226/228	1-1L Plastic w/ HNO3	0	1		
? 1	WT	Uranium	1L plastic HNO3	0	0 1		
1	WT	1613 DW DIOX	2-1L amber glass	0	2		

RETURN WITH COC

Hazard Shipping Placard In Place : NO

*Sample receiving hours are Monday through Friday 8:00 am to 6:00 pm and Saturday from 9:00 am to 12:00 pm unless special arrangements are made with you project manager.

*Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you.

*Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage and disposal.

*Payment term are net 30 days.

*Please include the proposal number on the chain of custody to insure proper billing.

Sample Notes

New Groundwater Source DW testing

Ship Date :

Prepared By:

Verified By:

Pace Analytical	Document Name: Sample Condition Upon Receipt Form Document No.: F-FL-C-007 rev. 06	Document Revised: August 11, 2014 Issuing Authority: Pace Florida Quality Office

Sample Condition Upon Receipt Form (SCUR)

Table Number: _____

Client Name: Curtis Grv Project # _____

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other _____

Tracking # 7812 9896 0887/9900 2257

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Date and Initials of person examining contents: 9/10/15

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other _____

Thermometer Used T213 Type of Ice: (Wet) Blue None

Cooler Temperature °C -1.9 (Visual) ϕ (Correction Factor) -1.9 (Actual) 2) 0.9 ϕ 0.9

(Temp should be above freezing to 6°C). If below 0°C, then was sample frozen? ☐ Yes ☐ No

Receipt of samples satisfactory: ☐ Yes ☐ No Rush TAT requested on COC:

If yes, then all conditions below were met:	If no, then mark box & describe issue (use comments area if necessary):
Chain of Custody Present	☐
Chain of Custody Filled Out	☐
Relinquished Signature & Sampler Name COC	☐
Samples Arrived within Hold Time	☐
Sufficient Volume	☐
Correct Containers Used	☐
Containers Intact	☐
Sample Labels match COC (sample IDs & date/time of collection)	☐ No Labels: ☐ No Time/Date on Labels: ☐
All containers needing preservation are found to be in compliance with EPA recommendation.	☐
No Headspace in VOA Vials (>6mm):	☐

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____

Comments/ Resolution (use back for additional comments): _____

Project Manager Review: _____ Date: 9/10

Finished Product Information Only

F.P. Sample ID: _____

Production Code: _____

Date/Time Opened: _____

Number of Unopened Bottles Remaining: _____

Extra Sample in Shed: Yes No

Size & Qty of Bottles Received

_____ x 5 Gal
_____ x 2.5 Gal
_____ x 1 Gal
_____ x 1 Liter
_____ x 500 mL
_____ x 250 mL
_____ x Other: _____

Chain of Custody

Pace Analytical®
www.pacelabs.com

Workorder: 35206520 **Workorder Name:** New Water Well Testing **Owner Received Date:** 9/10/2015 **Results Requested By:** 9/24/2015

Report To	Subcontract To
Joe Vondrick Pace Analytical Services, Inc. 8 East Tower Circle Ormond Beach, FL 32174 Phone (386)672-5668 Fax (386)672-5668	Pace Analytical Minnesota 1700 Elm Street SE Suite 200 Minneapolis, MN 55414 Phone (612)607-1700

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Unpreserved	Preserved Containers					Requested Analysis: EPA 1613												LAB USE ONLY
1	SJOPBW-159174	PS	9/9/2015 07:15	35206520001	Drinking	1	2					X												
2																								
3																								
4																								
5																								

Transfers	Released By	Date/Time	Received By	Date/Time
1				
2				
3				

Comments

Cooler Temperature on Receipt ____ °C | Custody Seal Y or N | Received on Ice Y or N | Samples Intact Y or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.*
This chain of custody is considered complete as is since this information is available in the owner laboratory.

Please E-Mail all results in a NELAC-Compliant Florida MDL PDF format to the PM listed above as soon as possible.

Pace Analytical®
www.pacelabs.com

Ship To:
Pace Analytical Minnesota
1700 Elm Street SE
Suite 200
Minneapolis, MN 55414
Phone (612)607-1700

INTER_LABORATORY WORK ORDER # 35206520
(To be completed by sending lab)

Sending Project No	35206520
Receiving Project No	
Check Box for Consolidated Invoice	☐
Date Prepared	09/10/15
REQUESTED COMPLETION DATE	9/24/2015

Sending Region	IR35-Ormond Beach	Sending Project Mgr.	Joe Vondrick
Receiving Region	IR10-Minnesota	External Client	Curtis Environmental
State of Sample Origin	FLORIDA	QC Deliverable	STD REPORT

All questions should be addressed to sending project manager.

Requested Reportable Units _____ Report Wet or Dry Weight? Dry Weight Cert Needed _____

WORK REQUESTED

Method Description	Container Type	Quantity of containers	Preservative	Quantity of Samples	Unit Price	Amount
EPA 1613 DXN	AG1U	2	Unpreserved	1	$225.00	$225.00
					TOTAL	$225.00

Special Requirements: _____

Receiving Region Department	Acctg. Code	Totals from above	Revenue Allocation: Receiving Region (80%)	Revenue Allocation: Client Services Dept. Sending Region (20%)
Dioxin, High Resolution*	35	$225.00	$202.50	$22.50
* Custom Revenue Allocation	TOTAL	$225.00	$202.50	$22.50

FOR ANALYTICAL WORK COMPLETED THIS SECTION ALSO

Chain of Custody Included: ☑ Yes ☐ No Return Samples to Sending Region: ☐ Yes ☑ No

Matrix: ☐ Soil ☑ Water ☐ Air ☐ Other (identify) _____

CONFIRMATION OF WORK COMPLETED

Date Completed: _____ Receiving Project Manager: _____

DISPOSITION of FORM

Original sent to the receiving lab - Copy kept at the sending lab.
When work completed: Original sent to the ABM at the receiving laboratory Copies are made to corporate as needed.

Chain of Custody

Pace Analytical®
www.pacelabs.com

Workorder: 35206520 **Workorder Name:** New Water Well Testing **Owner Received Date:** 9/10/2015 **Results Requested By:** 9/24/2015

Report To	Subcontract To
Joe Vondrick Pace Analytical Services, Inc. 8 East Tower Circle Ormond Beach, FL 32174 Phone (386)672-5668 Fax (386)672-5668	Pace Analytical Pittsburgh 1638 Roseytown Road Suites 2, 3, & 4 Greensburg, PA 15601 Phone (724)850-5600

Requested Analysis

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: HNO3						Gross Alpha/Beta	Rad 226/228	Uranium										LAB USE ONLY
1	SJOPBW-159174	PS	9/9/2015 07:15	35206520001	Drinking	✓	W					X	X	X										
2																								
3																								
4																								
5																								

Transfers	Released By	Date/Time	Received By	Date/Time
1				
2				
3				

Comments

Cooler Temperature on Receipt °C	Custody Seal Y or N	Received on Ice Y or N	Samples Intact Y or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.*
This chain of custody is considered complete as is since this information is available in the owner laboratory.

Please E-Mail all results in a NELAC-Compliant Florida MDL PDF format to the PM listed above as soon as possible.

Pace Analytical®
www.pacelabs.com

Ship To:
Pace Analytical Pittsburgh
1638 Roseytown Road
Suites 2, 3, & 4
Greensburg, PA 15601
Phone (724)850-5600

INTER_LABORATORY WORK ORDER # 35206520
(To be completed by sending lab)

Sending Project No:	35206520
Receiving Project No:	
Check Box for Consolidated Invoice:	☐
Date Prepared:	09/10/15
REQUESTED COMPLETION DATE:	9/24/2015

Sending Region	IR35-Ormond Beach	Sending Project Mgr.	Joe Vondrick
Receiving Region	IR30-Pittsburgh	External Client	Curtis Environmental
State of Sample Origin	FLORIDA	QC Deliverable	STD REPORT

All questions should be addressed to sending project manager.

Requested Reportable Units _____ Report Wet or Dry Weight? Dry Weight Cert. Needed _____

WORK REQUESTED

Method Description	Container Type	Quantity of Containers	Preservative	Quantity of Samples	Unit Price	Amount
Ra-226, Ra-228, Uranium	BPIN	3	HNO3	1	$290.00	$290.00
					TOTAL	$290.00

Special Requirements: _____

Receiving Region Department	Acctg. Code	Totals from above	Revenue Allocation	
			Receiving Region (80%)	Client Services Dept. Sending Region (20%)
Pittsburgh Radiochemistry	38	$290.00	$232.00	$58.00
* Custom Revenue Allocation	TOTAL	$290.00	$232.00	$58.00

FOR ANALYTICAL WORK COMPLETED THIS SECTION ALSO

Chain of Custody Included: ☑ Yes ☐ No Return Samples to Sending Region: ☐ Yes ☑ No

Matrix: ☐ Soil ☑ Water ☐ Air ☐ Other (identify) _____

CONFIRMATION OF WORK COMPLETED

Date Completed: _____ Receiving Project Manager: _____

DISPOSITION of FORM

Original sent to the receiving lab - Copy kept at the sending lab

When work completed: Original sent to the ABM at the receiving laboratory Copies are made to corporate as needed.

Chain of Custody

Pace Analytical®
www.pacelabs.com

Workorder: 35206520 **Workorder Name:** New Water Well Testing **Results Requested** 9/24/2015

Report Invoice To | Subcontract To | Requested Analysis

Joe Vondrick
Pace Analytical Ormond Beach
8 East Tower Circle
Ormond Beach, FL 32174
Phone (386)672-5668
Email joe.vondrick@pacelabs.com

EMSL NJ

P.O. FLS-7049

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved	Asbestos	LAB USE ONLY
1	SJOPBW-159174	9/9/2015 07:15	35206520001	Drinking		X	
2							
3							
4							
5							

Transfers	Released By	Date/Time	Received By	Date/Time
1				
2				
3				

Comments

Cooler Temperature on Receipt °C | Custody Seal Y or N | Received on Ice Y or N | Samples Intact Y or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.*
This chain of custody is considered complete as is since this information is available in the owner laboratory.

Please E-Mail all results in a NELAC-Compliant Florida MDL PDF format to the PM listed above as soon as possible.

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

www.pacelabs.com

Report Prepared for:

Joe Vondrick
PASI Florida
8 East Tower Circle
Ormond Beach FL 32174

REPORT OF LABORATORY ANALYSIS FOR 2,3,7,8-TCDD

Report Summary:

This report contains results of one drinking water sample analyzed to determine 2,3,7,8-TCDD content. This sample was analyzed according to Method 1613 by High Resolution Gas Chromatography/High Resolution Mass Spectrometry.

Report Prepared Date:

September 22, 2015

Report Information:

Pace Project #: 10322010
Sample Receipt Date: 09/15/2015
Client Project #: 35206520
Client Sub PO #: N/A
State Cert #: E87605

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 Drinking Water Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Nathan Boberg, your Pace Project Manager.

This report has been reviewed by:

September 22, 2015
Nathan Boberg, Project Manager

(612) 607-6444 (fax)
nathan.boberg@pacelabs.com

NELAP ACCREDITED TNI LABORATORY

Report of Laboratory Analysis

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE	MN002
California	01155CA	New York (NEL	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Reporting Flags

A = Reporting Limit based on signal to noise

B = Less than 10x higher than method blank level

C = Result obtained from confirmation analysis

D = Result obtained from analysis of diluted sample

E = Exceeds calibration range

I = Interference present

J = Estimated value

Nn = Value obtained from additional analysis

P = PCDE Interference

R = Recovery outside target range

S = Peak saturated

U = Analyte not detected

V = Result verified by confirmation analysis

X = %D Exceeds limits

Y = Calculated using average of daily RFs

* = See Discussion

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Chain of Custody

Pace Analytical
www.pacelabs.com
10322010

Workorder: 35206520 **Workorder Name:** New Water Well Testing **Owner Received Date:** 9/10/2015 **Results Requested By:** 9/24/2015

Report To	Bill To
Joe Vondrick Pace Analytical Services, Inc. 8 East Tower Circle Ormond Beach, FL 32174 Phone (386)672-5668 Fax (386)672-5668	Pace Analytical Minnesota 1700 Elm Street SE Suite 200 Minneapolis, MN 55414 Phone (612)607-1700

Item	Sample Id	Sample Type	Collect Date/Time	Lab ID	Matrix	Unpreserved						EPA 1613											LAB USE ONLY
1	SJOPBW-159174	PS	9/9/2015 07:15	35206520001	Drinking	~~1~~	2					X											001
2																							
3																							
4																							
5																							

Transfers	Released By	Date/Time	Received By	Date/Time
1		9/14/15	1010	
2			[illegible] - PACE	9-15-15 09:50
3				

Cooler Temperature on Receipt 0.7 °C | Custody Seal Y or (N) | Received on Ice (Y) or N | Samples Intact (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.*
This chain of custody is considered complete as is since this information is available in the owner laboratory.

Please E-Mail all results in a NELAC-Compliant Florida MDL PDF format to the PM listed above as soon as possible.

Pace Analytical®	Document Name: Sample Condition Upon Receipt Form	Document Revised: 23Feb2015 Page 1 of 1
	Document No.: F-MN-L-213-rev.13	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Pace FL

Project #:

WO#: 10322010

10322010

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 6341 7582 1532 6341 7582 1554

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ B88A9130516413 ☐ B88A912167504 ☐ B88A0143310098

Type of Ice: ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.0, 0.9 **Cooler Temp Corrected (°C):** 1.8, 0.7 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.2 **Date and Initials of Person Examining Contents:** KH 9.15.15

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☐ Yes	☑ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☐ Yes	☑ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: W	☐ Yes	☑ No	☐ N/A	12. COC says 2 containers. Only 1 present AG1U 1/1 Per label
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: [signature] **Date:** 9/15/15

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace AnalyticalServices, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612-607-6444

Drinking Water Analysis Results
2,3,7,8-TCDD -- USEPA Method 1613B

Sample ID.....SJOPBW-159174
Client..... PASI Florida
Lab Sample ID..... 35206520001

Date Collected.....09/09/2015
Date Received.....09/15/2015
Date Extracted.....09/16/2015

	Sample SJOPBW-159174	Method Blank	Lab Spike	Lab Spike Dup
[2,3,7,8-TCDD]	**ND**	ND	--	--
RL	0.96 pg/L	1.3 pg/L	--	--
2,3,7,8-TCDD Recovery	--	--	101%	96%
Spike Recovery Limit	--	--	73-146%	73-146%
RPD			5.4%	
IS Recovery	**81%**	58%	65%	81%
IS Recovery Limits	31-137%	31-137%	25-141%	25-141%
CS Recovery	**91%**	63%	76%	94%
CS Recovery Limits	42-164%	42-164%	37-158%	37-158%
Filename	F150921A_10	F150921A_05	F150921A_06	F150921A_07
Analysis Date	09/21/2015	09/21/2015	09/21/2015	09/21/2015
Analysis Time	15:19	11:45	12:27	13:10
Analyst	SMT	SMT	SMT	SMT
Volume	1.009L	1.011L	1.019L	1.030L
Dilution	NA	NA	NA	NA
ICAL Date	08/25/2015	08/25/2015	08/25/2015	08/25/2015
CCAL Filename	F150921A_01	F150921A_01	F150921A_01	F150921A_01

! = Outside the Control Limits
ND = Not Detected
RL = Reporting Limit
Limits = Control Limits from Method 1613 (10/94 Revision), Tables 6A and 7A
RPD = Relative Percent Difference of Lab Spike Recoveries
IS = Internal Standard [2,3,7,8-TCDD-$^{13}C_{12}$]
CS = Cleanup Standard [2,3,7,8-TCDD-$^{37}Cl_4$]

Analyst: _____

Project No.....10322010

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order ID:	041527520
Customer ID:	ELAB50
Customer PO:	FLS-7049
Project ID:	

Attn:	Joe Vondrick Pace Analytical Services, Inc. 8 East Tower Circle Ormond Beach, FL 32174	Phone: Fax: Collected: Received: Analyzed:	(386) 672-5668 (386) 673-4001 09/09/2015 09/11/2015 09/24/2015
Proj:	35206520 / New Water Well Testing		

Test Report: Determination of Asbestos Structures >10µm in Drinking Water Performed by the 100.2 Method (EPA 600/R-94/134)

Sample ID Client / EMSL	Sample Filtration Date/Time	Original Sample Vol. Filtered (ml)	Effective Filter Area (mm²)	Area Analyzed (mm²)	ASBESTOS Asbestos Types	Fibers Detected	Analytical Sensitivity	Concentration	Confidence Limits
							MFL (million fibers per liter)		
SJOPBW-159174 041527520-0001	9/11/2015 11:00 AM	10	1354	0.2772	None Detected	ND	0.49	<0.49	0.00 - 1.80

Sample ozonated prior to analysis due to lab receipt time exceeding 48hr method hold time.

Analyst(s)
Debbie Little (1)

Benjamin Ellis, Laboratory Manager
or Other Approved Signatory

Any questions please contact Benjamin Ellis.

Initial report from: 09/24/2015 16:17:34

Sample collection and containers provided by the client, acceptable bottle blank level is defined as ≤0.01MFL>10um. ND=None Detected. This report may not be reproduced, except in full, without written permission by EMSL Analytical, Inc. The test results contained within this report meet the requirements of NELAC unless otherwise noted. This report relates only to the samples reported above. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NELAC NYS ELAP 10872, NJ DEP 03036, FL DOH E87975, PA ID# 68-00367

Chain of Custody

041527520

Pace Analytical

Workorder: 35206520 **Workorder Name:** New Water Well Testing **Results Requested** 9/24/2015

Joe Vondrick
Pace Analytical Ormond Beach
8 East Tower Circle
Ormond Beach, FL 32174
Phone (386)672-5668
Email: joe.vondrick@pacelabs.com

EMSL NJ

P.O. FLS-7049

					Unpreserved	Asbestos	LAB USE ONLY
1	SJOPBW-159174	9/9/2015 07:15	35206520001	Drinking		X	
2							
3							
4							
5							

Transfers	Released By	Date/Time	Received By	Date/Time
1		9/10/15	GOU	
2			VC RK	9-11-15 9:40
3				

-05

Cooler Temperature on Receipt °C	Custody Seal Y or N	Received on Ice Y or N	Samples Intact Y or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

Please E-Mail all results in a NELAC-Compliant Florida MDL PDF format to the PM listed above as soon as possible.

RC

Thursday, September 10, 2015 2:17:31 PM

FMT-ALL-C-002rev.00 24March2009

Page 1 of 1

6341-7582-0525

OrderID: 041527520

Page 1 Of 1