

**SPECIFICATIONS
AND
CONTRACT DOCUMENTS**

FOR

**CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.
CONTRACT 4**

**MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS**

**CORONAVIRUS LOCAL FISCAL RECOVERY PROGRAM
THE AMERICAN RESCUE PLAN ACT (ARPA)**

**A WATER SECTOR PROGRAM
(PROJECT NO. 10901)**



ACT 410 of the 2021 Regular Session of the Louisiana Legislature

**NEBO WATER SYSTEM, INC.
(OWNER)**

OCTOBER 2025



**PAN AMERICAN ENGINEERS, LLC
1717 JACKSON STREET (71301)
P. O. BOX 8599 (71306)
ALEXANDRIA, LOUISIANA
318-473-2100 PHONE
PAE JOB NO. 12641**



The following Contract Documents and Technical Specifications have been prepared under my direct supervision and guidance for Nebo Water System, Inc. in conjunction with the Plans and for the explicit use by the Owner and Contractors for the bidding and construction of the project:

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.

CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS



Thomas C. David, Jr., P.E., P.L.S.
CIVIL ENGINEER

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.

CONTRACT NO. 4

MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

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NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.

CONTRACT NO. 4

MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

DIVISION 00

BIDDING AND CONTRACT DOCUMENTS

MaSECTION 00100

ADVERTISEMENT FOR BIDS

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.

CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

Separate sealed bids for the NEBO WATER SYSTEM, INC., CONSOLIDATION WITH THE MANIFEST-RHINEHART WATER SYSTEM, INC. CONTRACT NO. 4 MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS & BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS, will be received by Nebo Water System, Inc. at Pan American Engineers, 1717 Jackson Street, Alexandria, Louisiana 71301 until 10:00 A.M. on Wednesday, February 18, 2026 and then at said office publicly opened and read aloud. Any bid received after the specified time and date will not be considered.

The Instructions to Bidders, Bid Form, Agreement Between Owner and Contractor, Forms of Bid Bond, Performance and Payment Bonds, Drawings and Specifications, and other Contract Documents may be examined at the following location:

PAN AMERICAN ENGINEERS, LLC
(Design Professional)
1717 JACKSON STREET (71301)
P. O. BOX 8599 (71306)
ALEXANDRIA, LOUISIANA
(318) 473-2100

The work to be performed, by site, is as follows:

A. Water Well Site:

1. Plugging and abandoning of Water Well No. 1 and Water Well No. 2;
2. Demolition of existing aerator and associated piping (foundation and steel structure to remain); 44,000-gallon ground storage tank and associated piping, valves, foundation, etc.; duplex pump station and associated piping, valves, concrete pad, etc.; chemical buildings and equipment (foundation to remain); and electrical panels (shed, rack and foundation to remain)
3. Installation of two (2) water test wells;
4. Construction of permanent Water Well No. 3 and Water Well No. 4;
5. Installation of Aerator;
6. Installation of 44,000-Gallon Enamel-Coated Ground Storage Tank;
7. Installation of Duplex Submersible Tube Pump Station;
8. Installation of Chlorination Feed System;
9. Installation of Phosphate Feed System;

10. Installation of Emergency Diesel-Powered Generator and Automatic Transfer Switch;
11. Installation of Electrical, SCADA and VFDs;
12. Associated site work

B. Three (3) Booster Station Sites:

1. Demolition of existing packaged pump station, 14,000-gallon ground storage tank, 185 gallon hydro tank and associated piping, valves, etc.
2. Installation of 14,000-Gallon Enamel-Coated Ground Storage Tank;
3. Installation of Duplex Submersible Tube Pump Station;
4. Installation of Emergency Diesel-Powered Generator and Automatic Transfer Switch;
5. Installation of Electrical, SCADA and VFDs;
6. Associated site work (including, but not limited to, site fencing, grading, etc.)

Copies of the bidding documents shall be obtained from the office of Pan American Engineers, LLC upon deposit of \$150.00 for each set of documents; or from the electronic bid submittal option as noted in the Advertisement. The deposit on the first set of documents furnished to bonafide prime bidders will be fully refunded upon return of the documents, in good condition, no later than ten (10) days after receipt of bids. On other sets of documents furnished to bidders, the deposit less actual cost of reproduction will be refunded upon return of the documents, in good condition, no later than ten (10) days after receipt of bids.

The OWNER reserves the right to reject any or all bids for just cause. Such actions will be in accordance with Title 38 of Public Bid Law.

In accordance with L.R.S. 38:2212.B.(1), the provisions and requirements stated in the Bidding Documents shall not be considered as informalities and shall not be waived.

Each Bidder must deposit with the bid, security in the amount of at least five percent (5%) of the total bid price, as described in the Instructions to Bidders. Bid bonds shall be written by a surety or insurance company meeting the requirements noted in L.R.S. 38:2218.

The successful Bidder shall be required to furnish a Performance Bond and Payment Bond, in an amount equal to 100% of the Contract amount, written by a surety or insurance company meeting the requirements noted in L.R.S. 38:2219 A.(1)(a), (b) and (c), or for Federally funded projects, must be listed as acceptable on the U.S. Department of Treasury Circular 570.

Nebo Water System, Inc. is an equal opportunity employer.

Nebo Water System, Inc. encourages all small and minority-owned firms and women's business enterprises to apply.

Any person with disabilities required special accommodations must contact the Nebo Water System, Inc. no later than seven (7) days prior to bid opening.

The successful bidder must have an active Unique Entity ID (UEI) and be registered with the Federal System of Award (SAM) Registration Program prior to award of contract.

Nebo Water System
P.O. Box 624
Harrisonburg, Louisiana 71340
Chance Willis, President

Publish Dates:

Catahoula News Booster

Wednesday, January 21, 2026

Wednesday, January 28, 2026

Wednesday, February 4, 2026

The Jena Times

Wednesday, January 21, 2026

Wednesday, January 28, 2026

Wednesday, February 4, 2026

SECTION 00200

INSTRUCTIONS TO BIDDERS

NEBO WATER SYSTEM, INC.

**CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.**

**CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS**

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1. **Defined Terms:**

1.1 Terms used in these Instructions to Bidders which are defined in the General Conditions of the Construction Contract have the meanings assigned to them in the General Conditions. The term "Bidder" means one who submits a Bid directly to OWNER, as distinct from a sub-bidder, who submits a bid to a Bidder. The term "Successful Bidder" means the lowest, qualified, responsible and responsive Bidder to whom OWNER (on the basis of OWNER'S evaluation as hereinafter provided) makes an award. The term "Bidding Documents" includes the Advertisement or Invitation to Bid, Instructions to Bidders, the Bid Form, the proposed Contract Documents (including all Addenda issued prior to receipt of Bids) and the Drawings.

2. **Copies of Bidding Documents:**

2.1 Complete sets of the Bidding Documents in the number and for the sum stated in the Advertisement or Invitation to Bid may be obtained from ENGINEER.

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:

3.1 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 in the General Conditions.

4. Examination of Contract Documents and Site:

4.1 It is the responsibility of each Bidder before submitting a Bid, to (a) examine the contract Documents thoroughly, (b) visit the site to become familiar with local Laws and Regulations that may affect cost, progress, performance or furnishing of the WORK, (c) consider federal, state and local Law and Regulations that may affect cost, progress, performance or furnishing of the WORK, (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify ENGINEER of all conflicts, errors or discrepancies in the Contract Document.

4.2 Information and data reflected in the Contract Documents with respect to 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.

4.3 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 5.04 and 5.05 of the General Conditions.

4.4 Before submitting a Bid, each Bidder at Bidder's own expense, will be responsible to make or obtain any examinations, investigations, explorations, tests, studies and data concerning physical 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 and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

4.5 On request in advance, OWNER will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up, and restore the site to its former condition upon completion of such explorations.

4.6 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 provided by CONTRACTOR. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by OWNER unless otherwise provided in the Contract Documents.

4.7 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 as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the WORK.

5. Interpretations and Addenda:

5.1 All questions about the meaning or intent of the Contract Documents are to be directed to the ENGINEER. Interpretations 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 (10) 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.

5.2 Addenda may also be issued to modify the Bidding Documents as deemed advisable by OWNER and ENGINEER.

6. Bid Security:

6.1 Each Bid must be accompanied by Bid Security made payable to OWNER in an amount of five percent of the Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions.

6.2 The time period for holding bids and Bid Security shall be in accordance with Louisiana Revised Statute (L.R.S.) 38:2215. The Bid Security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required contract security, whereupon the Bid Security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within fifteen (15) days after the Notice of Award, OWNER may annul the Notice of Award and the Bid Security of that Bidder will be forfeited. Bid Security with Bids which are not competitive will be returned within seven days after the Bid opening.

6.3 In accordance with L.R.S. 38:2218.C, all Bid Guaranty Bonds shall be written by a surety or insurance agency currently on the U.S. Department of Treasury Financial Management Service list of approved companies, or by a Louisiana domiciled insurance company with at least an A-rating in the latest printing of the A.M. Best's Key Rating Guide or by an insurance company in good standing licensed to write bonds either domiciled in Louisiana or owned by Louisiana residents.

7. Contract Time:

7.1 The number 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 Contract Time) are set forth in the Agreement.

8. Liquidated Damages:

8.1 Provisions for liquidated damages are set forth in the Agreement.

9. Substitute Materials or Products - Prior Approvals:

9.1 In unusual cases where a closed specification has been justified for prior acceptance by the OWNER in conformance with L.R.S. 38:2291 and 38:2295.A and B, the naming of that product in the Drawings and Specifications will be followed by wording indicating that no substitution is permitted.

9.2 Otherwise, where the Drawings and Specifications name a certain brand, make, manufacturer, or uses a definite Specification, the Specifications are used only to denote the quality standard of product desired and do not restrict Bidders to the specific brand, make, manufacturer, or Specification named. The Specifications are only to set forth and convey to prospective Bidders the general style, type, character, and quality of product desired. Equivalent products may be acceptable.

9.3 If the Bidder desires to obtain approval of materials or equipment from other alternative suppliers or manufacturers to those identified in the Specifications or noted on the Drawings, a written request for a substitution shall be submitted to the ENGINEER at least seven (7) working days prior to the Bid date as specified in L.R.S. 38:2295.C. Each such request shall include the name of the material or equipment for which it is to be substituted and complete description of the proposed substitute including drawings, cuts, performance and test data and other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or Work that incorporation of the substitute would require shall be included. The burden of proof of the merit of the proposed substitute is upon the Bidder. The ENGINEER'S decision of approval or disapproval of a proposed substitution shall be final. If ENGINEER approves any proposed substitution, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

9.4 After the receipt of Bids, the Contract, if awarded, will be on the basis of material and product described in the Drawings or specified in the Specifications without consideration of possible substitute of "or equal" items except as specified in 9.3 above.

10. Subcontractors, Suppliers and Others:

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

11. Bid Form:

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

11.2 All blanks on the Bid Form must be completed in ink or by typewriter.

11.3 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). The corporate address must be shown where indicated on the Bid Form.

11.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear where indicated on the Bid Form and the official address of the partnership must be shown where indicated on the Bid Form.

11.5 All names must either be clearly written and legible or be typed or printed where indicated on the Bid Form.

11.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in where indicated on the Bid Form).

11.7 The address for communications regarding the Bid must be shown where indicated on the Bid Form.

12. Submission of Bids:

12.1 Bids shall be submitted at the time and place indicated in the Advertisement or Invitation to 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 Louisiana CONTRACTOR's license number, and accompanied by the Bid Security and other required documents. If the Bid is sent through the mail or other delivery system the sealed envelopes shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it.

12.2 Bidder shall submit with the Bid a Corporate Resolution (See Section 00900) or other similar written evidence of the authority of the person signing the Bid in accordance with L.R.S. 38:22.2.B.(2) and 38:2212.B.(5).

13. Modification and Withdrawal of Bids:

13.1 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.

13.2 If, within forty-eight (48) hours of the Bid opening, exclusive of Saturdays, Sundays and legal holidays, any Bidder who files a duly signed, and sworn written notice with OWNER to the satisfaction of OWNER that there was a patently obvious mechanical, clerical or mathematical error in its Bid, that Bidder may withdraw its Bid and the Bid Security will be returned as provided by L.R.S. 38:2214.C. Thereafter, the Bidder will be disqualified from future bidding on the Contract.

14. Opening of Bids:

14.1 Bids will be opened and (unless obviously nonresponsive) read aloud publicly. 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.

15. Award of Contract:

15.1 For reasons of just cause, as provided by L.R.S. 38:2214.B., the OWNER reserves the right to reject any and all Bids. The OWNER will disregard all nonconforming, nonresponsive, unbalanced or conditional Bids. Bids which are unsigned or are not accompanied by the required Bid Security shall be irrevocably rejected. When one or more bid is rejected, the reason therefore shall be given. Bids may be considered irregular and subject to rejection if they show serious omission, unauthorized alteration of form, unauthorized alternate bids, incomplete or unbalanced unit prices, or irregularities of any kind.

15.2 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.

15.3 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.

15.4 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.

15.5 In accordance with L.R.S. 38:2215(A), the OWNER shall act not later than forty-five calendar days after the date of opening bids to award such public works contract to the lowest responsible and responsive bidder or to reject all bids. However the OWNER and the lowest responsible and responsive bidder, by mutually written consent, may agree to extend the deadline for award by one or more extensions of thirty calendar days.

16. Contract Security:

16.1 Article 6 of the General Conditions sets 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.

16.2 In addition to the requirements in Article 6, in order to be acceptable to the OWNER, a surety company issuing Bid Guaranty Bonds, or 100% Performance/Payment Bonds, called for in these Specifications, shall meet and comply with the following minimum standards:

A. Surety must be admitted to do business in the State of Louisiana and shall comply with the provisions of L.R.S. 38:2241. The Surety Company shall be in conformance with L.R.S. 38:2219.

B. Surety shall have been in business and have a record of successful continuous operations for at least five (5) years.

C. Attorneys-in-fact who sign bid bonds or performance/payment bonds must file with such bond a certified copy of their power of attorney to sign such bond.

D. Agents of surety companies must list their name, address and telephone number on all bonds.

E. The life of the bonds shall extend twelve (12) months beyond the date of final payment and shall contain a waiver of alteration to the terms of the Contract, extensions of time and/or forbearance on the part of the OWNER.

17. Signing of Agreement:

17.1 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 other necessary Contract Documents attached. Within fifteen (15) 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 (10) days thereafter OWNER shall deliver one (1) fully signed counterpart to CONTRACTOR. Each counterpart is to be accompanied by a complete set of the Drawings with appropriate identification.

17.2 However, as noted in L.R.S. 38:2215.B., if all documents required of lowest responsive and responsible bidder have been provided to the OWNER, the Agreement shall be executed not later than sixty (60) calendar days after the date of award.

18. Retainage:

18.1 Retainage of 10% of the value of WORK completed and materials stored on-site shall be deducted from the CONTRACTOR'S Application for Payment for contract prices up to \$500,000.00.

18.2 Retainage of 5% of the value of WORK completed and materials stored on-site shall be deducted from the CONTRACTOR'S Application for Payment for contract prices of \$500,000 or more.

19. Contractor's License Certification:

19.1 If the bid submitted for this project exceeds fifty thousand dollars, in accordance with L.R.S. 37:2163.A.(1) the Bidder shall show his license number on the bid envelope; and, by placement of the authorized signature of Bidder on the Louisiana Uniform Public Work Bid Form, such signature shall be deemed as a certification that the Bidders holds an active license under the provisions of Title 37: Chapter 24. Contractors.

20. Issuance of Bidding Documents:

20.1 No Bidding Documents will be issued later than twenty-four (24) hours of the date set for receiving bids, as provided by L.R.S. 37:2163.B.

20.2 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 L.R.S. 37:2163. A single bid shall be submitted for all portions of the Contract Work.

21. Issuance of Addenda Deadline:

21.1 No addenda will be issued within seventy-two (72) hours of the advertised bid time, exclusive of Saturdays, Sundays and legal holidays without resulting in the extending the bid period for at least seven (7) working days but not more than twenty-one (21) working days, as provided by L.R.S. 38:2212.O.(2)(b).

22. Bids to Remain Open:

22.1 As provided by L.R.S. 38:2215A., all Bids shall remain open for forty-five (45) calendar days after the day of the Bid opening, however as provided under L.R.S. 38:2215.D, these provisions are not applicable for projects requiring the sale of bonds or financed in whole or in part by federal or other funds which will not be readily available at the time bids are opened.

22.2 Extensions of time when Bids shall remain open beyond the forty-five (45) calendar day period (or seventy-five (75) calendar days for federal funding projects) specified in L.R.S. 38:2215.A may be made only by mutual agreement between the OWNER and the lowest responsible bidder by one or more thirty (30) calendar day extensions.

23. Discrepancies on Bid Form:

23.1 For the purpose of evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the Bid Form as submitted by bidders:

- A. Obviously misplaced decimal points will be corrected; and,
- B. In case of discrepancy between unit price and unit price extension, the unit price will govern; and,
- C. Apparent errors of unit price extension(s) will be corrected; and
- D. Apparent errors in addition of unit price extension(s) will be corrected; and
- E. If a cap amount has been established for an item, such as for Mobilization, and the amount that is bid exceeded the established cap amount, the amount bid for said item shall be reduced to the established cap amount.

23.2 The Bids shall be evaluated on the basis of the unit prices and totals of unit price extensions arrived at by resolution of arithmetic discrepancies as provided above, and the bid will be so reflected on the abstract of bids.

24. Required Certifications, Attestations, Etc.

24.1 In accordance with L.R.S. 38:2227 and 38:2212.10.C, the low bidder on this project must submit the completed Attestation/Affidavit Form (Past Criminal Conviction of Bidders, Verification of Employees, and Certification Regarding Unpaid Workers Compensation Insurance) (Section 00920). The forms shall be submitted to the ENGINEER within 10 days after the opening of bids.

24.2 Before award of the contract, the successful Bidder shall furnish to the OWNER the following documents:

- A. CONTRACTOR Non-Collusion Affidavit (L.R.S. 38:2224) (Section 00910).
- B. All applicable insurance documents.

25. Unique Entity ID (UEI)

25.1 The successful bidder must have an active Unique Entity ID (UEI), as verified on www.sam.gov, prior to award of contract.

25.2 If the successful bidder does not presently have a Unique Entity ID (UEI) number; a UEI number can be obtained free of charge at <http://sam.gov/content/entity-registration>.

25.3 All proposed subcontractors must have an active UEI number prior to execution of any subcontract between the selected CONTRACTOR and subcontractor.

26. Conflict Between Drawings and Specifications:

26.1 Where an obvious conflict exists between the Drawings and Specifications, 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 more expensive alternative in his bid.

27. Drawings and Specifications Issued to Successful Bidder

27.1 The successful Bidder for this Contract will be furnished four (4) complete sets of Drawings and Specifications at no cost. If, during the prosecution of the work the CONTRACTOR should deem it necessary to have additional sets of Drawings and Specifications they may be purchased from the ENGINEER at the cost of reproduction.

- o 0 o -

SECTION 00300
LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Nebo Water System, Inc. BID FOR: Contract No. 4 – Manifest-Rhinehart Water Well
P.O. Box 624 Site Improvements & Booster Stations 2, 3, and 4
Harrisonburg, Louisiana 71340 Improvements
(Owner to provide name and address of owner) *(Owner to provide name of project and other identifying information)*

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:

Pan American Engineers, LLC and dated: October 2025
(Owner to provide name of entity preparing bidding documents.)

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) _____

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated “Base Bid” * but not alternates) the sum of:

_____ Dollars (\$ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1: *Owner to provide description of alternate and state whether add or deduct* for the lump sum of:

_____ N/A _____ Dollars (\$ _____ N/A _____)

Alternate No. 2: *Owner to provide description of alternate and state whether add or deduct* for the lump sum of:

_____ N/A _____ Dollars (\$ _____ N/A _____)

Alternate No. 3: *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ N/A _____ Dollars (\$ _____ N/A _____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

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 FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* 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.

**** A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

BID SECURITY in the form of a bid bond, certified check or cashier’s check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
c/o Pan American Engineers, LLC
1717 Jackson Street
Alexandria, Louisiana 71301
(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF. NO. 1	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Building Permit (01012)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF. NO. 2	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Utility Permit (01015)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF. NO. 3	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Construction Layout (01331)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF. NO. 4	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Mobilization (Max Amount - 5% Total Base Bid) (01400)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

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(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF. NO. 5	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Preconstruction Video Filming of Project Area (01715)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF. NO. 6	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Record Drawings (01720)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF. NO. 7	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Operation & Maintenance Manuals (01730)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 8	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Storm Water Pollution Prevention Plan (Including All Temporary and Permanent Seed, Fertilizer, Hydroseed, Erosion Control Blankets, Silt Fences, Hay Bales, Rock Check Dams, Etc.) (02002)(01)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

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BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 9	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Removal of Structures & Obstructions (02202)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 10	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Temporary Signs, Barricades and Barriers (02713)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF. NO. 11	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Site Work as Required to Drill Test Well Pilot Hole Well No. 3 (Including Temporary Access Drive, Securing Source of Drilling Water, Mud Pit, Clearing, Grubbing, Stripping, Removal of Structures and Obstructions, Restoration of Site, Etc.) (Division 2)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
c/o Pan American Engineers, LLC
1717 Jackson Street
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(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 12	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Test Well Pilot Hole to a Base Depth of 400 Feet Well No. 3 (Includes Pilot Hole Drilling, Driller's Log, Geophysical and Electric Logs) (13100)	400	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 13	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Test Well Pilot Hole Analysis Well No. 3 (Including Collection of Sand Samples From Pilot Hole, Sieve Analysis and Phase I Contractor's Report) (13100)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

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c/o Pan American Engineers, LLC
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BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 14	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Abandonment of Test Well Pilot Hole Well No. 3 (If No Potential Water Bearing Aquifers are Discovered) (If Non-Developable, in Accordance with State of Louisiana, Department of Transportation and Development Regulations, Completion of "Water Well Plugging and Abandonment Form" (DOTD-GW-2) and Processing with State, and Restoration of Site) (13600)	400	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 15	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Test Well Install Cement Plug Well No. 3 (From Base of Pilot Hole to Bottom of Test Well/Screen) (From Depth of 400 Feet to 350 Feet) (13200)	50	L.F.		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

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c/o Pan American Engineers, LLC
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BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 16	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Test Well Screen Initial Strata in Original Test Hole Well No. 3 (To a Base Depth of 350 Feet) (Includes Reaming of Pilot Hole, Setting 300 Feet of 4" Minimum Diameter Temporary Casing, up to 50 Feet of Screen, and Removal of Casing and Screen upon Completion) (13200)	350	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 17	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Test Well Development Well No. 3 (Includes Development of Test Well, Conducting and Recording Test Pumping at 50 gpm (min.) for 24 Hours, Collection and Analysis of Water Samples, and Phase II Contractor's Reports, Etc.) (13200)	1	Each Strata		

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BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 18	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Abandonment of Test Well Well No. 3 (In Accordance with State of Louisiana, Department of Transportation and Development Regulations, Completion of "Water Well Plugging and Abandonment Form" (DOTD-GW-2) and Processing with State, and Restoration of Site) (From Depth of 350 Feet to Ground Surface) (13600)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 19	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Permanent Well Pilot Hole to a Base Depth of 400 Feet Well No. 3 (Includes Pilot Hole Drilling, Driller's Log, Geophysical and Electric Logs) (13300)	400	L.F.		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

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c/o Pan American Engineers, LLC
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(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 20	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Permanent Well Pilot Hole Analysis Well No. 3 (Including Collection of Sand Samples From Pilot Hole, Sieve Analysis and Phase III Contractor's Report) (13300)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 21	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Install Cement Plug Well No. 3 (From Base of Permanent Well Pilot Hole to Bottom of Screen) (From Depth of 400 Feet to 350 Feet) (13300)	50	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 22	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Permanent Well Casing Well No. 3 (Includes Reaming of Pilot Hole, 12" Diameter Casing, Cement Grout Seal and Centralizers) (13300)	300	L.F.		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

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BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 23	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Permanent Well Screen Well No. 3 (Includes 6" Diameter Screen, Underream, Gravel Pack, Washout Plug and Back Pressure Valve) (13300)	40	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 24	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Permanent Well Lap Pipe Well No. 3 (Includes 6" Diameter Lap Pipe and Centralizers) (13300)	40	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 25	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Permanent Well Development Well No. 3 (Includes Development Pumping, Well Production Testing, Disinfection, Phase IV Contractor's Reports, Etc.) (13300)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
c/o Pan American Engineers, LLC
1717 Jackson Street
Alexandria, Louisiana 71301
(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 26	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Permanent Well Water Sampling and Analysis Well No. 3 (Includes Water Sample Collection, Analysis and Report for EPA Primary and Secondary Contaminants, Etc.) (13500)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 27	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Pump Column Pipe Well No. 3 (Includes 6" Column Pipe and Submersible Cable) (13400)	180	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 28	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Submersible Pump and Motor Well No. 3 (Includes Pump Capable of 250 GPM at 240' TDH, 25 HP Motor) (13400)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
c/o Pan American Engineers, LLC
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Alexandria, Louisiana 71301
(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 29	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Well Head Assembly Well No. 3 (Includes Pump Discharge Head, All Pipe, Fittings, Valves, Appurtenances, Wellhead Foundation, Field Hydrostatic and Leakage Testing, Disinfection, Etc.) (13400, 15120)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 30	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Water Production Well Site Electrical Well No. 3 (Includes Well Head Junction Box, Disconnect Switch, Wiring, Conduit, Etc.) (Division 16)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

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BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF. NO. 31	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Site Work as Required to Drill Test Well Pilot Hole Well No. 4 (Including Temporary Access Drive, Securing Source of Drilling Water, Mud Pit, Clearing, Grubbing, Stripping, Removal of Structures and Obstructions, Restoration of Site, Etc.) (Division 2)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 32	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Test Well Pilot Hole to a Base Depth of 410 Feet Well No. 4 (Includes Pilot Hole Drilling, Driller's Log, Geophysical and Electric Logs) (13100)	410	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 33	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Test Well Pilot Hole Analysis Well No. 4 (Including Collection of Sand Samples From Pilot Hole, Sieve Analysis and Phase I Contractor's Report) (13100)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
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(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 34	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Abandonment of Test Well Pilot Hole Well No. 4 (If No Potential Water Bearing Aquifers are Discovered) (If Non-Developable, in Accordance with State of Louisiana, Department of Transportation and Development Regulations, Completion of "Water Well Plugging and Abandonment Form" (DOTD-GW-2) and Processing with State, and Restoration of Site) (13600)	410	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 35	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Test Well Install Cement Plug Well No. 4 (From Base of Pilot Hole to Bottom of Test Well/Screen) (From Depth of 410 Feet to 360 Feet) (13200)	50	L.F.		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

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(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 36	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Test Well Screen Initial Strata in Original Test Hole Well No. 4 (To a Base Depth of 360 Feet) (Includes Reaming of Pilot Hole, Setting 310 Feet of 4" Minimum Diameter Temporary Casing, up to 50 Feet of Screen, and Removal of Casing and Screen upon Completion) (13200)	360	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 37	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Test Well Development Well No. 4 (Includes Development of Test Well, Conducting and Recording Test Pumping at 50 gpm (min.) for 24 Hours, Collection and Analysis of Water Samples, and Phase II Contractor's Reports, Etc.) (13200)	1	Each Strata		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

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2, 3, and 4 Improvements
PAE Job No. 12641
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DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 38	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Abandonment of Test Well Well No. 4 (In Accordance with State of Louisiana, Department of Transportation and Development Regulations, Completion of "Water Well Plugging and Abandonment Form" (DOTD-GW-2) and Processing with State, and Restoration of Site) (From Depth of 360 Feet to Ground Surface) (13600)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 39	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Permanent Well Pilot Hole to a Base Depth of 410 Feet Well No. 4 (Includes Pilot Hole Drilling, Driller's Log, Geophysical and Electric Logs) (13300)	410	L.F.		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

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UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 40	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Permanent Well Pilot Hole Analysis Well No. 4 (Including Collection of Sand Samples From Pilot Hole, Sieve Analysis and Phase III Contractor's Report) (13300)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 41	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Install Cement Plug Well No. 4 (From Base of Permanent Well Pilot Hole to Bottom of Screen) (From Depth of 410 Feet to 360 Feet) (13300)	50	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 42	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Permanent Well Casing Well No. 4 (Includes Reaming of Pilot Hole, 12" Diameter Casing, Cement Grout Seal and Centralizers) (13300)	310	L.F.		

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UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 43	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Permanent Well Screen Well No. 4 (Includes 6" Diameter Screen, Underream, Gravel Pack, Washout Plug and Back Pressure Valve) (13300)	40	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 44	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Permanent Well Lap Pipe Well No. 4 (Includes 6" Diameter Lap Pipe and Centralizers) (13300)	40	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 45	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Permanent Well Development Well No. 4 (Includes Development Pumping, Well Production Testing, Disinfection, Phase IV Contractor's Reports, Etc.) (13300)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
c/o Pan American Engineers, LLC
1717 Jackson Street
Alexandria, Louisiana 71301
(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 46	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Permanent Well Water Sampling and Analysis Well No. 4 (Includes Water Sample Collection, Analysis and Report for EPA Primary and Secondary Contaminants, Etc.) (13500)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 47	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Pump Column Pipe Well No. 4 (Includes 6" Column Pipe and Submersible Cable) (13400)	190	L.F.		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 48	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Submersible Pump and Motor Well No. 4 (Includes Pump Capable of 250 GPM at 250' TDH, 25 HP Motor) (13400)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
c/o Pan American Engineers, LLC
1717 Jackson Street
Alexandria, Louisiana 71301
(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 49	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Well Head Assembly Well No. 4 (Includes Pump Discharge Head, All Pipe, Fittings, Valves, Appurtenances, Wellhead Foundation, Field Hydrostatic and Leakage Testing, Disinfection, Etc.) (13400, 15120)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 50	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Water Production Well Site Electrical Well No. 4 (Includes Well Head Junction Box, Disconnect Switch, Wiring, Conduit, Etc.) (Division 16)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 51	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Plug and Abandon Existing Well No. 1 (13600)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
c/o Pan American Engineers, LLC
1717 Jackson Street
Alexandria, Louisiana 71301
(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 52	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Plug and Abandon Existing Well No. 2 (13600)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 53	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Manifest Rhinehart Well Site Improvements (Includes Sand Clay Gravel Base and Crushed Stone Surfacing, Portland Cement Concrete Sidewalks, Fencing and Gates, Stone Revetment, Filling and Grading, Ditch Grading, Seeding, Fertilizer, Site Piping and Valving, Field Hydrostatic and Leakage Test and Disinfection, Aerator, Aerator Tower Rehabilitation, 44,000 Gallon Ground Storage Tank, Duplex Pump Station, Chlorination System, Phosphate Feed System, Etc.)	Job	Lump Sum		

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 54	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times Unit Price)
Manifest Rhinehart Site Well Electrical Improvements (Includes Electrical and Controls, Wiring, Motor Starters, Electrical Control Shed, Standby Power System, SCADA System Upgrades, Automatic Transfer Switch, Etc.)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
c/o Pan American Engineers, LLC
1717 Jackson Street
Alexandria, Louisiana 71301
(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:		■ Base Bid or □ Alt. # _____		
REF NO.	55	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE EXTENSION (Quantity times Unit Price)
Booster Station No. 2 (Includes Fencing and Gates, Clearing, Grubbing and Stripping, Filling and Grading, Ditch Grading, Driveway Culverts, Seeding, Fertilizer, Site Piping and Valving, Field Hydrostatic and Leakage Test and Disinfection, 14,000 Gallon Ground Storage Tank, Booster Station, Connection to 6" & 4" Water Mains, Electrical and Controls, Wiring, Variable Frequency Drives, Standby Power System, Automatic Transfer Switch, SCADA System, Demolition of Existing Tank, Booster Station, Etc.)		Job	Lump Sum	

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
c/o Pan American Engineers, LLC
1717 Jackson Street
Alexandria, Louisiana 71301
(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 56	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Booster Station No. 3 (Includes Fencing and Gates, Clearing, Grubbing and Stripping, Filling and Grading, Ditch Grading, Driveway Culverts, Seeding, Fertilizer, Site Piping and Valving, Field Hydrostatic and Leakage Test and Disinfection, 14,000 Gallon Ground Storage Tank, Booster Station, Connection to 6" & 4" Water Mains, Electrical and Controls, Wiring, Variable Frequency Drives, Standby Power System, Automatic Transfer Switch, SCADA System, Demolition of Existing Tank, Booster Station, Etc.)	Job	Lump Sum		

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: Nebo Water System, Inc.
c/o Pan American Engineers, LLC
1717 Jackson Street
Alexandria, Louisiana 71301
(Owner to provide name and address of owner)

BID FOR: Contract No. 4 - Manifest-Rhinehart Water Well
Site Improvements & Booster Stations
2, 3, and 4 Improvements
PAE Job No. 12641
(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amount shall be stated in figures and only in figures.

DESCRIPTION:	■ Base Bid or □ Alt. # _____			
REF NO. 57	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION <i>(Quantity times Unit Price)</i>
Booster Station No. 4 (Includes Fencing and Gates, Clearing, Grubbing and Stripping, Filling and Grading, Ditch Grading, Driveway Culverts, Seeding, Fertilizer, Site Piping and Valving, Field Hydrostatic and Leakage Test and Disinfection, 14,000 Gallon Ground Storage Tank, Booster Station, Connection to 6" & 4" Water Mains, Electrical and Controls, Wiring, Variable Frequency Drives, Standby Power System, Automatic Transfer Switch, SCADA System, Demolition of Existing Tank, Booster Station, Etc.)	Job	Lump Sum		

SECTION 00400

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____ as Principal, and _____ as Surety, are hereby held and firmly bound unto the Nebo Water System, Inc., as OWNER in the penal sum of _____ DOLLARS (\$) for the payment of which sum well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed this ____ day of _____, 2025. The Condition of the above obligation is such that whereas the Principal has submitted to the Nebo Water System, Inc., a BID, attached hereto and hereby made a part thereof, to enter into a contract in writing, for Contract No. 4 - Manifest-Rhinehart Water Well Site Improvements & Booster Stations 2, 3, and 4 Improvements.

NOW THEREFORE,

- a. If said BID shall be rejected, or
- b. If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Agreement attachment hereto (properly completed in accordance with said BID) and shall furnish a BOND for faithful performance of said contract, and for the payment of all persons performing labor and furnishing materials in connection therewith, and shall in all other respects perform the Agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extensions.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____ PRINCIPAL

BY:

_____ TITLE

_____ SURETY

BY:

_____ TITLE

IMPORTANT: Bid Guaranty Bonds: In accordance with Louisiana Revised Statute 38:2218.C, all Bid Guaranty Bonds shall be written by a surety or insurance agency currently on the U.S. Department of Treasury Financial Management Service list of approved companies, or by a Louisiana domiciled insurance company with at least an A-rating in the latest printing of the A.M. Best's Key Rating Guide or by an insurance company in good standing licensed to write bonds either domiciled in Louisiana or owned by Louisiana residents.

SECTION 00500**NOTICE OF AWARD**

Date: _____

Project: Consolidation with the Manifest-Rhinehart Water System, Inc. Contract 2 Nebo Water Treatment Site Improvements

Owner: Nebo Water System, Inc.

Owner's Contract No.:

Contract:

Engineer's Project No.: 12641

Bidder:

Bidder's Address:

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for Contract 2 Nebo Water Treatment Site Improvements.

The Contract Price of your Contract is _____ Dollars (\$_____).

Four (4) copies of the proposed Contract Documents accompany this Notice of Award.Four (4) sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within fifteen (15) days of the date you receive this Notice of Award.

1. Deliver to the Owner four (4) fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Paragraph 16), General Conditions (Article 6.01).
3. Other conditions precedent:
 1. *Provide Certification of Insurance as specified (SC-6.03 and SC-6.04)*
 2. *Provide affidavits, certificates, and required documents as specified in the Instructions to Bidders (Paragraph 24).*

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

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

Nebo Water System, Inc.

Owner

By: _____

Authorized Signature

Project Engineer

Title

SECTION 00600

**AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT
(UNIT PRICE)**

THIS AGREEMENT is by and between _____ NEBO WATER SYSTEM, INC. _____ (“Owner”) and

_____ (“Contractor”).
Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

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

The work to be performed, by site, is as follows:

A. Water Well Site:

1. Plugging and abandoning of Water Well No. 1 and Water Well No. 2;
2. Demolition of existing aerator and associated piping (foundation and steel structure to remain); 44,000-gallon ground storage tank and associated piping, valves, foundation, etc.; duplex pump station and associated piping, valves, concrete pad, etc.; chemical buildings and equipment (foundation to remain); and electrical panels (shed, rack and foundation to remain)
3. Installation of two (2) water test wells;
4. Construction of permanent Water Well No. 3 and Water Well No. 4;
5. Installation of Aerator;
6. Installation of 44,000-Gallon Enamel-Coated Ground Storage Tank;
7. Installation of Duplex Submersible Tube Pump Station;
8. Installation of Chlorination Feed System;
9. Installation of Phosphate Feed System;
10. Installation of Emergency Diesel-Powered Generator and Automatic Transfer Switch;
11. Installation of Electrical, SCADA and VFDs;
12. Associated site work

B. Three (3) Booster Station Sites:

1. Demolition of existing packaged pump station, 14,000-gallon ground storage tank, 185-gallon hydro tank and associated piping, valves, etc.
2. Installation of 14,000-Gallon Enamel-Coated Ground Storage Tank;
3. Installation of Duplex Submersible Tube Pump Station;
4. Installation of Emergency Diesel-Powered Generator and Automatic Transfer Switch;
5. Installation of Electrical, SCADA and VFDs;
6. Associated site work (including, but not limited to, site fencing, grading, etc.)

ARTICLE 2 – THE PROJECT

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

Nebo Water System, Inc. – Contract No. 4 – Manifest-Rhinehart Water Well Site Improvements & Booster Stations 2, 3, and 4 Improvements

ARTICLE 3 – ENGINEER

- 3.01 The Project has been designed by Pan American Engineers, LLC which 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 the completion of the Work in accordance with the Contract Documents.

- 3.02 Engineer's contact information is as follows:

*Pan American Engineers, LLC
1717 Jackson Street (P. O. Box 8599)
Alexandria, Louisiana 71301 (71306)
(318) 473-2100 telephone*

ARTICLE 4 – CONTRACT TIMES

- 4.01 *Time of the Essence*

- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

- 4.02 *Contract Times: Days*

- A. The Work will be substantially completed within 260 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 305 days after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty),
1. *Substantial Completion:* Contractor shall pay Owner \$500.00 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion until the Work is substantially complete.
 2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$500.00 for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment
 3. Liquidated damages for failing to timely attain Substantial Completion, and final completion are not additive, and will not be imposed concurrently.
- B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

ARTICLE 5 – CONTRACT PRICE

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an estimated total of _____ Dollars (\$ _____), as derived from extension of estimated units and bid prices for each unit from the Base Bid. Actual payment shall be as specified in Paragraph 13.03 of the General Conditions.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment as provided in Paragraph 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the 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.
1. Prior to final completion and acceptance of all Work covered by the Contract Documents, 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 may determine or Owner may withhold, including but not limited to liquidated damages. Retainage indicated below does not include withholdings for known incomplete work. Such withholdings are not included in calculating the retainage but are additional monies withheld.
 - a. For Contract Prices of \$500,000 or less, 90% of Work completed and/or cost of materials and equipment not incorporated in the Work (with the balance of 10% being retainage).
 - b. For Contract Prices in excess of \$500,000, 95% of Work completed and/or cost of materials and equipment not incorporated in the Work (with the balance of 5% being retainage).
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to the applicable percent based on the preceding Paragraph 6.02.A.1 of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 15.01.E of the General Conditions and less the value of Engineer's estimate of the Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer.

ARTICLE 7 – CONTRACT DOCUMENTS

7.01 *Contents*

- A. The Contract Documents consist of the following:
1. This Agreement (pages 1 to 8, inclusive).
 2. Performance bond (pages 1 to 4, inclusive).
 3. Payment bond (pages 1 to 4, inclusive).

4. General Conditions (pages 1 to 70, inclusive).
5. Supplementary Conditions (pages 1 to 18, inclusive).
6. Specifications as listed in the table of contents of the Project Manual.
7. Drawings consisting of 58 sheets with each sheet bearing the following general title:
Contract No. 4 Manifest-Rhinehart Water Well Site Improvements & Booster Stations 2, 3, and 4 Improvements.
8. Addenda (numbers _____ to _____, inclusive).
9. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages 1 of 23, inclusive).
 - b. Bid Bond
 - c. Documentation submitted by Contractor.
 - 1) Attestation/Affidavit – L.R.S. 38:2227 (Past Criminal Convictions of Bidders); L.R.S. 38:2212.10 (Verification of Employees); and L.R.S. 23:1726(B) (Certification Regarding Unpaid Workers Compensation Insurance).
 - 2) Affidavit Attesting that Public Contract was not Secured through Employment or Payment of Solicitor – Non-Collusion Affidavits - Contractor (L.R.S. 38:2224)
10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed (pages 1 of 1, inclusive).
 - b. Work Change Directives.
 - c. Change Orders.
- B. The documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8 – CONTRACTOR’S REPRESENTATIONS, CERTIFICATIONS AND STIPULATIONS

8.01 Contractor’s Representations

- A. In order to induce Owner to enter into this Agreement, Contractor makes the following representations:
1. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
 2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
 5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
 6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor’s safety precautions and programs.
 7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work
 8. 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.
 9. 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.

10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

8.03 *Standard General Conditions*

- A. Owner stipulates that the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and the Owner has shown all modifications to the standard wording of such published document to the Contractor in the Supplementary Conditions.

ARTICLE 9 – MISCELLANEOUS

9.01 *Terms*

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

9.02 *Severability*

- A. 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.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____ (which is the Effective Date of the Agreement).

OWNER:

Nebo Water System, Inc.

By: _____

Title: Chance Willis, President

Address for giving notices:

P.O. Box 624

Harrisonburg, LA 71340

CONTRACTOR

By: _____

Title: _____

(If Contractor is a corporation, a partnership,
or a joint venture, attach evidence of authority
to sign.)

Address for giving notices:

License No.: _____

SECTION 00620**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 Address of Principal Place of Business*):

OWNER (*Name and Address*):

Nebo Water System, Inc.
P.O. Box 624
Harrisonburg, Louisiana 71340

CONTRACT

Effective Date of Agreement:

Amount:

Description (*Name and Location*): Contract 4 – Manifest-Rhinehart Water Well Improvements & Booster
Stations 2, 3, and 4 Improvements

BOND

Bond Number:

Date (*Not earlier than Effective Date of Agreement*):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL**SURETY**

Contractor's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. The Contractor and 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 when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
 - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. 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 does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
 - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
 - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. 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:
 - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
 - 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
 - 5.3. 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 a contractor selected with the Owners 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 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
 - 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
 - 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
 - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven 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 Paragraph 5.4, and the Owner refuses the payment, 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.
7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 7.2. 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 5; and
 - 7.3. 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.
8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
9. 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 will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
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. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of 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 periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
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 this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
14. Definitions
 - 14.1. *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 for the Contractor for 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.

14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

16. Modifications to this Bond are as follows: None

FOR INFORMATION ONLY – (*Name, Address and Telephone*)

Surety Agency or Broker:

Owner's Representative (*Engineer or other party*): Pan American Engineers, LLC, P. O. Box 8599, Alexandria, Louisiana 71306

SECTION 00630
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 Address of Principal Place of Business*):

OWNER (*Name and Address*):

Nebo Water System, Inc.
P.O. Box 624
Harrisonburg, Louisiana 71340

CONTRACT

Effective Date of Agreement:

Amount:

Description (*Name and Location*):

Contract 4 – Manifest-Rhinehart Water Well Improvements & Booster Stations 2, 3, and 4 Improvements

BOND

Bond Number:

Date (*Not earlier than Effective Date of Agreement*):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. The Contractor and 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, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
 - 5.1. Claimants who do not have a direct contract with the Contractor
 - 5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2. Pay or arrange for payment of any undisputed amounts.
 - 7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract will 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 satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. 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 the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. 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.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, 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 will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. 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 will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. Definitions
 - 16.1. *Claim*—A written statement by the Claimant including at a minimum:
 - 16.1.1. The name of the Claimant;
 - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
 - 16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 - 16.1.4. A brief description of the labor, materials, or equipment furnished;

- 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 - 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 - 16.1.7. The total amount of previous payments received by the Claimant; and
 - 16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2. *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 Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the 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.
- 16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
18. Modifications to this Bond are as follows: None

FOR INFORMATION ONLY – (*Name, Address, and Telephone*)

Surety Agency or Broker:

Owner's Representative (*Engineer or other*): Pan American Engineers, LLC, P.O. Box 8599, Alexandria, Louisiana 71306

SECTION 00640**NOTICE TO PROCEED**

Date: _____

Project: Contract 4 – Manifest-Rhinehart Water Well Improvements & Booster Stations 2, 3, and 4 Improvements

Owner: Nebo Water System, Inc.

Owner's Contract No.:

Contract:

Engineer's Project No.: 12641

Contractor:

Contractor's Address:

You are notified that the Contract Times under the above Contract will commence to run on _____. On that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the number of days to achieve Substantial Completion is 260, and the number of days to achieve readiness for final payment is 305.

Also, before you may start any Work at the Site, you must:

- 1) Notify ENGINEER'S office as to date crews will move to the site so as to coordinate field control and layout work.
- (2) Provide ENGINEER'S office with detailed submittal data on all material to be incorporated into project (Section 01340 - Shop Drawings, Samples and Project Date)

Nebo Water System, Inc.

Owner

Given by:

Authorized Signature

Project Engineer

Title

Date

SECTION 00650
CHANGE ORDER

No. _____

Date of Issuance: _____ Effective Date: _____

Project: Contract 4 Manifest-Rhinehart Water Well Improvements & Booster Stations 2, 3, and 4 Improvements	Owner: Nebo Water System, Inc.	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 12641

You are directed to make the following change(s) in this contract: Attach itemized breakdown in accordance with L.R.S. 38:2212M.(5). Also, please give brief description and justification of change(s) below.

The Contract Documents are modified as follows upon execution of this Change Order:

Description: _____

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price: \$ _____	Original Contract Times: ☐ Working days ☐ Calendar Days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: \$ _____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____. Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: \$ _____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____ Pan American Engineers, LLC	By: _____ Nebo Water System, Inc.	By: _____ Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____
Approved by Funding Agency (if applicable): _____		Date: _____

(Note: Before any Change Order is routed to Owner for approval it must first be routed to the Funding Agency for review).

SECTION 00660**WORK CHANGE DIRECTIVE****No.** _____

Date of Issuance: _____ Effective Date: _____

Project: Contract 4 Manifest-Rhinehart Water Well Improvements & Booster Stations 2, 3, and 4 Improvements	Owner: Nebo Water System, Inc.	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 12641

Contractor is directed to proceed promptly with the following change(s):

Item No.	Description

Attachments (list documents supporting change):

Purpose for Work Change Directive:

Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

- ☐ Nonagreement on pricing of proposed change.
- ☐ Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price \$ _____ (increase/decrease) Contract Time _____ (increase/decrease)
days

Recommended for Approval by Engineer:	Date
Authorized for Owner by:	Date
Received for Contractor by:	Date
Received by Funding Agency (if applicable):	Date:

SECTION 00670**FIELD ORDER****No.** _____

Date of Issuance: _____ Effective Date: _____

Project: Contract 4 Manifest-Rhinehart Water Well Improvements & Booster Stations 2, 3, and 4 Improvements	Owner: Nebo Water System, Inc.	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 12641

Attention:

You are hereby directed to promptly execute this Field Order issued in accordance with General Conditions Paragraph 11.04.A, for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Reference: _____
(Specification Section(s)) (Drawing(s) / Detail(s))

Description:

Attachments:

Engineer:

Receipt Acknowledged by Contractor:	Date:

Copy to Owner

SECTION 00700

STANDARD GENERAL CONDITIONS
OF THE CONSTRUCTION CONTRACT

Prepared By



Endorsed By



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www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. 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, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document 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, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*
 - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

- b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. A demand for money or services by a third party is not a Claim.
- 11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
 - 12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.
 - 13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
 - 14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
 - 15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
 - 16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
 - 17. *Cost of the Work*—See Paragraph 13.01 for definition.
 - 18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
 - 19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
 - 20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
 - 21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice 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.
30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.
36. *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.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *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, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *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.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *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 of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, 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 a Subcontractor.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *Work*—The entire 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; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives*: 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 information in the Contract Documents and with the design concept of the 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 Article 10 or any other provision of the Contract Documents.
- C. *Day*: The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective*: The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - 1. does not conform to the Contract Documents;
 - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - 3. 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 15.03 or Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
 - 1. The word “furnish,” when used in connection with services, materials, or equipment, means 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, means 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, means to furnish and install said services, materials, or equipment complete and ready for intended use.
 - 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 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.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site 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 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *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 the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will 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 the component parts of the Work.
 - 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document 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.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will 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.
- G. Nothing in the Contract Documents creates:
 - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
 - 2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

- A. *Standards Specifications, Codes, Laws and Regulations*
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract 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, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer 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 part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then 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 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
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 had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); 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 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers 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 its consultants, including electronic media versions, or reuse any 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 adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract 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 Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work may be done at the Site prior to such date.

4.03 *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.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 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 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, 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 Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 - 2. Abnormal weather conditions;
 - 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 - 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing 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.

- 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 permanent improvements are to be made 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.

5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all 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 directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
 - C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas 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 of 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 structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

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

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
3. Technical Data contained in such reports and drawings.

- B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

- C. *Reliance by Contractor on Technical Data*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

- D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
 2. is of such a nature as to require a change in the Drawings or Specifications;
 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 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- E. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph 5.04.A;
 - 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 Paragraph 13.03; and,
 - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
 - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
- F. *Underground Facilities; Hazardous Environmental Conditions:* Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then 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 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
 4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. 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 Paragraph 13.03;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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;
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 removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) 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. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. 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, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. 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, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, 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, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, 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 the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and “Occupational Accident and Excess Employer's Indemnity Policies,” are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
- H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain the insurance required of such party by the Contract, 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.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 - 1. include at least the specific coverages required;
 - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
 - 4. apply with respect to the performance of the Work, whether such performance is 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; and
 - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 - 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, 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, risks, 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 Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
 2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, 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 fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights 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 insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, 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 fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *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 the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

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

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. 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 will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, 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, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will 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 must 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.

7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item 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 is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) 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) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 Substitutes

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
 - a. will certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design;
 - 2) be similar in substance to the item specified; and
 - 3) be suited to the same use as the item specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
 - 2) whether 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 other work on the Project) to adapt the design to the proposed substitute item; and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable 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.

- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *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 an 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 will be disclosed in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, 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 specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, 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 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.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. 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 the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *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.

7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, 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 such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. 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, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.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 at its expense (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).
- E. 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.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as 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.

7.15 *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 damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must 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 7.16.C.
 2. *Samples*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall 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 7.16.C.
 3. 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. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. 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, comply with the requirements of 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, or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will

document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

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.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
- 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 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 is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
 - 1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 - 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, or improper modification, 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.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
 - 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;
 - 6. The issuance of a notice of acceptability by Engineer;
 - 7. The end of the correction period established in Paragraph 15.08;
 - 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.

- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (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 from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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 7.18.A will 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.

7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. 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 such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to 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.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. An itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
 - 1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
 - 2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all 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 damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

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

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

- 9.05 *Lands and Easements; Reports, Tests, and Drawings*
- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
 - B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
 - C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.
- 9.06 *Insurance*
- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.
- 9.07 *Change Orders*
- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.
- 9.08 *Inspections, Tests, and Approvals*
- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.
- 9.09 *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.
- 9.10 *Undisclosed Hazardous Environmental Condition*
- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.
- 9.11 *Evidence of Financial Arrangements*
- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).
- 9.12 *Safety Programs*
- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
 - B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *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.

10.02 *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 10.07. 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.

10.03 *Resident Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, 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, will 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 Contractor under Paragraph 15.06.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 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. Changes in 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;
 - 2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 - 3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and
 - 4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

- B. If Owner has issued a Work Change Directive and:
 - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
 - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes 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. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *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, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. 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, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
 2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
 3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will 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 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 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 Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.
- B. *Change Proposal Procedures*
 - 1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
 - 2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
 - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

- 3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
- 4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety 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), 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.

ARTICLE 12—CLAIMS

12.01 *Claims*

- A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
 - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
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 in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will 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 Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will 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, which 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 will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
 4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
 5. Other costs consisting of 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, 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.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
 - 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
 - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.
- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than 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, 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 builder's risk or other property insurance established in accordance with Paragraph 6.04), 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 include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded:* The term Cost of the Work does not include any of the following items:
- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, 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 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
 - 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
 - 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 - 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 - 5. 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.
 - 6. Expenses incurred in preparing and advancing Claims.
 - 7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee*
- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
 - 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 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 and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances*: Contractor agrees that:
1. 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
 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's 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 for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 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. Payments to Contractor for Unit Price Work will be based on actual quantities.
- 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. 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, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- 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, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 3. by manufacturers of equipment furnished under the Contract Documents;
 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. 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, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 Defective Work

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then 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, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. 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, 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, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *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, then 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 will 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.

14.07 *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 defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, 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 incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. 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 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
 - 1. At least 20 days before the date established in the Agreement 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.
 - 2. 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 must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, 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 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, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and 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; or
 - b. 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;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; 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 stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. Payment Becomes Due

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. Reductions in Payment by Owner

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

- b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. The Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. The Contract Price has been reduced by Change Orders;
 - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. 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; or
 - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, 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, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *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 and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

- 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 deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- 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. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.
2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work 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 therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 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 6.04 regarding builder's risk or other property insurance.

15.05 *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, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *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, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

- d. a list of all duly pending Change Proposals and Claims; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, 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, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* 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 have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. 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. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written 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. Contractor shall pay all 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). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. 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.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, 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.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *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 written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and 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);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
 - 1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
 - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, 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 complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.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 the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds 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.

- F. 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, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. 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. 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; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 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 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed 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, 7 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 are not intended to preclude Contractor from submitting a Change Proposal 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 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
 2. agree with the other party to submit the dispute to another dispute resolution process; or
 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract 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.

18.03 *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. 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.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is 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.

18.09 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SECTION 00710

SUPPLEMENTARY CONDITIONS
OF THE CONSTRUCTION CONTRACT

Prepared By

Pan American Engineers, LLC
For

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.
CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added—for example, “Paragraph SC-4.05.”

SC-1.01 *Definitions and Terminology*

SC-1.01.33 Delete Paragraph 1.01.33 in its entirety and insert the following in its place:

Project Representative - The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Project Representative (PR) includes any assistants or field staff of Project Representative. (Where “Resident Project Representative” may be found within the General Conditions it shall mean “Project Representative”).

SC-2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

SC-2.01.A Add the following sentence at the end of Paragraph 2.01.A.:

The Owner shall record within thirty (30) days the Agreement Between Owner and Contractor and Performance and Payment Bond with the Clerk of Court in the Parish in which work is to be performed in accordance with Louisiana Revised Statute (L.R.S.) 38:2241A(2).

SC-2.02 *Copies of Documents*

SC-2.02.A Delete Paragraph 2.02.A in its entirety and insert the following in its place:

A. Owner shall furnish to Contractor up to four (4) printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

SC-4.01 *Commencement of Contract Times; Notice to Proceed*

SC-4.01.A Delete Paragraph 4.01.A in its entirety and insert the following in its place:

- A. The Contract Times will commence to run on the day indicated in the Notice to Proceed. In accordance with L.R.S. 38:2215.C; A Notice to Proceed shall be issued within 30 days of the Effective Date of the Agreement; or the Notice to Proceed may be given at any time mutually agreed to by the Owner and Contractor.

SC-4.05 *Delays in Contractor's Progress*

SC-4.05.A Delete Paragraph 4.05.A in its entirety and insert the following in its place:

- A. If Owner, Engineer, 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 Contract Times.

SC-4.05.C Add the following paragraph immediately at after Paragraph 4.05.C.4:

5. *Weather-Related Delays*

- a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled.
- b. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:
 - 1) Every workday on which the total precipitation occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds one inch (1") of precipitation (as rain equivalent) will be considered a "bad weather day".
 - 2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by the nearest public weather monitoring station.

- 3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in the Chart below:

January	<u>11</u> days	February	<u>10</u> days
March	<u>8</u> days	April	<u>7</u> days
May	<u>5</u> days	June	<u>6</u> days
July	<u>6</u> days	August	<u>5</u> days
September	<u>4</u> days	October	<u>3</u> days
November	<u>5</u> days	December	<u>8</u> days

- 4) In each month, every bad weather day exceeding the number of foreseeable bad weather days established in SC.4.05.C.5.b.3 will be considered as "abnormal weather conditions." The existence of abnormal weather conditions will not relieve Contractor of the obligation to demonstrate and document that delays caused by abnormal weather are specific to the planned work activities or that such activities thus delayed were on Contractor's then-current Progress Schedule's critical path for the Project.

SC-4.05.D Delete Paragraph 4.05.D in its entirety and insert the following in its place:

D. Contractor's entitlement to an adjustment of Contract Times is limited as follows:

1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
2. Adjustments of Contract Times are subject to the provisions of Article 11.

SC-5.01 *Availability of Lands*

SC-5.01.C Add the following new paragraph immediately after Paragraph 5.01.C:

- D. Permanent improvements on private property are limited to those areas having an executed easement or servitude agreement prior to installation. Contractor is to comply with all terms, restrictions, special conditions, etc., as described in the easements or servitudes. Costs of such compliance are to be reflected in related work. No separate compensation will be made for this compliance.

SC-5.03 *Subsurface and Physical Conditions*

SC-5.03.D Add the following new paragraphs immediately after Paragraph 5.03.D:

- E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely:

Report Title	Date of Report	Technical Data
N/A	N/A	N/A

- F. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data, and specifically identifies the Technical Data upon which Contractor may rely:

Drawings Title	Date of Drawings	Technical Data
N/A	N/A	N/A

- G. Contractor may examine copies of reports and drawings identified in SC-5.03.E and SC-5.03.F that were not included with the Bidding Documents at the Engineer's Office during regular business hours, or may request copies from Engineer.

SC-5.04 *Differing Subsurface or Physical Conditions*

SC-5.4.E Delete Paragraph 5.04.E.1.b in its entirety and insert the following in its place:

- b. With respect to Work that is paid for on a unit price basis, the provisions of L.R.S. 38:2212 M(5) shall prevail.

SC-5.06 *Hazardous Environmental Conditions at Site*

SC-5.06.A Add the following new paragraphs immediately after Paragraph 5.06.A.3:

4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely:

Report Title	Date of Report	Technical Data
N/A	N/A	N/A

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely:

Drawings Title	Date of Drawings	Technical Data
N/A	N/A	N/A

SC-6.01 *Performance, Payment and Other Bonds*

SC-6.01.A Add the following paragraphs immediately after Paragraph 6.01.A:

1. *Required Performance Bond Form:* The performance bond that Contractor furnishes will be in the form of EJCDC® C-610, Performance Bond (2018 Edition).
2. *Required Payment Bond Form:* The payment bond that Contractor furnishes will be in the form of EJCDC® C-615, Payment Bond (2018 Edition).

SC-6.02 *Insurance – General Provisions*

SC-6.02.B Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

SC-6.03 *Contractor's Insurance*

SC-6.03.B. Add the following new paragraph immediately after Paragraph 6.03.B.5:

6. Remain in effect for one (1) year after final payment.

SC-6.03.C. Add the following new paragraph immediately after Paragraph 6.03.C:

D. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation:

a. State:	Statutory
b. Applicable Federal (e.g., Longshoreman's):	Statutory
c. Employer's Liability:	<u>\$1,000,000</u>

2. Contractor's General Liability which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

a. General Aggregate	<u>\$2,000,000</u>
b. Products – Completed Operations Aggregate	<u>\$1,000,000</u>
c. Personal and Advertising Injury	<u>\$1,000,000</u>
d. Each Occurrence (Bodily Injury and Property Damage)	<u>\$1,000,000</u>
e. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverages where applicable.	
f. Excess or Umbrella Liability	
☐ General Aggregate	<u>\$2,000,000</u>
☐ Each Occurrence	<u>\$2,000,000</u>

3. Automobile Liability:

a. Combined Single Limit of	<u>\$1,000,000</u>

4. The Contractual Liability shall provide coverage for not less than the following amounts:

a. Bodily Injury:	
Each person	<u>\$1,000,000</u>
Each Accident	<u>\$1,000,000</u>
b. Property Damage:	
Each Accident	<u>\$1,000,000</u>
Annual Aggregate	<u>\$2,000,000</u>

5. The Contractor shall provide the Owner with an Owner's Protective Liability Insurance Policy naming the Owner and the Engineer as additional insureds, and each of their officers, agents and employees as additional insureds under that policy, said policy to protect said parties from claims which may arise from operations under the contract. Limits of policy coverage shall be bodily injury liability \$1,000,000 each person/\$2,000,000 aggregate; property damage - \$1,000,000 per person/\$2,000,000 aggregate. Any and all additional premium charges for securing this insurance shall be included as part of the Contractor's bid and contract price.
6. The Contractor, shall cause the Owner and the Engineer to be named as an additional insureds under the Contractor's liability policy and any and all additional premium charges for securing an endorsement to the Contractor's liability policy naming the Owner and the Engineer as an additional insureds shall also be included as part of the Contractor's bid and contract price.

SC-6.03.C Add the following new paragraph immediately after Paragraph 6.03.D:

- E. Exhibit A: Certificate of Insurance - Insured/Contractor (Exhibit A1); Certificate of Insurance - Insured/Owner (Exhibit A2); and Certificate of Insurance Insured/Contractor-Builder's Risk (Exhibit A3). Exhibit A1, Exhibit A2 and Exhibit A3 are samples showing sample insurance coverages. Actual coverage required shall be as stated in the General & Supplemental Conditions.

SC-6.04 *Builder's Risk and Other Property Insurance*

SC-6.04 Delete Paragraph 6.04 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 equal to 100% of the cost of the total construction plus 8% of the construction cost to cover professional design services. If the Owner is damaged by the failure of the Contractor to maintain such insurance, then the Contractor shall bear all reasonable costs properly attributable thereto. Contractor shall be responsible for any deductible or self-insured retention. This insurance shall:
1. Include the interests of Owner, Contractor, Subcontractors, Engineer and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them, each of who is deemed to have an insurable interest and shall be listed as an insured or loss payee;
 2. Be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, falsework, 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 that caused by flood), and such other perils or causes of loss as may be specifically required by these 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;

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 loss payee to whom a certificate of insurance has been issued; and

SC-7.04 *Services, Materials, and Equipment*

SC-7.04.C Add the following new paragraph immediately after paragraph 7.04.C:

- D. Suppliers of all major materials or equipment furnished shall supply manufacturer's printed warranties on all materials or equipment furnished. The Contractor shall furnish these warranties with the Shop Drawings submittal. The warranties shall warrant the materials or equipment for a period of one (1) year from the filing of the Substantial Completion certificate.

SC-7.09 *Permits*

SC-7.09.A Add the following new language to the end of the last sentence of Paragraph 7.09.A:

- A. ;unless otherwise stated in the Contract Documents.

SC-7.10 *Taxes*

SC-7.10.A Delete paragraph 7.10.A in its entirety and insert the following:

- A. Contractor shall include all city, state and federal taxes and sales taxes in his bid except when exempted as an Agent of Governmental Entity by Louisiana Department of Revenue Form LDR R-1020. Tax exempt status will be granted to the Contractor, providing the Contractor processes the necessary LDR form(s).

SC-7.17 *Contractor's General Warranty and Guarantee*

SC-7.17.E Add the following new paragraph immediately after paragraph 7.17.E:

F. In accordance with L.R.S. 9:2774, the commencement date for ALL warranties or guarantees of every nature or kind shall be the date of Substantial Completion. It shall be the Contractor's sole responsibility to ensure that all written warranties include this commencement time. Also, in accordance with L.R.S. 9:2274, the provision of this Section shall not be subject to waiver by contract.

SC-7.18 *Indemnification*

SC-7.18 Delete Paragraphs 7.18.A and 7.18.B in their entirety and insert the following:

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer and their consultants, agents and employees from and against all claims, damages, losses and expense, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense is caused in whole or in part by any negligent act or omission, or breach of this contract, by Contractor, or any Subcontractors of Contractor or, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable. Any and all insurance premium cost that insures this obligation to indemnify shall be included as part of the Contractor's bid and contract price.
- B. In any and all claims against Owner or Engineer or any of their consultants, agents or employees by any person, agent or employee of Contractor, and Subcontractor, or any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 7.18.A. shall not be limited in any way by any limitation on the legal remedies or the amount or type of damages, compensation or benefits payable by or for Contractor or any such Subcontractor or other person or organization under worker's or workmen's compensation acts, disability benefit act or other employee benefit acts.

SC-10.03 *Resident Project Representative*

SC-10.03.B Add the following new paragraph immediately after paragraph 10.03.B:

- C. The Duties, Responsibilities, and Limitations of Authority of Project Representative shall be as noted in an Exhibit to this document.

SC-11.02 *Change Orders*

SC-11.02.B Add the following new paragraphs immediately after Paragraph 11.02.B:

- A. Before a Change Order is prepared, the Contractor shall provide and deliver to the Engineer the following information concerning the Cost of Work, not subject to waiver in accordance with L.R.S. 38:2212M.(5), within a reasonable time after being notified to prepare said Change Order.
 - 1. A detailed itemized list of labor, material and equipment costs for the General Contractor's Work including quantities and unit costs for each item of labor, material and equipment.
 - 2. An itemized list of labor, material and equipment costs for each Subcontractor's and/or Sub-Subcontractor's Work including quantities and unit costs for each item of labor, material and equipment.
- B. After a Change Order has been approved, no future requests for extensions of time or additional cost shall be considered for that Change Order.

SC-13.01 *Cost of the Work*

SC-13.01.B. Delete Paragraphs 13.01.B.5.c.1 and 13.01.B.5.c.2 in their entirety and insert the following in their place:

c. *Construction Equipment Rental:*

- 1) Rentals of all construction equipment and machinery, and the parts thereof 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.

- 2) Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in the Equipment Rental Rate Book as defined in the Louisiana Public Bid Law, or if not available, the latest edition of "Blue Book" rates, or special equipment rates agreed to by the Owner and Engineer. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than \$1,000 will be considered small tools.

SC-13.03 *Unit Price Work*

SC-13.03.E Delete Paragraphs 13.03.E.1 and 13.03.E.2 in their entirety and insert the following in their place:

1. In regards to established unit prices as originally bid the provisions of R.S. 38:2212M.(5) shall apply.

SC-15.01 *Progress Payments*

SC-15.01.B Add the following new paragraphs immediately after Paragraph 15.01.B.4:

5. Normal retainage shall not be due the Contractor until after substantial completion and expiration of the forty-five day lien period and submission to the Engineer of a clear lien certificate, consent of surety, and invoice for retainage. Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. Payments for materials or equipment stored on the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, including applicable insurance.

SC-15.01.D Delete Paragraph 15.01.D.1 in its entirety and insert the following in its place:

1. Forty-five (45) days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount will (subject to the provisions of Paragraph 15.01.E) become due, and when due will be paid by Owner to Contractor; except for projects funded fully or in part by a Federal reimbursement program. For such projects the Owner will make payment in a timely manner consistent with reimbursement.

SC-15.03 *Substantial Completion*

SC-15.03.A Delete Paragraph 15.03.A in its entirety and insert the following in its place:

- 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 and request that Engineer schedule a site visit to review the status of work. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

SC-15.03.C Delete Paragraph 15.03.C in its entirety and insert the following in its place:

- C. If Engineer considers the work as substantially complete, Engineer will deliver to Owner a report recommending consideration of acceptance of the Contract as substantially complete. There shall be attached to the report a punch list of items to be completed or corrected before final payment. Owner shall timely consider the Engineer's recommendation of acceptance and either officially accept or reject the recommendation. If the recommendation is rejected by the Owner, the Owner shall notify the Contractor in writing, stating reasons therefore. If the recommendation is accepted by the Owner, either an adopted governing body resolution; or a Notice of Acceptance document dated and signed by the Owner shall establish the date of Substantial Completion. The Owner will record the resolution or the Notice of Acceptance document with the Clerk of Court in the Parish in which the work has been performed. Any punch list generated during the project will include the cost estimates for the particular items of work the Engineer has developed based on the mobilization, labor, material, and equipment costs of

correcting each punch list item. The values established for punch list items shall be withheld in addition to the withheld retainage amount.

SC-15.03.D Delete Paragraph 15.03.D in its entirety and insert the following in its place:

D. Warranties required by the Contract Documents shall commence on the date of Acceptance of the Work unless otherwise agreed to in writing by the Owner and Contractor. Unless otherwise agreed to in writing by the Owner and Contractor, security, maintenances, heat, utilities, damage to the Work not covered by the punch list and insurance shall become the Owner's responsibility on the Date of Substantial Completion.

SC-15.03.E Delete Paragraph 15.03.E in its entirety and insert the following in its place:

C. If all punch list items have not been completed by the end of the forty-five (45) day lien period, through no fault of the Engineer or Owner, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within forty-five (45) days after notification, the Surety has not completed the punch list, through no fault of the Engineer or Owner, the Owner may, at his option, contract to have the balance of the Work completed and pay for such Work with the unpaid funds remaining in the Contract sum.

SC-15.03.F Delete Paragraph 15.03.F in its entirety and insert the following in its place:

D. At the end of the 45 day lien period, payment shall be approved for all punch list items completed up to that time and for the contract retainage. After that payment, none of the remaining funds shall be due the Contractor until all punch list items are completed and are accepted by the Engineer. If funds remaining are less than that required to complete the Work, the Contractor shall pay the difference.

SC-15.06 *Final Payment*

SC-15.06.A Delete Paragraph 15.06.A.2.e in its entirety and insert the following in its place:

- e. A certified clear lien certificate on the Contract obtained from the Clerk of Court after 45 days from the recordation date of the certificate of substantial completion.

SC-15.06.A Delete Paragraph 15.06.A.3 in its entirety.

SC-15.06.E Delete Paragraph 15.06.E in its entirety and insert the following in its place:

- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 45 days of Owner's receipt of the final Application for Payment from Engineer.

SC-16.01 *Owner May Suspend Work*

SC-16.01.A Delete Paragraph 16.01.A. in its entirety and insert the following in its place:

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 60 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work. If Work is suspended by Owner for more than 60 consecutive days, Contractor shall be entitled to an adjustment in Contract Price and/or and adjustment of Contract Time directly attributable to any such suspension.

SC-16.04 *Contractor May Stop Work or Terminate*

SC-16.04 Delete Paragraph 16.04.A. and 16.04.B in its entirety and insert the following in its place:

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 45 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 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 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 45 days to pay Contractor any sum finally determined to be due, Contractor may, 7 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 are not intended to preclude Contractor from submitting a Change Proposal 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.

SC-18.07 *Controlling Law*

SC-18.07 Delete Paragraph 18.07.A in its entirety and insert the following in its place:

- A. This Contract is to be governed by the nearest District Court to the location of the Project; and overriding distance, the District Court within the Parish where the Project is located, if such District Court exists.

SC-18.11 *Precedence Between Federal Compliance Provisions and Other Provisions*

SC-18.11 Add the following new paragraph immediately after Paragraph 18.10:

- A. Where discrepancies between federal compliance provisions, if any, and other Contract Documents exist, the federal compliance provisions shall take precedence.

SC-18.12 *Ownership and Use of Drawings, Specifications and Other Instruments of Service*

SC-18.12 Add the following new paragraph immediately after Paragraph 18.11:

- A. All Drawings, Specifications and all other documents and things (in electronic and/or tangible form) prepared by the Engineer (or Engineer's consultants) are deemed work made for hire and shall be the property of the Owner, including all copyrights thereto as provided in R.S. 38:2317.

SC-18.13 *Recovery of Attorney's Fees*

SC-18.13 Add the following new paragraph immediately after Paragraph 18.12:

- A. In the event that it is necessary to enforce this contract in any judicial forum, the parties agree that whoever substantially prevails in the litigation shall be entitled to its reasonable attorney's fees as fixed by the court.

SC-18.14 *Contractor and Subcontractor Employees*

SC-18.14 Add the following new paragraph immediately after Paragraph 18.13:

Contractor and its employees, officers, agents, representatives, and Subcontractors shall conduct themselves in an appropriate and professional manner, in accordance with the Owner's requirements, at all times while working on the Project. Any such individual who behaves in an inappropriate manner or who engages in the use of inappropriate language or conduct while on Owner's property, as determined by the Owner, shall be removed from the Project at the Owner's request. Such individual shall not be permitted to return without the written permission of the Owner. The Owner shall not be responsible or liable to Contractor or any Subcontractor for any additional costs, expenses, losses, claims or damages incurred by Contractor or its Subcontractor as a result of the removal of an individual from the Owner's property pursuant to this paragraph. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

SC-18.15 *Human Remains, Archeological Sites, Etc.*

SC-18.15 Add the following new paragraph immediately after Paragraph 18.14:

- A. If, during the course of the Work, the Contractor discovers human remains, unmarked burial or archaeological site, burial artifacts, or wetlands, which are not indicated in the Contract Documents, the Contractor shall follow all procedures mandated by State and Federal law, including but not limited

to R.S. 8:671 et seq., R.S. 49:213.1 et seq., and Sections 401 & 404 of the Federal Clean Water Act. Request for adjustment of the Contract Sum and Contract Time arising from the existence of such remains or features shall be submitted in writing to the Owner pursuant to the Contract Documents.

SC-18.16 *Subcontractor Responsibility*

SC-18.16 Add the following new paragraph immediately after Paragraph 18.15:

- A. The Contractor shall be solely responsible for selection and performance of all subcontractors. The Contractor shall not be entitled to claims for additional time and/or an increase in the contract sum due to a problem with performance or non-performances of a subcontractor.

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.
CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

SUPPLEMENTARY CONDITIONS

EXHIBIT A

EXHIBIT A1 - SAMPLE "CERTIFICATE OF INSURANCE -
INSURED/CONTRACTOR"

EXHIBIT A2 - SAMPLE "CERTIFICATE OF INSURANCE -
INSURED/OWNER"

EXHIBIT A3 - SAMPLE "CERTIFICATE OF INSURANCE -
INSURED/CONTRACTOR – BUILDERS RISK"

ACORD**CERTIFICATE OF LIABILITY INSURANCE**

DATE (MM/DD/YY)

PRODUCER
ABC Agency
 123 Street
 Anywhere USA

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

COMPANY
A

XYZ Insurance Co

INSURED

COMPANY
B

COMPANY
C

COMPANY
D

John Doe Construction Co.
1 Construction Lane
Builder City USA

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS
	GENERAL LIABILITY				
☒	COMMERCIAL GENERAL LIABILITY	1111111	01/01/07	01/01/08	GENERAL AGGREGATE \$ 2,000,000
☐	CLAIMS MADE ☒ OCCUR				PRODUCTS-COMP/OP AGG. \$ 1,000,000
☐	OWNER'S & CONTRACTOR'S PROT.				PERSONAL & ADV INJURY \$ 1,000,000
☒	Additional Insured: Pan American Engineers, City of Tomorrow				EACH OCCURRENCE \$ 1,000,000
☒	Waiver of Rights of Recovery: Pan American Engineers, City of Tomorrow				FIRE DAMAGE (Any One Fire) \$ 50,000
					MED. EXP (Any One Person) \$ 5,000
	AUTOMOBILE LIABILITY				
☒	ANY AUTO	2222222	01/01/07	01/01/08	COMBINED SINGLE LIMIT \$ 1,000,000
☐	ALL OWNED AUTOS				BODILY INJURY (Per person) \$
☐	SCHEDULED AUTOS				BODILY INJURY (Per accident) \$
☐	HIRED AUTOS				PROPERTY DAMAGE \$
☐	NON-OWNED AUTOS				
☒	Additional Insured: Pan American Engineers, City of Tomorrow				
☒	Waiver of Rights of Recovery: Pan American Engineers, City of Tomorrow				
	GARAGE LIABILITY				
☐	ANY AUTO				AUTO ONLY - EA ACCIDENT \$
☐					OTHER THAN AUTO ONLY:
☐					EACH ACCIDENT \$
☐					AGGREGATE \$
	EXCESS LIABILITY				
☐	UMBRELLA FORM				EACH OCCURRENCE \$
☐	OTHER THAN UMBRELLA FORM				AGGREGATE \$
					\$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				
	THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: ☒ INCL ☐ EXCL	3333333	01/01/07	01/01/08	☒ WC STATUTORY LIMITS ☐ OTHER \$
					EACH ACCIDENT \$ 1,000,000
					DISEASE-POLICY LIMIT \$ 1,000,000
					DISEASE-EACH EMPLOYEE \$ 1,000,000
	OTHER:				

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

CERTIFICATE HOLDER**Pan American Engineers, LLC****P.O. Box 8599****Alexandria, LA 71306****ACORD 25-S (1/95)**

Certificate #

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

ABC Agency


Pan American Engineers, LLC
 2022

ACORD		CERTIFICATE OF LIABILITY INSURANCE			DATE (MM/DD/YY)	
PRODUCER ABC Agency 123 Street Anywhere USA		THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.				
		COMPANIES AFFORDING COVERAGE				
		COMPANY A XYZ Insurance Co				
		COMPANY B COMPANY C COMPANY D				
INSURED City of Tomorrrow						
COVERAGES THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.						
CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY ☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS MADE ☒ OCCUR ☒ OWNER'S & CONTRACTOR'S PROT. ☒ Additional Insured: Pan American Engineers ☒ Waiver of Rights of Recovery: Pan American Engineers, City of Tomorrow	4444444	Job Start Date		GENERAL AGGREGATE \$1,000,000 PRODUCTS-COMP/OP AGG. \$1,000,000 PERSONAL & ADV INJURY \$1,000,000 EACH OCCURRENCE \$1,000,000 FIRE DAMAGE (Any One Fire) \$ MED. EXP (Any One Person) \$	
	AUTOMOBILE LIABILITY ☐ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON-OWNED AUTOS				COMBINED SINGLE LIMIT \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE \$	
	GARAGE LIABILITY ☐ ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN AUTO ONLY: EACH ACCIDENT \$ AGGREGATE \$	
	EXCESS LIABILITY ☐ UMBRELLA FORM ☐ OTHER THAN UMBRELLA FORM				EACH OCCURRENCE \$ AGGREGATE \$ \$	
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY THE PROPRIETOR/PARTNERS/EXECUTIVE OFFICERS ARE: ☐ INCL ☐ EXCL				☐ WC STATUTORY LIMITS ☐ OTHER EACH ACCIDENT \$ DISEASE-POLICY LIMIT \$ DISEASE-EACH EMPLOYEE \$	
	OTHER:					
DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS Reference: Project Description						
CERTIFICATE HOLDER Pan American Engineers, LLC P.O. Box 8599 Alexandria, LA 71306 Agency				CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, IT'S AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE ABC 		
ACORD 25-S (1/95)		Certificate #				



CERTIFICATE OF PROPERTY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

If this certificate is being prepared for a party who has an insurable interest in the property, do not use this form. Use ACORD 27 or ACORD 28.

PRODUCER ABC Agency 123 Street Anywhere, USA	CONTACT NAME:	
	PHONE (A/C, No. Ext):	FAX (A/C, No):
INSURED John Doe Construction Co. 1 Construction Lane Builder City USA	E-MAIL ADDRESS:	
	PRODUCER CUSTOMER ID #:	
	INSURER(S) AFFORDING COVERAGE	
	INSURER A : XYZ Insurance Co.	
	INSURER B :	
	INSURER C :	
	INSURER D :	
INSURER E :		
INSURER F :		
NAIC #		

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

LOCATION OF PREMISES / DESCRIPTION OF PROPERTY (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Reference: Project Location

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	COVERED PROPERTY	LIMITS
	☐ PROPERTY					
	CAUSES OF LOSS	DEDUCTIBLES			BUILDING	\$
		BUILDING			PERSONAL PROPERTY	\$
	☐ BASIC				BUSINESS INCOME	\$
	☐ BROAD	CONTENTS			EXTRA EXPENSE	\$
	☐ SPECIAL				RENTAL VALUE	\$
	☐ EARTHQUAKE				BLANKET BUILDING	\$
	☐ WIND				BLANKET PERS PROP	\$
	☐ FLOOD				BLANKET BLDG & PP	\$
						\$
						\$
	☒ INLAND MARINE	TYPE OF POLICY	Job Start Date	Job End Date	☒ Site Limit	\$ *See Below
	CAUSES OF LOSS	Builders Risk			☒ Transit Limit	\$ As Required
	☐ NAMED PERILS	POLICY NUMBER			☒ Temp. Loc. Limit	\$ As Required
	☒ All Risk	NNNNNN			☒ Deductible	\$ 10,000
	☐ CRIME					\$
	TYPE OF POLICY					\$
						\$
	☐ BOILER & MACHINERY / EQUIPMENT BREAKDOWN					\$
						\$
						\$
						\$

SPECIAL CONDITIONS / OTHER COVERAGES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Reference: Project Description

Owner and Engineer are additional insureds with Waiver of Subrogation

*Contract Amount Plus 8% (See S.C. 6.04)

CERTIFICATE HOLDER

CANCELLATION

Pan American Engineers, LLC P.O. Box 8599 Alexandria, LA 71306	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE ABC Agency

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.

CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

SUPPLEMENTARY CONDITIONS

EXHIBIT B

DUTIES, RESPONSIBILITIES AND LIMITATIONS OF
AUTHORITY OF PROJECT REPRESENTATIVE

EXHIBIT B

Duties, Responsibilities and Limitations of Authority of Project Representative

ENGINEER shall furnish a Project Representative ("PR"), assistants and other field staff to assist ENGINEER in observing progress and quality of the work of CONTRACTOR.

Through more extensive on-site observations of the Work in progress and field checks of materials and equipment by the PR and assistants, ENGINEER shall endeavor to provide further protection for OWNER against defects and deficiencies in the work of CONTRACTOR. However, ENGINEER shall not, during such visits or as a result of such observations of CONTRACTOR's work in progress, supervise, direct, or have control over CONTRACTOR's work nor shall ENGINEER have authority over or responsibility for the means, methods, techniques, sequences or procedures selected by CONTRACTOR, for safety precautions and programs incident to the work of CONTRACTOR, for any failure of CONTRACTOR to comply with laws, rules, regulations, ordinances, codes or orders applicable to CONTRACTOR's performing and furnishing the work, or responsibility of construction for CONTRACTOR's failure to furnish and perform the Work in accordance with the Contract Documents.

The duties and responsibilities of the PR are limited to those of ENGINEER in ENGINEER's agreement with the OWNER and in the construction Contract Documents, and are further limited and described as follows:

A. General

PR is ENGINEER's agent at the Site, will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding PR's actions. PR's dealings in matters pertaining to the on-site Work shall in general be with ENGINEER and CONTRACTOR, keeping OWNER advised as necessary. PR's dealings with Subcontractors shall only be through or with the full knowledge and approval of CONTRACTOR. PR shall generally communicate with OWNER with the knowledge of and under the direction of ENGINEER.

B. Duties and Responsibilities of PR

1. *Schedules:* Review the progress schedule, schedule of Shop Drawing submittals and schedule of values prepared by CONTRACTOR and consult with ENGINEER concerning acceptability.
2. *Conferences and Meetings:* Attend meetings with CONTRACTOR, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
3. *Liaison:*
 - a. Serve as ENGINEER's liaison with CONTRACTOR, working principally through CONTRACTOR's superintendent and assist in understanding the intent of Contract Documents; and assist ENGINEER in serving as OWNER's liaison with CONTRACTOR when CONTRACTOR's operations affect OWNER's on-site operations.
 - b. Assist in obtaining from OWNER additional details or information, when required for proper execution of the Work.

4. *Shop Drawings and Samples:*

- a. Record date of receipt of Shop Drawings and Samples.
- b. Receive Samples, which are furnished at the Site by CONTRACTOR, and notify ENGINEER of availability of Samples for examination.
- c. 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.

5. *Review of Work, Rejection of Defective Work, Inspections and Tests:*

- a. 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.
- b. Report to ENGINEER whenever PR believes that any Work will not produce a completed Project that conforms generally to the Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated in 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 PR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
- c. Verify that tests, equipment and systems start-ups 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 start-ups.
- d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to ENGINEER.

6. *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.

7. *Modifications:* Consider and evaluate CONTRACTOR's suggestions for modifications in Drawings or Specifications and report with PR's recommendations to ENGINEER. Transmit to CONTRACTOR in writing decisions as issued by ENGINEER.

8. *Records:*

- a. 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 Change Directives, 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, Shop Drawing submittals received from and delivered to CONTRACTOR and other Project related documents.
- b. Prepare a daily report or keep a diary or log book, recording CONTRACTOR's hours on the job site, weather conditions, data relative to questions of Work Change Directives, 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.

c. Record names, addresses and telephone numbers of all contractors, subcontractors and major suppliers of materials and equipment.

9. *Reports:*

a. Furnish to 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.

b. Consult with ENGINEER in advance of scheduled major tests, inspections or start of important phases of the Work.

c. Draft proposed Change Orders and Work Change Directives, obtaining backup material from CONTRACTOR and recommend to ENGINEER Change Orders, Work Change Directives, and Field Orders.

d. Report immediately to ENGINEER and OWNER the occurrence of any accident.

10. *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.

11. *Certificates, Maintenance and Operation Manuals:* During the course of the Work, verify that certificates, maintenance and operation 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.

12. *Completion:*

a. Before ENGINEER issues a Certificate of Substantial Completion, submit to CONTRACTOR a list of observed items requiring completion or correction.

b. Observe whether CONTRACTOR has had performed inspections required by laws, rules, regulations, ordinances, codes, or orders applicable to the Work, including but not limited to those to be performed by public agencies having jurisdiction over the Work.

c. Conduct a final inspection in the company of ENGINEER, OWNER and CONTRACTOR and prepare a final list of items to be completed or corrected.

d. Observe whether all items on final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance and issuance of the Notice of Acceptability of the Work.

C. Limitations on Authority of PR

Project Representative:

1. Shall not authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items), unless authorized by ENGINEER.

2. Shall not exceed limitations of ENGINEER's authority as set forth in the Agreement or the Contract Documents.

3. Shall not undertake any of the responsibilities of CONTRACTOR, Subcontractor, Suppliers, 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.

SECTION 00800

**FEDERAL TERMS & CONDITIONS FOR PROJECTS FUNDED THROUGH THE
CORONAVIRUS LOCAL FISCAL RECOVERY PROGRAM AND THE
AMERICAN RESCUE PLAN ACT (ARPA)**

1. Breach of Contract Terms:

Any violation or breach of terms of any contract on the part of the Contractor or the Contractor's subcontractors may result in the suspension or termination of the contract or such other action that may be necessary to enforce the rights of the parties of the contract. The duties and obligations imposed by the contract documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

2. Termination for Cause:

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

- i. 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);
- ii. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
- iii. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
- iv. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:

- i. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
- ii. enforce the rights available to Owner under any applicable performance bond.

- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, 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 complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.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 the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds 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.
- F. 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, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

3. Termination for Convenience:

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - i. 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;
 - ii. 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; and
 - iii. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

4. Equal Employment Opportunity:

- A. For Contracts/Subcontracts of \$10,000 and under, the Contractor agrees as follows:
 - i. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants for employment are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

- ii. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by Contracting Officer setting forth the provisions of this non-discrimination clause. The Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
 - iii. Contractors shall incorporate foregoing requirements in all subcontracts.
- B. For Contracts/Subcontracts above \$10,000, the Contractor shall comply with Executive Order 11246 of September 24, 1965, entitled "Equal Employment Opportunity," as amended by Executive order 11375 of October 13, 1967, and as supplemented in Department of Labor regulations (41 CFR chapter 60).

i. Section 202 Equal Opportunity Clause

During the performance of this contract, the Contractor agrees as follows:

- a. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- b. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration without regard to race, color, religion, sex, or national origin.
- c. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the Contract Compliance Officer advising the said labor union or workers' representatives of the Contractor's commitment under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

- d. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and the rules, regulations, and relevant orders of the Secretary of Labor.
 - e. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Department and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and others.
 - f. In the event of the Contractor's noncompliance with the non-discrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
 - g. The Contractor will include the provisions of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Department may direct as a means of enforcing such provisions, including sanctions for noncompliance. Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Department, the Contractor may request the United States to enter into such litigation to protect the interest of United States.
- ii. Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246). (Applicable to contracts/subcontracts exceeding \$10,000).
 - a. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

- b. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
 - c. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed, giving the State, parish, and city, if any):
 - iii. Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)
 - a. As used in these specifications:
 - (1) "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - (2) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - (3) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
 - (4) "Minority" includes:
 - (a) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (b) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South America or other Spanish Culture or origin, regardless of race);

- (c) Asian and Pacific Islander (all persons having origins in any of the original people of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (d) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
- b. When the Contractor, or any subcontractor, at anytime, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract, in excess of \$10,000, the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
- c. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
- d. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing contracts in geographical areas where they do not have a federal or federally-assisted construction contract shall apply the minority and female

goals established for the geographic area where the contract is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

- e. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
- f. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
- g. The Contractor shall take specific affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - (1) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

- (2) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.
- (3) Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.
- (4) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement have not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- (5) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly includes minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
- (6) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at

least once a year; and by posting the company EEO policy on a bulletin board accessible to all employees at each location where construction work is performed.

- (7) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- (8) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- (9) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- (10) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
- (11) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

- (12) Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - (13) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - (14) Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
 - (15) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitation to minority and female contractor associations and other business associations.
 - (16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
- h. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation shall not be a defense for the Contractor's non-compliance.

- i. A single goal for minorities and a separate single goal for women has been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non- minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
- j. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any persons because of race, color, religion, sex, or national origin.
- k. The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts pursuant to E.O. 11246.
- l. The Contractor shall not carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to E.O. 11246, as amended.
- m. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
- n. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the government and to keep records. Records shall at least include for each employee, the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number where assigned, social security number, race, sex, status (e.g., mechanic, apprenticeship trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and location at which the work was performed.

Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

- o. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application or requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

C. Certification of Nonsegregated Facilities (Over \$10,000) (41 CFR 60-1.9)

By the submission of this bid, the bidder, offeror, applicant or subcontractor certifies that he/she does not maintain or provide for his/her establishments, and that he/she does not permit employees to perform their services at any location, under his/her control, where segregated facilities are maintained. He/she certifies further that he/she will not maintain or provide for employees any segregated facilities at any of his/her establishments, and he/she will not permit employees to perform their services at any location under his/her control where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the equal opportunity clause of this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, 1transportation and housing facilities provided for employees which are segregated on the basis of race, color, religion, or otherwise. He/she further agrees that (except where he/she has obtained for specific time periods) he/she will obtain identical certification from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the equal opportunity clause; that he/she will retain such certifications in his/her files; and that he/she will forward the following notice to such proposed subcontractors (except where proposed subcontractors have submitted identical certifications for specific time periods).

5. Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708)

Where applicable, all contracts awarded by the non-Federal entity in excess of \$100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The

requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

6. Rights to Inventions Made Under a Contract or Agreement

If the Federal award meets the definition of “funding agreement” under 37 CFR § 401.2 (a) and the recipient or subrecipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that “funding agreement,” the recipient or subrecipient must comply with the requirements of 37 CFR Part 401, “Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements,” and any implementing regulations issued by the awarding agency.

7. Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251- 1387), as amended (Contracts and subgrants of amounts in excess of \$150,000)

Compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 7401-7671(q)), and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

8. Debarment and Suspension (Executive Orders 12549 and 12689)

A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), “Debarment and Suspension.” SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

9. Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)

Contractors that apply or bid for an award exceeding \$100,000 must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in

connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.

10. Domestic Preferences for Procurements

As appropriate and to the extent consistent with law, the Contractor should, to the greatest extent practicable under a Federal award, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States. This includes, but is not limited to iron, aluminum, steel, cement, and other manufactured products.

For purposes of this clause:

“Produced in the United States” means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

“Manufactured products” means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

(THIS FORM RESOLUTION, OR OTHER SIMILAR WRITTEN EVIDENCE OF AUTHORITY, IS REQUIRED TO BE SUBMITTED WITH BID (SEE INSTRUCTIONS TO BIDDERS – ARTICLE 12.2)

SECTION 00900

CORPORATE RESOLUTION

EXCERPT FROM MINUTES OF MEETING OF THE BOARD OF DIRECTORS OF _____, INCORPORATED.

AT THE MEETING OF DIRECTORS OF _____, INCORPORATED, DULY NOTICED AND HELD ON _____, _____, A QUORUM BEING THERE PRESENT, ON MOTION DULY MADE AND SECONDED. IT WAS:

RESOLVED THAT _____, BE AND IS HEREBY APPOINTED, CONSTITUTED AND DESIGNATED AS AGENT AND ATTORNEY-IN-FACT OF THE CORPORATION WITH FULL POWER AND AUTHORITY TO ACT ON BEHALF OF THIS CORPORATION IN ALL NEGOTIATIONS, BIDDING, CONCERNS AND TRANSACTIONS WITH THE NEBO WATER SYSTEM, INC., THE GOVERNING AUTHORITY OF THE NEBO WATER SYSTEM, INC OR ANY OF ITS AGENCIES, DEPARTMENTS, EMPLOYEES OR AGENTS, INCLUDING BUT NOT LIMITED TO THE EXECUTION OF ALL BIDS, PAPERS, DOCUMENTS, AFFIDAVITS, BONDS, SURETIES, CONTRACTS AND ACTS AND TO RECEIVE AND RECEIPT THEREFOR ALL PURCHASE ORDERS AND NOTICES ISSUED PURSUANT TO THE PROVISIONS OF ANY SUCH BID OR CONTRACT, THIS CORPORATION HEREBY RATIFYING, APPROVING, CONFIRMING AND ACCEPTING EACH AND EVERY SUCH ACT PERFORMED BY SAID AGENT AND ATTORNEY-IN-FACT.

I HEREBY CERTIFY THE FOREGOING TO BE A TRUE AND CORRECT COPY OF AN EXCERPT OF THE MINUTES OF THE ABOVE DATED MEETING OF THE BOARD OF DIRECTORS OF SAID CORPORATION, AND THE SAME HAS NOT BE REVOKED OR RESCINDED.

SECRETARY-TREASURER

DATE

(NOT REQUIRED TO BE SUBMITTED WITH BID)

SECTION 00910

**CONTRACTOR NON-COLLUSION AFFIDAVIT
(L.R.S. 38:2224)**

STATE OF LOUISIANA

PARISH OF _____

BE IT KNOWN, that on this _____ day of _____, _____, before me the undersigned Notary Public, duly commissioned and qualified, within and for the Parish of _____, State of Louisiana, personally came and appeared _____, as the duly authorized agent of _____, who after being by me first duly sworn, did depose and say:

That _____ has/have been selected as Contractor for the Nebo Water System, Inc. - Contract No. 4 – Manifest-Rhinehart Water Well Site Improvements & Booster Stations 2, 3, and 4 Improvements and 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, alteration or demolition of the public building or project or in securing the public contract were in the regular course or their duties for affiant; and

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, alternation or demolition of the public building or project were in the regular course of their duties for affiant.

APPEARER FURTHER DECLARES, that they will, in all respects, comply with the public contract laws of the State of Louisiana, including Title 38 of the Louisiana Statutes, and particularly Section 2224, as amended, of such Title 38 of the Louisiana Revised Statutes.

WITNESSES:

BY: _____

Sworn to and subscribed before me this _____ day of _____, 20____.

Notary Public

(NOT REQUIRED TO BE SUBMITTED WITH BID)
SUBMIT BY THE LOW BIDDER WITHIN 10 DAYS AFTER BID OPENING

SECTION 00920

ATTESTATIONS/AFFIDAVITS

NEBO WATER SYSTEM, INC.

CONTRACT 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS
NAME OF PROJECT

Before me, the undersigned notary public, duly commissioned and qualified in and for the parish and state aforesaid, personally came and appeared Affiant, who after being duly sworn, attested as follows:

L.R.S. 38:2227 PAST CRIMINAL CONVICTIONS OF BIDDERS

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes:

(a) Public bribery (L.R.S. 14:118)

(c) Extortion (L.R.S. 14:66)

(b) Corrupt influencing (L.R.S. 14:120)

(d) Money laundering (L.R.S. 14:230)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (L.R.S. 14:67)

(f) Bank fraud (L.R.S. 14:71.1)

(b) Identity Theft (L.R.S. 14:67.16)

(g) Forgery (L.R.S. 14:72)

(c) Theft of a business record
(L.R.S.14:67.20)

(h) Contractors; misapplication of
payments (L.R.S. 14:202)

(d) False accounting (L.R.S. 14:70)

(i) Malfeasance in office (L.R.S. 14:134)

(e) Issuing worthless checks
(L.R.S. 14:71)

L.R.S. 38:2212.10 VERIFICATION OF EMPLOYEES

A. Appearer is registered and participates in a status verification system to verify that all employees in the state of Louisiana are legal citizens of the United States or are legal aliens.

B. If awarded the contract, Appearer shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.

(NOT REQUIRED TO BE SUBMITTED WITH BID)
SUBMIT BY THE LOW BIDDER WITHIN 10 DAYS AFTER BID OPENING

C. If awarded the contract, Appearer shall require all subcontractors to submit to it a sworn affidavit verifying compliance with Paragraphs (A) and (B) of this Subsection.

L.R.S. 23:1726(B) CERTIFICATION REGARDING UNPAID WORKERS COMPENSATION INSURANCE

A. L.R.S. 23:1726 prohibits any entity against whom an assessment under Part X of Chapter 11 of Title 23 of the Louisiana Revised Statutes of 1950 (Alternative Collection Procedures & Assessments) is in effect, and whose right to appeal that assessment is exhausted, from submitting a bid or proposal for or obtaining any contract pursuant to Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950 and Chapters 16 and 17 of Title 39 of the Louisiana Revised Statutes of 1950.

B. By signing this bid /proposal, Affiant certifies that no such assessment is in effect against the bidding/proposing entity.

NAME OF BIDDER

NAME OF AUTHORIZED SIGNATORY OF BIDDER

DATE

TITLE OF AUTHORIZED SIGNATORY OF BIDDER

SIGNATURE OF AUTHORIZED
SIGNATORY OF BIDDER

WITNESSES:

Sworn to and subscribed before me this _____ day of _____, 202____

Notary Public

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.
CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

DIVISION 1 - GENERAL PROVISIONS

- Section 01010 - SUMMARY OF WORK
- Section 01011 - DRAWINGS
- Section 01012 - BUILDING PERMITS
- Section 01013 - PERMANENT UTILITY SERVICE CONNECTIONS
- Section 01015 - GENERAL CONDUCT OF WORK
- Section 01016 - PROTECTION OF EXISTING UTILITIES
- Section 01030 - SPECIAL PROJECT PROCEDURES
- Section 01090 - ABBREVIATIONS
- Section 01150 - MEASUREMENT AND PAYMENT
- Section 01300 - CONSTRUCTION PROGRESS AND SCHEDULES
- Section 01331 - CONSTRUCTION LAYOUT
- Section 01340 - SHOP DRAWINGS, SAMPLES AND PRODUCT DATA
- Section 01400 - MOBILIZATION
- Section 01410 - TESTING LABORATORY SERVICES
- Section 01500 - TEMPORARY FACILITIES
- Section 01560 - MAINTENANCE OF WORK SITE
- Section 01570 - CONSTRUCTION PROCEDURES
- Section 01700 - CONTRACT CLOSEOUT
- Section 01710 - CLEANING
- Section 01715 - PRECONSTRUCTION VIDEO FILMING OF
PROJECT AREA
- Section 01720 - RECORD DRAWINGS
- Section 01730 - OPERATION AND MAINTENANCE MANUAL
- Section 01740 - WARRANTIES AND BONDS

SECTION 01010**SUMMARY OF WORK**PART 1 - GENERAL

1.1 Scope: This section describes the location of the project site and the work to be performed.

1.2 Description of Site: The sites are located as follows:

- A. Water Well Site – 12080 La. Hwy. 8, Jonesville, La.
- B. Booster Station No. 2 – 190 Old Jena Road, Jonesville, La.
- C. Booster Station No. 3 – 1220 Blade Loop Road, Jena, La.
- D. Booster Station No. 4 – 8838 U.S. Hwy. 84 E, Jena, La.

1.3 Work to be Performed: The work to be performed, by site, is as follows:

A. Water Well Site:

- 1. Plugging and abandoning of Water Well No. 1 and Water Well No. 2;
- 2. Demolition of existing aerator and associated piping (foundation and steel structure to remain);
- 3. Demolition of 44,000-gallon ground storage tank and associated piping, valves, foundation, etc.;
- 4. Demolition of duplex pump station and associated piping, valves, concrete pad, etc.;
- 5. Demolition of chemical buildings and equipment (foundation to remain);
- 6. Demolition of electrical panels (shed, rack and foundation to remain)
- 7. Installation of two (2) water test wells;
- 8. Construction of permanent Water Well No. 3 and Water Well No. 4;
- 9. Installation of Aerator;
- 10. Installation of 44,000-Gallon Enamel-Coated Ground Storage Tank;
- 11. Installation of Duplex Submersible Tube Pump Station;
- 12. Installation of Chlorination Feed System;
- 13. Installation of Phosphate Feed System;
- 14. Installation of Emergency Diesel-Powered Generator and Automatic Transfer Switch;
- 15. Installation of Electrical, SCADA and VFDs;
- 16. Associated site work

B. Three (3) Booster Station Sites:

- 1. Demolition of existing packaged pump station,
- 2. Demolition of 14,000-gallon ground storage tank
- 3. Demolition of 185 gallon hydro tank and associated piping, valves, etc.
- 4. Installation of 14,000-Gallon Enamel-Coated Ground Storage Tank;
- 5. Installation of Duplex Submersible Tube Pump Station;
- 6. Installation of Emergency Diesel-Powered Generator and Automatic Transfer Switch;

7. Installation of Electrical, SCADA and VFDs;
8. Associated site work (including, but not limited to, site fencing, grading, etc.)

1.4 Water Well Phasing: The Test Well/Permanent Well portion of this project is divided into four (4) Phases, (Phase I, Phase II, Phase III and Phase IV).

A. Phase I of the Contract consists of drilling a test well pilot hole at the test well location, completion of geophysical logs, collection and analysis of sand sample(s) and Phase I Contractor's Report. The work order for Phase I will be issued at the Pre-Construction conference. If the results of the Phase I work indicate the suitability of the site for constructing a water test well meeting specified conditions, then the work order for Phase II will be issued.

B. Phase II of the Contract, if authorized, consists of the completion of water test well(s) in the pilot hole, collection and analysis of water sample(s), analysis of test well pumping data, and Phase II Contractor's Report. If the results of the Phase II work indicate the suitability of the site for constructing a water production well meeting specified conditions, then the work order for Phase III will be issued.

C. Phase III of the Contract, if authorized, consists of the drilling of a pilot hole at the permanent well location, permanent well casing, well screen, lap pipe, well development, analysis of test pumping, collection and analysis of water sample(s), and Phase III Contractor's Report. If the results of the Phase III work indicate the suitability of the site for constructing a permanent water production well capable of producing adequate quantity and quality of potable water, meeting specified conditions, then the work order for Phase IV will be issued.

D. Phase IV of the Contract, if authorized, consists of the balance of the Contract Work, including the installation of the pump column, pump, motor, well head assembly, well disinfection, site work, electrical work and controls, raw water main and appurtenances, etc.

1.5 Multiple Water Bearing Aquifers: If the results of pilot hole work indicate the existence of multiple potential water bearing aquifers, the Contractor may be ordered to construct test wells in each of the water bearing aquifers. The estimated quantities shown in the Bid Form are based on developing three (3) water test wells in the test hole. The Contractor shall be paid under Pay Item *"Test Well No. 1- Screen Initial Strata in Original Hole"* for reaming of the pilot hole and setting the initial temporary casing and screen. The Contractor shall then develop the aquifer. Said development shall be paid under Pay Item *"Test Well Development"*. Upon satisfactory completion of all test well work in the initial strata, the Contractor shall remove the temporary casing and screen from the hole. If the Contractor is authorized to investigate a second strata in the initial test hole, the Contractor shall install a cement plug between the initial test strata and the bottom of the subsequent test strata. The Contractor shall be paid for installation of this cement plug under Pay Item *"Test Well No. X - Install Cement Plug"*. Upon successful installation of the cement plug, the Contractor shall then recondition the test hole and set the required length of casing and screen in the hole. This work shall be paid for under Pay Item *"Test Well No. X - Screen Alternate Strata in Original Test Hole"*. The quantities to be paid for well abandonment shall be based on the initial pilot hole depth less the quantities paid for installation of cement plug. The estimated quantities of work shown in the Bid Form are based upon review of available geologic data and do not necessarily indicate the actual amount of work

to be completed under this project. The Contractor may be ordered to conduct more or less work contingent upon actual conditions.

1.6 Permanent Water Well Work: The OWNER reserves the right to eliminate from the Contract all work, or parts thereof, related to the construction of the permanent water production well, well controls, and associated site improvements in the event the results from Phases I and/or II do not indicate the existence of suitable aquifers for development into a water production well with capacities of 300 gpm or greater. If a permanent water production well is not recommended by the Contractor's Hydrologist, a change order will be prepared to accordingly delete those items of work designated above as Phase II, Phase III, and/or Phase IV work items.

1.7 Alternate Water Well Sites: The OWNER may determine to drill pilot hole(s) and/or water test wells at other sites and modify the site work accordingly to connect the new well site to the distribution main. If such modifications are deemed necessary in an effort to locate sites for a suitable permanent wells, bid prices for respective work items will be used for the basis of payment and a change order will be prepared accordingly.

1.8 Health Authority Requirements: The CONTRACTOR will familiarize himself with the requirements of the local health authority. The CONTRACTOR will be particularly careful that the water piping is not to be placed parallel to sewer lines closer than six (6) feet from one pipeline to the other or when crossing over or under, no closer than 1'-6" clearance.

1.9 Drawings and Specifications:

A. Specifications: The SECTIONS of the General Requirements consist of four (4) parts: General, Products, Execution and Measurement and Payment. The General Part contains general requirements which govern the work. The Products and Execution Parts modify and supplement the General Part by providing detailed requirements of the work and shall always govern whenever there appears to be a conflict. The Measurement and Payment Part defines and describes the methods by which the work will be measured and on what basis the payments will be made.

B. Intent:

1. 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.

2. 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 Specifications, 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.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 General: Perform all work within the limits indicated on the Drawings and described herein, all to the ENGINEER'S and OWNER'S satisfaction.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01011**DRAWINGS**PART 1 - GENERAL

- 1.1 Scope: This Section describes each sheet of the Drawings prepared for this project.
- 1.2 Drawings: The Drawings referred to in the Contract Documents bears the title:

DRAWINGS

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.
CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

and are numbered and designated as follows:

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	VICINITY MAP AND SHEET INDEX
3-8	MANIFEST-RHINEHART WELL SITE PLANS
9-11	WATER WELL DETAILS
12	DUPLEX PUMP AND DISCHARGE ASSEMBLY DETAILS
13	44,000 GALLON GROUND STORAGE TANK DETAILS
14	AERATOR DETAILS
15	CHLORINE BUILDING DETAILS
16	PHOSPHATE BUILDING DETAILS
17	MANIFEST-RHINEHART WELL SITE - GENERATOR DETAILS
18	MANIFEST-RHINEHART WELL SITE - ELECTRICAL DETAILS
19	MANIFEST-RHINEHART WELL SITE - ELECTRICAL RISER DIAGRAM
20-23	MANIFEST-RHINEHART WELL SITE - ARCHIVE DRAWINGS
24-28	BOOSTER STATION NO. 2 PLANS
29-33	BOOSTER STATION NO. 3 PLANS

SHEET NO.	DESCRIPTION
34-38	BOOSTER STATION NO. 4 PLANS
39	14,000 GALLON GROUND STORAGE TANK ORIENTATION DETAILS
40	14,000 GALLON GROUND STORAGE TANK DETAILS
41	BOOSTER PUMP AND DISCHARGE ASSEMBLY DETAILS
42	14,000 GALLON GROUND STORAGE TANK DETAILS
43	BOOSTER STATION GENERATOR FOUNDATION DETAILS
44	BOOSTER STATION ELECTRICAL DETAILS (1 OF 2)
45	BOOSTER STATION ELECTRICAL DETAILS (2 OF 2)
46	BOOSTER STATIONS - ARCHIVE DRAWINGS
47	MISCELLANEOUS TANK DETAILS
48	MISCELLANEOUS SITE DETAILS
49	PAVEMENT DETAILS
50-54	STANDARD WATER DETAILS
55	FENCE DETAILS
56	STORM WATER POLLUTION PREVENTION PLAN
57-58	STORM WATER POLLUTION PREVENTION DETAILS

P.A.E. Job No. 12641, Drawing No. 14645, dated October 2025.

1.3 Drawings and Specifications Issued to Successful Bidder: The successful Bidder for this Contract will be furnished four (4) complete sets of Drawings and Specifications at no cost. If, during the prosecution of the work the CONTRACTOR should deem it necessary to have additional sets of Drawings and Specifications they may be purchased from the ENGINEER at the cost of reproduction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 The WORK shall conform to the Drawings and Specifications prepared by the ENGINEER. The WORK shall conform to such other Drawings relating to the project as may be exhibited by the OWNER and the ENGINEER prior to the opening of proposal and which are included with the above Drawings and Specifications for the CONTRACTOR'S use in making his bid. The WORK shall also conform to such Drawings and Specifications as may be furnished from time to time during construction, including changes of detail as the ENGINEER may consider necessary because of conditions that are found to exist during construction.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01012

BUILDING PERMITS

PART 1 - GENERAL

1.1 Scope: This Section describes the requirements for acquiring building permits for this project.

1.2 General: Building Permits will be required for construction of this project. The CONTRACTOR shall acquire all building permits and shall pay all fees related to permit fees, inspections, etc. prior to beginning work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 Catahoula Parish Building Permit: The CONTRACTOR shall ensure that all work is permitted through the Catahoula Parish Police Jury Office. The contact information for the Catahoula Parish Police Jury Office is as follows:

Catahoula Parish Police Jury Office

Ms. Ashley Lazarus
301 Bushley Street, Room 104
Harrisonburg, Louisiana 71340
Phone: 318-744-5435
Email: accountspayable@catahoulappj.org

3.2 LaSalle Parish Building Permit: The CONTRACTOR shall ensure that all work is permitted through the LaSalle Parish 911 Office. The contact information for the LaSalle Parish LaSalle Parish 911 Office is as follows:

LaSalle Parish 911 Office

Ms. Ann Breland
1050 Courthouse Street
Jena, Louisiana 71342
Phone: 318-992-7306
Email: lasalleparish911@gmail.com

PART 4 - MEASUREMENT AND PAYMENT

4.1 Building Permit:

A. Method of Measurement: Building Permit, completed and accepted as specified, shall be measured per Lump Sum job.

B. Payment: Building Permit, measured as provided above, will be paid at the Contract Lump Sum price.

C. Pay Item: Payment will be made under Building Permit (01012) per Lump Sum Job.

- END OF SECTION -

SECTION 01013**PERMANENT UTILITY SERVICE CONNECTIONS**PART 1 - GENERAL

1.1 Scope: This Section describes the requirements for acquiring permanent utility service connections for this project.

PART 2 - PRODUCTS (NOT USED)PART 3 - EXECUTION

3.1 General: The Contractor shall make all arrangements for obtaining permanent utility service connections. All costs related to development of service, accounts, deposits, fees, transfer of billing from Contractor to Owner, etc. shall be borne by the Contractor.

3.2 Water: The Contractor shall acquire potable water service from the Public Water System(s) serving the project sites. The CONTRACTOR is responsible for coordinating with the Systems to ensure a complete operational system. Contact information for the Public Water Systems serving the project areas are as follows:

1. Nebo Water System
119 Pine Street, Suite C
Harrisonburg, LA 71340
318-744-0308

3.3 Power: The Contractor shall acquire electrical service from Concordia Electric Cooperative. The CONTRACTOR is responsible for coordinating with Concordia Electric Cooperative to ensure a complete operational system.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01015

GENERAL CONDUCT OF WORK

PART 1 - GENERAL

1.1 Scope: This Section generally describes the manner in which work shall be conducted.

1.2 Coordination of Work: The CONTRACTOR shall be responsible for the coordination of all work so that the project can be completed within the time stipulated in the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 Handling and Storage:

A. The CONTRACTOR shall, at his own expense, handle, haul, and distribute all materials and all surplus materials for the different portions of the work, as necessary. He shall provide suitable and adequate storage room for materials and equipment during the progress of the work and be responsible for loss, or damage to, materials and equipment furnished by him, until the final acceptance of work.

B. All excavated materials, construction equipment, materials and equipment to be incorporated in the work shall be placed so as not to injure the work and so that free access can be had at all times to all parts of the work and to all public utility installations in the vicinity of the work.

C. Storage charges and demurrage charges by transportation companies and vendors, which result from delays in handling, shall be borne by the CONTRACTOR.

3.2 Work on State Highways and Rights-of-Way: LDOTD project permits will be acquired for this project by the OWNER and will be distributed to the CONTRACTOR at the preconstruction conference. The CONTRACTOR shall comply with all provisions of the permits. The CONTRACTOR shall contact DOTD forty-eight (48) hours prior to beginning work.

3.3 Work within Catahoula Parish Right-of-Way: The CONTRACTOR shall ensure that all work conducted within Catahoula Parish right-of-way is permitted through the Catahoula Parish Police Jury Office. The contact information for the Catahoula Parish Police Jury Office is as follows:

Catahoula Parish Police Jury Office

Ms. Ashley Lazarus
301 Bushley Street, Room 104
Harrisonburg, Louisiana 71340
Phone: 318-744-5435
Email: accountspayable@catahoulappj.org

The CONTRACTOR shall comply with all provisions of the permits. The CONTRACTOR shall contact the Catahoula Parish Police Jury forty-eight (48) hours prior to beginning work. The contact information for the Catahoula Parish Police Jury is as follows:

Catahoula Parish Police Jury

301 Bushley Street, Room 104
Harrisonburg, Louisiana 71340
Phone: 318-744-5435
Email: accountspayable@catahoulappj.org

3.4 Work on Railroad Rights-of-Way: NONE REQUIRED THIS PROJECT

3.5 Work on Gas Line Rights-of-Way: NONE REQUIRED THIS PROJECT

3.6 Sequence of Work: The WORK shall be carried on in such a manner and in a sequence designed so that work performed during each day shall be cleaned and neatly dressed at the end of that day. The WORK in any one area will be carried out so that interruption or access to and from homes and businesses will be minimized; and so that access to the area for pedestrians, fire protection and other vital services can be maintained at least on a limited basis. The OWNER may order a change in the sequence of the work if it is found that the circumstance of the construction operation, a section of the public or private thoroughfare will be blocked off or unduly inconvenienced. The CONTRACTOR will not be allowed to obstruct private driveways or approaches or to dig up or occupy public streets and highways with the materials more than is absolutely necessary for the prosecution of the work.

3.7 Layout of Work: The CONTRACTOR shall lay out his work and shall be responsible for all measurements in connection therewith. All detailed construction surveys and aids such as cut stakes, batter boards, etc., shall be developed or provided by the CONTRACTOR. The CONTRACTOR shall verify all grades, lines, levels and dimensions shown on the Drawings or Specifications and report any errors or inconsistencies to the ENGINEER before commencing work.

3.8 Existing Utilities: See Specification Section 01016 - PROTECTION OF EXISTING UTILITIES.

3.9 Private Property: The CONTRACTOR will at no time use or occupy private property which falls outside of the rights-of-way or servitudes without obtaining authority independently from respective owners. CONTRACTOR shall remove all trash, debris, spoil, etc. that may be left or result from construction and shall not dispose of or leave said material on private property in the general vicinity of the project.

3.10 Preservation of Fences and Existing Vegetation: The CONTRACTOR will preserve and protect all fences and existing vegetation such as trees, shrubs, and grass on or adjacent to the site which do not unreasonably interfere with the construction as may be determined by the ENGINEER. The CONTRACTOR will be responsible for all unauthorized cutting or damaging of fences and trees and shrubs, including damage due to careless operation of equipment. Care will be taken by the CONTRACTOR in cutting fences and in falling trees authorized for removal to avoid any unnecessary damage to fences and vegetation that are to remain in place. Any limbs or branches of trees broken during such operations shall be trimmed with a clean cut and painted with an approved tree pruning compound if required by the ENGINEER. The CONTRACTOR will be liable for and will be required to replace or restore at his own expense all fences and vegetation not protected and preserved as required herein that may be destroyed or damaged. In residential areas, lawns shall be excavated only after the sod or turf has been carefully removed before commencement of trenching operations. Sod or turf will be wetted as required and stored until backfill is complete. Upon completion of backfill the turf and fences shall be replaced in a strictly neat and workmanlike manner, and lawn areas shall be restored as near as possible to their original condition prior to excavation.

3.11 Removal of Ground Water: Any pumping or bailing required to construct the WORK will be done at no extra cost to the OWNER.

3.12 OSHA Requirements: The CONTRACTOR shall comply with all Occupational Safety and Health Administration (OSHA) requirements.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Utility Permit:

A. Method of Measurement: Utility Permit, completed and accepted as specified, shall be measured per Lump Sum job.

B. Payment: Utility Permit, measured as provided above, will be paid at the Contract Lump Sum price.

C. Pay Item: Payment will be made under Utility Permit (01015) per Lump Sum Job.

- END OF SECTION -

SECTION 01016**PROTECTION OF EXISTING UTILITIES**PART 1 - GENERAL

1.1 Scope: This Section describes the work required to allow for the location and protection of existing underground utilities in the project work area.

1.2 General: The locations of existing underground utilities shown on the Drawings are approximate. The location of the existing utilities shown on the Drawings have, in part, been determined by information compiled and furnished by others.

PART 2 - PRODUCTS (NOT USED)PART 3 - EXECUTION

3.1 General: It shall be the responsibility of the CONTRACTOR to locate all underground utilities that may conflict with the proposed work. The CONTRACTOR shall be responsible for repairing all damage to underground utilities as a result of construction activities, at no cost to the OWNER. The CONTRACTOR shall contact Louisiana One Call by phone at 1-800-272-3020 so that those utilities who participate in the Louisiana Once Call System may mark the field locations of their underground facilities. CONTRACTOR shall also contact owners of other underground facilities that may be affected for information as to their location.

3.2 Existing Utilities: The WORK will be located in the vicinity of existing water, sewer, gas, telephone and electric lines. The CONTRACTOR shall handle his work in a manner so as not to damage the existing utilities. The CONTRACTOR shall support by shoring, ties, or other means, the existing lines as necessary to prevent damage to them; and shall be responsible for any damage his work does to them. The CONTRACTOR shall repair or pay for any repairs to them occasioned by damage done to them by his work. The CONTRACTOR shall notify the proper office when his work is near their facilities so that they may send persons to advise about the work which may affect their facilities. It will be the CONTRACTOR'S responsibility to locate the utilities in advance of his work, and plan his work ahead so as to best carry on his work in a manner to insure no damage to the existing facilities.

3.3 Owner's Utilities: The Nebo Water System cannot accurately identify the exact location of its utility mains or services. The existing infrastructure is not equipped with locator wire. The CONTRACTOR should anticipate that conflicts with existing water and sewer mains will occur. As such, the CONTRACTOR should include in his base bid, any and all costs related to these conflicts including down time, lack of production, repair costs, disinfection costs, etc.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01030**SPECIAL PROJECT PROCEDURES**PART 1 - GENERAL

1.1 Scope: This section covers procedures which are special or specific to this project.

1.2 Workmanship, Material and Equipment:

A. When a particular product is specified or called for, it is intended and shall be understood that the CONTRACTOR include those products in his Bid. Should the CONTRACTOR desire to substitute products which he purports to be equal to those specified, the CONTRACTOR shall furnish information as described in the General Conditions and Instruction to Bidders. The alternative 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. 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.

1.3 Relocations: The CONTRACTOR shall be responsible for the relocation of structures, including, but not limited to, light poles, signs, sign poles, fences, piping, conduits and drains that interfere with the positioning of the work as set out on the Drawings. The cost of all such relocations shall be included in the bid unless a specific pay item is established on the Bid Form for a particular item of work.

1.4 Salvage: See Specification 02202 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS for salvageable material. The CONTRACTOR shall remove and deliver the designated equipment to the OWNER at a location directed by the ENGINEER. All equipment removed by the CONTRACTOR and NOT designated as salvage by the ENGINEER shall be properly disposed of by the CONTRACTOR.

1.5 Hazardous Locations:

A. In operations near natural gas mains, the CONTRACTOR shall use spark-proof tools and explosion-proof temporary lighting and shall not use electric power tools, open flame devices, electric welding or any device or methods which might conceivably cause ignition or explosion.

B. If a working area atmosphere is unsafe, the CONTRACTOR shall furnish, install, operate and later remove such temporary auxiliary ventilating facilities as are necessary to provide a safe atmosphere.

C. The CONTRACTOR also shall instruct and caution his employees and the employees of his subcontractors to avoid smoking while in the hazardous areas. Suitable prominent "NO SMOKING" signs shall be placed at locations where natural gas could be present.

1.6 Operating Requirements for Existing Water Mains: During construction of the new water mains, the OWNER'S operators will be responsible for operating and maintaining the existing water mains. The CONTRACTOR is required to have the new water mains in complete working order including pressure tests, approved bacteriological samples etc., prior to transferring service from the existing mains to the new mains. After the new water mains have been adequately pressure tested and a negative bacteriological sample has been received from the water mains, the CONTRACTOR may transfer service from the existing mains to the new mains and begin abandonment of the existing mains.

1.7 Operating Requirements for Existing Sewer Mains: During construction of the new sewer mains, the OWNER'S operators will be responsible for operating and maintaining the existing sewer mains. The CONTRACTOR is required to have the new sewer mains in complete working order including pressure tests, etc., prior to transferring service from the existing mains to the new mains. After the new sewer mains have been adequately tested and approved, the CONTRACTOR may transfer service from the existing mains to the new mains and begin abandonment of the existing mains.

1.8 Notification of Work on Existing Facilities: Before commencing work on any of the existing structures or equipment, the CONTRACTOR shall notify the ENGINEER at least three (3) calendar days in advance of the date he proposes to commence such work.

1.9 Coordination With Other Contractors: The CONTRACTOR is notified that other work may be conducted simultaneously by other Contractors in the project area during the Contract Time. The CONTRACTOR shall be responsible for coordination of work with other Contractors or trades to ensure completion of the project within the established Contract Time. The CONTRACTOR may, at times, be required to suspend ongoing work to repair damage inflicted on the water, sewer and/or natural gas systems by other Contractors or trades. This repair work shall be paid for at a negotiated price.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

- END OF SECTION-

SECTION 01090**ABBREVIATIONS**PART 1 - GENERAL

1.1 Scope: To identify abbreviations and acronyms used in Contract Documents as referenced standards.

1.2 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: Use the publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified. The revision in effect on the date of Contract Documents will be deemed the necessary and proper standard.

1.3 Abbreviations, Names, and Addresses of Organizations:

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.

B. Abbreviation used in these Contract Documents shall refer to and designate the following:

ABBREVIATION	NAME AND ADDRESS	PHONE FAX WEB OR E-MAIL
AA	Aluminum Association 900 19 th Street N.W., Suite 300 Washington, DC 20006	202-862-5100 202-862-5164 www.aluminum.org
AABC	Associate Air Balance Council 1518 K Street NW, Suite 503 Washington, DC 20005	202-737-0202 202-738-4833 aabchq@aol.com
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol St., N.W., Suite 249 Washington, DC 20001	202-624-5800 202-624-5806 aashto.aashto.org

ACI	American Concrete Institute P.O. Box 9094 Farmington Hills, MI 48333	248-848-3700 www.aci-int.net
ACPA	American Concrete Pipe Association 222 W. Las Colinas Boulevard, Suite 641 Irving, TX 75039-5423	972-506-7216 972-506-7682 www.concrete-pipe.org
ADA	Air Diffusion Council 104 S. Michigan Avenue, Suite 1500 Chicago, IL 60603	312-201-0101 312-201-0214 www.flexibleduct.org
AF&PA	American Forest & Paper Association 1111 19 th Street, Suite 800, N.W. Washington, DC 20036	202-463-2700 202-463-2785 info@afandpa.org
AGC	Associated General Contractors of American 333 John Carlyle Street, Suite 200 Alexandria, VA 22314	703-548-3318 703-548-3119 www.agc.org
AGMA	American Gear Manufacturers Association 1500 King Street, Suite 201 Alexandria, VA 22314	703-684-0211 703-684-0242 www.agma.org
AI	Asphalt Institute Research Park Drive P.O. Box 14052 Lexington, KY 40512-4052	606-288-4960 606-288-4999 www.asphaltinstitute.org
AIA	American Institute of Architects 1735 New York Avenue, N.W. Washington, DC 20006	202-626-7300 202-626-7587 www.aiaonline.com
AISC	American Institute of Steel Construction One East Wacker Drive, Suite 3100 Chicago, IL 60601	312-670-2400 312-670-5403 www.aisc.org
AISI	American Iron & Steel Institute 1101 17 th Street, NW, Suite 1300 Washington, DC 20036	202-452-7100 202-463-6573 www.steel.org
AITC	American Institute of Timber Construction 7012 S. Revere Parkway, Suite 140 Englewood, CO 80112	303-792-9559 303-792-0669 www.aitc-glulam.org

AMCA	Air Movement and Control Association International, Inc. 30 West University Drive Arlington Heights, IL 60004-1893	847-394-0150 847-253-0088 www.amca.org
ANLA	American Nurserymen & Landscape Association 1250 I Street N.W. Washington, DC 20005	202-789-2900 202-789-2900 www.anla.org
ANSI	American National Standards Institute 11 West 42 nd Street New York, NY 10036	212-642-4900 212-398-0023 www.ansi.org
APA	APA - The Engineered Wood Association P.O. Box 11700 Tacoma, WA 98411-0700	253-565-6600 253-565-7265 www.apawood.org
ARI	Air-Conditioning & Refrigeration Institute 4301 N. Fairfax Drive, Suite 425 Arlington, VA 22203	703-524-8800 703-528-3816 www.ari.org
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191-4400	800-548-2723 703-295-6222 www.asce.org
ASHRAE	American Society of Heating, Refrigerating & Air Conditioning Engineers 1791 Tullie Circle, N.E. Atlanta, GA 30329	800-527-4723 404-321-5478 www.ashrae.org
ASME	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-5990	212-591-7722 212-591-7674 www.asme.org
ASPA	American Sod Producers Association 1855-A Hicks Road Rolling Meadows, IL 60008	
ASTM	American Society for Testing & Materials 100 Barr Harbor Drive W. Conshohocken, PA 19428	610-832-9500 610-832-9555 www.astm.org

AWI	Architectural Woodwork Institute 1952 Isaac Newton Square West Reston, VA 20190	703-733-0600 703-733-0584 www.awinet.org
AWPA	American Wood Preservers' Association P.O. Box 5690 Granbury, TX 76049-0690	817-326-6300 817-326-6306 www.awpa.com
AWS	American Welding Society 550 Lejeune Road NW Miami, FL 33135	800-443-9353 305-443-7559 www.aws.org
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235	303-794-7711 303-794-8735 www.awwa.org
BIA	Brick Institute of America 11490 Commerce Park Drive Reston, VA 22091	703-620-0010 703-620-3928 www.bia.org
CDA	Copper Development Association, Inc. 260 Madison Avenue New York, NY 10016	212-251-7200 212-251-7234 www.copper.org
CLFMI	Chain Link Fence Manufacturers Institute 9891 Broken Land Parkway, Suite 300 Columbia, MD 21046	301-596-2583 301-596-2594 www.chainlinkinfo.org
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Road Schaumburg, IL 60173-4758	847-517-1200 847-517-1206 www.crsi.org
CSI	Construction Specifications Institute 99 Canal Plaza, Suite 300 Alexandria, VA 22314	800-689-2900 703-684-0465 www.csinet.org
CSSB	Cedar Shake & Shingle Bureau P.O. Box 1178 Sumas, WA 98295	604-462-8961 604-462-9386 www.cedarbureau.org
DHI	Door & Hardware Institute 14150 Newbrook Drive, Suite 200 Chantilly, VA 20151	703-222-2010 703-222-2410 www.dhi.org

DIPRA	Ductile Iron Pipe Research Association 245 Rivercase Parkway, E., Suite 0 Birmingham, AL 35244	205-402-8700 205-402-8730 www.dipra.com
EJCDC	Engineers' Joint Contract Documents Committee American Consulting Engineers Council 1015 15 th Street, N.W. #802 Washington, DC 20005-2279	202-347-7474 202-898-0068 www.acec.telebuild.com/ contracts
FGMA	Flat Glass Marketing Association 3310 SW Harrison Street Topeka, KS 66611-2279	
FM Global	FM Global - Corporate Headquarters P.O. Box 7500 Johnston, RI 02919	888-216-9322 888-216-9326 www.fmglobal.com
GSA	GSA, Federal Supply Service Specification Section 470 East L'Enfant Plaza, S.W., Suite 8100 Washington, DC 20407	202-619-8925 202-619-8978
Gypsum	Gypsum Association 810 First, NE #510 Washington, DC 20002	202-289-5440 202-289-3707 www.gypsum.org
ICBO	International Conference of Building Officials 5360 Workman Mill Road Whittier, CA 90601	562-699-0541 562-692-3853 www.icbo.org
IEEE	Institute of Electrical & Electronics Engineers 445 Hoes Lane Piscataway, NJ 08901	800-678-4333 732-981-9667 www.ieee.org
IMIAC	International Masonry Industry All-Weather Council - International Masonry Institute The James Brice House 42 East Street Annapolis, MD 21401	301-280-1302 301-261-2855 www.imiweb.org
LDOTD	Louisiana Department of Transportation and Development P.O. Box 94245 Baton Rouge, LA 70804-9245	225-379-1100 www.dotd.state.la.us

MBMA	Metal Building Manufacturer's Association 1300 Sumner Avenue Cleveland, OH 44115-2851	216-241-7333 216-241-0105 www.mbma.com
MFMA	Maple Flooring Manufacturer's Association 60 Rivere Drive Northbrook, IL 60062	847-480-9138 847-480-9282 www.maplefloor.org
MIL	Military Specification Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120	215-697-3321 or 697-4834
ML/SFA	Metal Lath/Steel Framing Association 11 S. La Salle Street #1400 Chicago, IL 60603-1210	
NAAMM	National Association of Architectural Metal Manufacturers 600 S. Federal Street, Suite 400 Chicago, IL 60605	
NCMA	National Concrete Masonry Association 2302 Horse Pen Road Herndon, VA 20171-3499	703-713-1900 703-713-1910 www.ncma.org
NCSCI	National Center for Standards & Certification Information National Institute of Standards & Technology 100 Bureau Drive, Stop 2150 Gaithersburg, MD 20899-2150	301-975-4040 310-926-1559 ncsci@nist.gov
NEBB	National Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MA 20877	301-977-3698 301-977-9589 www.nebb.org
NEMA	National Electrical Manufacturer's Association 1300 North 17 th Street, Suite 1847 Rosslyn, VA 22209	703-841-3200 703-841-3300 www.nema.org
NFPA	National Fire Protection Association 1 Battery March Park Quincy, MA 02269	617-770-3000 617-770-0700 www.nfpa.org
NSPE	National Society of Professional	703-684-2800

	Engineers 1420 King Street Alexandria, VA 22314-2794	703-836-4875 www.nspe.org
NSWMA	National Solid Wastes Management Association 4301 Connecticut Avenue NW, Suite 300 Washington, DC 20008	202-244-4700 202-966-4841 www.envasns.org/ns wma
NTMA	National Terrazzo and Mosaic Association 110 East Market Street, Suite 200A Leesburg, VA 20176	800-323-9736 703-779-1026 www.ntma.com
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077	800-868-6733 847-966-9666 www.portcement.org
PCI	Precast/Prestressed Concrete Institute 209 W. Jackson Boulevard Chicago, IL 60606-6938	312-786-0300 312-786-0353 www.pci.org
RCSHSB	Red Cedar Shingle and Handsplit Shake Bureau 515 116 th Avenue Bellevue, WA 98004	
RIS	Redwood Inspection Service 405 Enfrente Drive, Suite 200 Novato, CA 94949	415-382-0662 415-382-8531 www.calredwood.org
SDI	Steel Door Institute 30200 Detroit Road Cleveland, OH 44145-1967	440-899-0010 440-892-1404 www.steeldoor.org
SDI	Steel Deck Institute P.O. Box 25 Fox River Grove, IL 60021-0025	847-462-1930 847-462-1940 www.sdi.org
SIGMA	Sealed Insulating Glass Manufacturers Association 401 N. Michigan Avenue Chicago, IL 60611	312-644-6610 312-527-6783 www.sigmaonline.org
SJI	Steel Joist Institute 3127 10 th Avenue, North Ext. Myrtle Beach, SC 29577-6760	843-626-1995 843-626-5565 www.steeljoist.org
SMACNA	Sheet Metal & Air Conditioning Contractors National Association 4201 Lafayette Center Drive Chantilly, VA 20151-1209	703-803-2980 703-803-3732 www.smacna.org

SSPC	Steel Structures Painting Council 40 24 th Street 6 th Floor Pittsburgh, PA 15222-4656	412-281-2331 412-281-9992 www.sspc.org
TCA	Tile Council of America, Inc. 100 Clemson Research Boulevard Anderson, SC 29625	864-646-8453 864-646-2821 www.tileusa.com
UL	Underwriter's Laboratories, Inc. 333 Pfingsten Road Northbrook, IL 60062-2096	847-272-8800 847-272-8129 www.ul.com
UNI-BELL	Uni-Bell PVC Pipe Association 2655 Villa Creek Drive #155 Dallas, TX 75234	972-243-3902 972-243-3907 unibell@aol.com
WCLIB	West Coast Lumber Inspection Bureau 6980 SW Varns Road, Box 23145 Portland, OR 97223	503-639-0651 503-684-8928 www.wclib.org
WWPA	Western Wood Products Association 522 SW Fifth Avenue, Suite 500 Portland, OR 97204-2122	503-224-3930 503-224-3934 www.wwpa.org

PART 2 - PRODUCTS (NOT USED)PART 3 - EXECUTION (NOT USED)PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01150MEASUREMENT AND PAYMENTPART 1 - GENERAL1.1 Scope:

A. The Bid Items are defined in Part 4 - Measurement and Payment of the individual Sections of the Specifications.

B. The contract prices included in the bid form will be full compensation for all labor, materials, tools, equipment and incidentals necessary to complete the item as shown on the Drawings and/or as described in the Specifications to be performed under this contract. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction. Payment for the actual quantities at the unit price bid will constitute full compensation for all work to be performed under this contract.

PART 2 - PRODUCTS (NOT USED)PART 3 - EXECUTION

3.1 Work Not Listed as a Bid Item: Work not listed as a Bid Item will not be paid for separately; it will be considered as a subsidiary obligation of the Contract and paid under other contract items.

3.2 Unit Price Work and Bid Form Abbreviations:

A. The Work will be measured by units listed in the Bid Form and payment will be made for the actual quantity constructed whether more or less than the estimated quantities listed therein, and payment will be made at the unit price quoted in the Bid Form multiplied by the actual quantity of units constructed.

B. The term L.F. means linear foot, S.Y. means square yard, C.Y. means cubic yard, Mfbm means thousand foot, board measure, C.F. means cubic feet, gal. means gallon.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01300**CONSTRUCTION PROGRESS AND SCHEDULES**PART 1 - GENERAL

1.1 Scope: This Section covers the establishment of a Pre-Construction Conference to discuss matters relating to the construction of the project prior to actual construction.

1.2 Pre-Construction Conference:

A. Prior to issuance of the Notice to Proceed for the work, a conference will be held to review the proposed construction schedule, to establish procedures for handling vendor drawings and other submissions, for processing applications for payment and to establish a working understanding between the parties as to the project.

B. Present at the Pre-Construction Conference will be the ENGINEER, the ENGINEER'S Project Representative, the CONTRACTOR and his Superintendent, and a Representative of the OWNER.

C. Submission of a detailed schedule indicating starting and completion dates of various stages of the work shall be prepared in accordance with Paragraph 2.6 and 2.9 of the General Conditions of the Construction Contract. This progress schedule shall be approved by the ENGINEER prior to beginning work.

1.3 Submittals: CONTRACTOR shall submit the detailed schedule, prepared in accordance with Paragraphs 2.6 and 2.9 of the General Conditions, indicating starting and completion dates of the various stages of the work.

1.4 Notice to Proceed: The OWNER will submit to the CONTRACTOR a written Notice to Proceed, stating a date on which the CONTRACTOR shall start the work. Contract time shall commence on the date specified in the Notice to Proceed.

PART 2 - PRODUCTS (NOT USED)PART 3 - EXECUTION (NOT USED)PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01331**CONSTRUCTION LAYOUT**PART 1 - GENERAL

1.1 Scope: This Section covers the extent of survey data that will be available to the CONTRACTOR during the project and the requirements for construction layout.

1.2 Project Survey Requirements for Installations Within Apparent Rights-of-Way: The CONTRACTOR shall be responsible for determining the actual or "apparent" rights-of-way of the D.O.T.D. maintained routes and the Parish maintained routes. The CONTRACTOR shall be responsible for installing the improvements within the distances from the rights-of-way, property lines or baselines as shown on the Drawings, using public records of filing plats, fences, and other monument locations.

1.3 Project Survey Requirements for Installations Within LDOTD Rights-of-Way:

A. The CONTRACTOR shall provide a Louisiana registered land surveyor to determine and stake the location of the LDOTD rights-of-way prior to construction.

B. The CONTRACTOR shall provide the distance from the highway centerline to the new utility at 100 foot intervals. The CONTRACTOR shall provide top of pipe elevations on the new utility at 100 foot intervals. New mains and service lines crossing the roadways shall be identified and recorded by pipe size, pipe type and distance to nearest intersection. Additionally, the top of pipe elevation of the new mains and service lines crossing existing roadways shall be determined and recorded on both sides of the roadway.

C. The above noted information shall be certified by the land surveyor as to correctness and completeness with a tabulation of elevation locations by station or by notations on a set of Project blueline Drawings noted as "Record Drawings".

1.4 Submittal: Submit marked "Record Drawings" in accordance with Section 01720 – Record Drawings.

1.5 Referenced Standard: Conform to the following sections of the State of Louisiana, Department of Transportation and Development, "Standard Specifications of Roads and Bridges", 2006 Edition, except as modified herein: Section 740 - Construction Layout.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 Description: The work consists of establishing lines and grades, taking all cross sections, and staking out the construction work in accordance with these specifications, plan details, and as directed. This work also includes but is not limited to, the layout of pavement striping and raised pavement markers, setting of line and grade for construction of superelevated curves or other applicable work items, and providing assistance in the coordination of utility relocation activities to ensure that placement of relocated facilities will not conflict with required construction.

3.2 Surveying Personnel: The CONTRACTOR shall employ qualified engineering and surveying personnel experienced in layout and construction to correctly establish and keep complete records (field books) of all lines and grades necessary from initial layout to final acceptance.

3.3 Construction Requirements:

A. The CONTRACTOR is responsible for all horizontal and vertical control. Reference marks for horizontal and vertical control are shown on the Drawings. The CONTRACTOR shall establish all lines and grades and stake out all the work on this project.

B. The contractor shall employ such methods as approved by the ENGINEER for the location of the project alignment & other necessary survey control points in accordance currently acceptable surveying standards and practices. The accuracy of any method of staking shall be the responsibility of the CONTRACTOR.

C. The CONTRACTOR shall be liable for the accuracy of the initial layout and all subsequent alignment and elevations and shall, at no additional pay, rebuild, repair or make good any portion of the work found to be incorrectly positioned either horizontally or vertically at any time before final acceptance. The CONTRACTOR shall notify the ENGINEER immediately of any apparent errors in the plans. The CONTRACTOR shall compute and provide template grades to the ENGINEER, where applicable.

D. All construction survey and aids such as construction stakes, batter boards, etc. shall be developed or provided by the CONTRACTOR. The CONTRACTOR shall be responsible for installing the improvements within the distances from the rights-of-way, property lines or baselines as shown on the Drawings. The CONTRACTOR shall be responsible for the preservation of all stakes and marks. If any stakes are disturbed, the CONTRACTOR shall not proceed with work until he has reestablished such points, marks, lines and elevations as may be necessary for the prosecution of the work. The reference marks shall be replaced at the CONTRACTOR'S expense if damaged or destroyed.

E. The CONTRACTOR shall make measurements and check all dimensions necessary for the proper construction of the work. During the prosecution of the work, he shall make all necessary measurements to prevent misfitting in said work, and he shall be responsible thereof, and for the accurate construction of the work.

F. Where the dimensions and locations of existing structures are of critical importance in the installation or connection of new work, the CONTRACTOR shall verify such dimensions and locations in the field before the fabrication of any material or equipment which is dependent on the correctness of such information.

G. Numbered notebooks for recording of all lines and grades will be provided by the CONTRACTOR. The CONTRACTOR shall keep complete and comprehensive notebook records of all lines and grades necessary from initial layout to final acceptance. Computer generated printouts will be allowed when approved by the ENGINEER. All CONTRACTOR notebooks, field books, computer generated printouts, etc. shall be given to the ENGINEER, when requested.

H. The CONTRACTOR shall be responsible for installing the improvements to the grades and alignment and within the sites as shown on the Drawings.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Measurement: Measurement for partial payment for Construction Layout will be made in accordance with the following schedule.

Total Contract Amount Earned	Allowable Lump Sum Payment
Staffed	25%
25%	50%
50%	80%
75%	95%
100%	100%

4.2 Payment: Construction Layout will be paid at the Contract Lump Sum Price in accordance with the table in Part 4.1A, which price and payment shall constitute full compensation for furnishing all survey and layout work in accordance with the Drawings and Specifications.

4.3 Pay Item: Payment will be made under Construction Layout (01331) per Lump Sum for the job.

- END OF SECTION -

SECTION 01340**SHOP DRAWINGS, SAMPLES AND PRODUCT DATA**PART 1 - GENERAL

1.1 Scope: This Section covers the submission and approval of shop drawings, samples, and other relevant product data.

1.2 Materials: Unless otherwise indicated on the Drawings or specified, only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by the CONTRACTOR to be incorporated in the work shall be subject to the inspection and approval of the ENGINEER. No material shall be processed for, fabricated for, or delivered to the work without prior approval of the ENGINEER.

1.3 Submission Schedule: The CONTRACTOR shall submit data relating to the materials and equipment he proposes to incorporate into the work, in sufficient detail to enable the ENGINEER to identify the particular product in question and to form an opinion as to its conformity to the contract requirements. Such data shall be submitted in a manner similar to that specified for shop drawings.

1.4 Samples:

A. If the OWNER so requires, either prior to beginning or during the progress of the work, 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, including concrete test cylinders, shall be furnished, taken, stored, packed, and shipped as directed, at the expense of the OWNER. Except as otherwise specified, the OWNER shall make arrangements for, and pay for, the tests. Any subsequent tests required due to failure of samples to meet specifications shall be at the expense of the CONTRACTOR.

B. When required, the CONTRACTOR shall furnish to the OWNER triplicate sworn copies of manufacturer's shop or mill test (or reports from independent testing laboratories) relative to materials, equipment performance ratings and concrete data.

C. After approval of the samples, data, etc. the materials and equipment used on the work shall correspond therewith.

1.5 Shop Drawings/Submittals:

A. The CONTRACTOR shall submit for approval five (5) print copies of shop drawings of materials fabricated especially for this contract, and of equipment and materials of which such drawings are specifically requested. Two (2) copies will be returned to the CONTRACTOR.

- B. Such drawings shall show the principal dimensions, weight, structural and operating features, performance characteristics and wiring diagrams, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawings. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for this contract.
- C. When so specified or if considered by the ENGINEER to be acceptable, manufacturer's specifications, catalog data, descriptive matter, illustrations, etc. may be submitted for approval in place of shop drawings. In such case the requirements shall be as specified for shop drawings, insofar as applicable.
- D. No material shall be purchased or fabricated especially for this contract until the requirement shop drawings have been submitted and reviewed as conforming to the contract requirements. All materials and work involved in the construction shall then be as represented by said drawings.
- E. Prior to submitting shop drawings to the OWNER, the CONTRACTOR shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the drawings and specifications in all respects.
- F. The ENGINEER'S review of shop drawings will follow a general check made to ascertain conformance with the design concept and functional result of the project and compliance with the information given in the contract documents. The CONTRACTOR shall be responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication processes or to techniques of construction; and for coordination of the work of all trades.
- G. The CONTRACTOR shall make any corrections required by the ENGINEER and shall return the required number of corrected copies of shop drawings. The CONTRACTOR shall resubmit shop drawings until approved.
- H. At the time of each submission or resubmission, the CONTRACTOR shall direct specific attention, in writing, to deviations that the shop drawings or samples may have from the requirements of the contract documents or corrections required by the OWNER on previous submissions.
- I. The ENGINEER'S approval of shop drawings and samples shall not relieve the CONTRACTOR from his responsibility for any deviations from the requirements of the contract documents, unless the ENGINEER has been notified, in writing, and has given his written approval to such deviation, nor shall any approval by the ENGINEER relieve the CONTRACTOR from responsibility for errors and omissions in shop drawings.
- 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). Resubmittals or confirming material shall be assigned a letter next to the submittal number, i.e., A - second submittal, B - third submittal, etc.

L. Resubmittals 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.

M. 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.

1.6 Record Documents: Refer to Section 01720 - RECORD DRAWINGS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01400**MOBILIZATION**PART 1 - GENERAL

1.1 Scope: This work consists of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the project site; the establishment of all offices, building, and other facilities necessary for work on the project and the costs of bonds and any required insurance, and any other pre-construction expense necessary for the start of the WORK excluding the cost of construction materials.

1.2 Mobilization Bid Amount: Mobilization bid cost shall not exceed five percent (5%) of the total bid amount including this bid item.

PART 2 - PRODUCTS (NOT USED)PART 3 - EXECUTION (NOT USED)PART 4 - MEASUREMENT AND PAYMENT4.1 Mobilization:

A. Method of Measurement: Measurement for partial payment for mobilization will be made in accordance with the following schedule, based upon the lump sum bid to a maximum of five percent (5%) of the total base bid.

<u>% of Total Contract Amt. Earned</u>	<u>% of Lump Sum Price Paid</u>
1st Partial Estimate	25%
10%	50%
25%	75%
50%	100%

B. Payment: The lump sum price so bid will be paid and shall constitute full compensation for all preparatory work and operations, including, equipment, supplies and incidentals to the project site; the establishment of all offices, buildings and other facilities necessary for work on the project and the cost of bonds and any required insurance, and any other preconstruction expense necessary for the start of the WORK, excluding the cost of construction materials.

C. Pay Item: Payment will be made under Mobilization (Maximum Amount - 5% of Total Base Bid) (01400) per Lump Sum job.

- END OF SECTION -

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 Scope: This Section describes the Testing Laboratory Services to be included in this project.

1.2 Requirements: 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 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.

1.3 Limitations of Authority of Testing Laboratory: Laboratory is not authorized to:

A. Release, revoke, alter or enlarge on requirements of Contract Documents.

B. Approve or accept any portion of the WORK.

C. Perform any duties of the CONTRACTOR.

1.4 Contractor's Responsibilities:

A. Cooperate with laboratory personnel, provide access to WORK, 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 materials 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. 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 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01500**TEMPORARY FACILITIES**PART 1 - GENERAL

1.1 Scope: This section covers the installation of temporary facilities for the use of the CONTRACTOR during the construction project.

1.2 Precautions Against Weather: During adverse weather conditions and against the possibility thereof, the CONTRACTOR shall take all necessary precautions so that the work shall be properly done and be satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood and building paper shelter, or other approved means.

1.3 Potable Water: The CONTRACTOR shall make all necessary applications and arrangements and pay all fees and charges for any potable water service necessary for the proper completion of the work during its entire progress. The CONTRACTOR shall provide and pay for all temporary connections, meters, etc. Contact information for the Public Water Systems serving the project areas are as follows:

1. Nebo Water System
P.O. Box 624
Harrisonburg, Louisiana 71340
(318) 744-0308

1.4 Electrical Energy: The CONTRACTOR shall make all necessary applications and arrangements and pay all fees and charges for electrical energy for power and light necessary for the proper completion of the work during its entire progress. The CONTRACTOR shall provide and pay for all temporary wiring, switches, connections, and meters. There shall be sufficient electric lighting so that all work may be done in a workmanlike manner when there is not sufficient daylight.

1.5 Sanitary Facilities: The CONTRACTOR shall provide adequate sanitary conveniences for the use of those employed on the work. Such conveniences shall be made available when the first employees arrive on the work, shall be properly secluded from public observation, and shall be constructed and maintained in suitable numbers and at such points and in such manner as may be required or approved. The CONTRACTOR shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. He shall rigorously prohibit the committing of nuisances on the site of the work on the land of the OWNER, or on adjacent property.

PART 2 - PRODUCTS (NOT USED)PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01560**MAINTENANCE OF WORK SITE**PART 1 - GENERAL

1.1 Scope: This Section covers the general overall maintenance of the entire project site to assure the safety and protection of the CONTRACTOR'S employees, general public, materials incorporated into the project, and property within the project limits.

1.2 Safety and Protection:

A. CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. He shall take all necessary precautions for the safety of employees and the public, and shall provide the necessary protection to prevent damage, injury or loss to:

1. All employees involved with the work and other persons who may be affected thereby.
2. All the work and all materials or equipment to be incorporated therein, whether in storage on or off the site.
3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
4. Existing site piping, structures, electrical services, water, and other underground properties.

B. The CONTRACTOR shall notify owners of adjacent utilities when prosecution of the work may affect them. All damage, injury or loss to any property referred to in Paragraphs 1.2.A.3 and 1.2.A.4 above, directly or indirectly, in whole or in part, by CONTRACTOR, any part, to the fault or negligence of CONTRACTOR, shall be replaced or restored to at least original condition at CONTRACTOR'S expense. CONTRACTOR'S duties and responsibilities for the safety and 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 as described herein that work is acceptable.

C. The CONTRACTOR shall not load or permit any part of any structure to be loaded with a weight that would endanger its safety.

D. The CONTRACTOR shall provide protection of the work from freezing and from other elements which would be harmful to it. The CONTRACTOR shall furnish heat or protective shelters or temporary buildings as required for the prosecution and protection of the work.

E. The CONTRACTOR shall take all necessary precautions for the safety of employees on the work and shall comply with all applicable provisions of Federal, State and local safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards and barricades for the protection of employees on the work and the safety of others employed near the work and public, and shall post danger signs and warning lights warning against the hazards created by such features of the construction as protruding nails, hoists, excavations, elevator hatchways, scaffoldings, window openings, stairways and falling materials.

F. The CONTRACTOR shall designate a responsible member of its organization on the work whose duty shall be the prevention of accidents.

G. The CONTRACTOR shall immediately report in writing, giving full details, to the OWNER all serious accidents which arise out of or in connection with the performance of the work, whether on or adjacent to the site, which cause death, serious personal injury or substantial property damage, the accident shall be reported immediately by telephone or messenger to the ENGINEER. If a claim is made or suit is filed by anyone against the CONTRACTOR or any Sub-Contractor on account of any accident, the CONTRACTOR shall promptly report the facts in writing to the ENGINEER, with a copy to the OWNER, giving full details of the claim.

H. The CONTRACTOR shall assume all risks of loss damage of any kind to any vehicles, machinery, equipment, materials or supplies which he shall provide in doing the work.

I. The CONTRACTOR shall take all precautions to prevent damage to the work by the elements, storm or by water entering the site of the work directly or through the ground. In case of damage by the elements, storm or water, the CONTRACTOR shall make such repairs or replacements or rebuild such parts of the work as the ENGINEER may require in order that the work may be completed as required.

J. The CONTRACTOR shall post illuminated warning and danger signs so as to alert all persons against any hazards created by the work being done under this contract.

K. The CONTRACTOR shall maintain drainage which may be interrupted by his work and shall provide pumping if necessary to route drainage water around the work.

1.3 Protection of Public: The CONTRACTOR shall conduct his work so as to interfere as little as possible with the private personal activities of residents, private business and public business and travel. Wherever necessary or required, and at his own expense, he shall maintain fences, furnish full-time or part-time watchmen, guards, flagman and or like protective personnel, maintain lights, and take such actions, precautions as may be necessary to protect life and property.

1.4 Nuisance and Dust Control: During the course of the work the CONTRACTOR shall take steps at his cost as necessary to prevent public nuisance on demand of the ENGINEER by holding down the raising of dust or spraying of mud from construction operation, vehicular traffic, wind or other causes.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01570**CONSTRUCTION PROCEDURES**PART 1 - GENERAL

1.1 Scope: This Section covers the general overall maintenance of the entire project site to assure the safety and protection of the CONTRACTOR'S employees, general public, materials incorporated into the project, and property within the project limits.

1.2 Safety and Protection:

A. CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. He shall take all necessary precautions for the safety of employees and the public, and shall provide the necessary protection to prevent damage, injury or loss to:

1. All employees involved with the work and other persons who may be affected thereby.
2. All the work and all materials or equipment to be incorporated therein, whether in storage on or off the site.
3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
4. Existing site piping, structures, electrical services, water and other underground properties.

B. The CONTRACTOR shall notify owners of adjacent utilities when prosecution of the work may affect them. All damage, injury or loss to any property referred to above, directly or indirectly, in whole or in part, by CONTRACTOR, any part, to the fault or negligence of CONTRACTOR, shall be replaced or restored to at least original condition at CONTRACTOR'S expense. CONTRACTOR'S duties and responsibilities for the safety and 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 as described herein that work is acceptable.

C. The CONTRACTOR shall not load or permit any part of any structure to be loaded with a weight that would endanger its safety.

D. The CONTRACTOR shall provide protection of the work from freezing and from other elements which would be harmful to it. The CONTRACTOR shall furnish heat or protective shelters or temporary buildings as required for the prosecution and protection of the work.

E. The CONTRACTOR shall take all necessary precautions for the safety of employees on the work and shall comply with all applicable provisions of Federal, State and local safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards and barricades for the protection of employees on the work and the safety of others employed near the work and public, and shall post danger signs and warning lights warning against the hazards created by such features of the construction as protruding nails, hoists, excavations, elevator hatchways, scaffoldings, window openings, stairways and falling materials.

F. The CONTRACTOR shall designate a responsible member of its organization on the work whose duty shall be the prevention of accidents.

G. The CONTRACTOR shall immediately report in writing, giving full details, to the OWNER all serious accidents which arise out of or in connection with the performance of the work, whether on or adjacent to the site, which cause death, serious personal injury or substantial property damage is caused, the accident shall be reported immediately by telephone or messenger to the ENGINEER. If a claim is made or suit is filed by anyone against the CONTRACTOR or any Sub-Contractor on account of any accident, the CONTRACTOR shall promptly report the facts in writing to the ENGINEER, with a copy to the OWNER, giving full details of the claim.

H. The CONTRACTOR shall assume all risks of loss damage of any kind to any vehicles, machinery, equipment, materials or supplies which he shall provide in doing the work.

I. The CONTRACTOR shall take all precautions to prevent damage to the work by the elements, storm or by water entering the site of the work directly or through the ground. In case of damage by the elements, storm or water, the CONTRACTOR shall make such repairs or replacements or rebuild such parts of the work as the ENGINEER may require in order that the work may be completed as required.

J. The CONTRACTOR shall post illuminated warning and danger signs so as to alert all persons against any hazards created by the work being done under this contract.

K. The CONTRACTOR shall maintain drainage which may be interrupted by his work and shall provide pumping of necessary to route drainage water around the work.

1.3 Protection of Public: The CONTRACTOR wherever necessary or required, and at his own expense, he shall maintain fences, furnish full-time or part-time watchmen, guards, flagman and or like protective personnel, maintain lights, and take such actions, precautions as may be necessary to protect life and property.

1.4 Dust Control: During the course of the work the CONTRACTOR shall take steps at his cost as necessary to prevent public nuisance on demand of the ENGINEER by holding down the raising of dust or spraying of mud from construction operation, vehicular traffic, wind or other causes.

1.5 Site Maintenance:

- A. Minimize discharge of effluent and rainwater runoff into sewers.
 - 1. Control sediment discharge into sewers; filter out construction debris, soil, and contaminants.
 - 2. Comply with regulations and orders of public utilities regarding use of sewers.
 - 3. Where disposal of effluent or rainwater by means of sewers is no lawful or is not possible, provide alternative methods of disposal.
- B. Prevent erosion due to rainwater runoff.
- C. Prevent flooding of excavations, below-grade construction, and adjacent properties due to rainwater runoff.
- D. Protect existing property indicated to remain, including:
 - 1. Plants and trees, as indicated on the drawings and as identified by Owner. Erect fencing around drip lines of trees. Areas within the drip lines of trees shall be off limits to construction activities including but not limited to parking and storage of materials.
 - 2. Existing property, as indicated on the drawings.
- E. Keep the site and adjacent public ways free of hazardous and unsanitary conditions and public nuisances.
- F. Control rodents and other pests; prevent infestation of adjacent sites and buildings due to pests on this site.
- G. Keep public streets free of debris and material storage due to this work.
- H. Provide temporary supports as required to prevent movement and structural failures.
- I. Install products only during environmental conditions which will ensure the best possible results.

1.6 Sequencing and Scheduling: Install products only at the time and in the sequence which will ensure the best possible results.

PART 2 - PRODUCTS

2.1 Materials:

- A. Patching Materials: Identical to the materials of the work to be cut, unless indicated as specific materials specified in other sections.
 - 1. For exposed materials for closing up openings, use materials identical to those of the adjacent construction; concealed materials are not required to be identical.

2. If identical materials are not available or cannot be used, use materials that provide best visual match; obtain approval of the architect.
3. Use materials that perform equally as well as, or better than, the material cut.
4. If necessary, determine composition of existing materials to be patched by testing.

PART 3 - EXECUTION

3.1 General Examination Requirements:

- A. Prior to performing work, examine the applicable substrates and the conditions under which the work is to be performed.
- B. If unsafe, or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding.
- C. Verify space requirements of items which are shown diagrammatically on the drawings.

3.2 General Installation Procedures:

- A. Accurately locate the work and components of the work; make vertical work plumb; make horizontal work level.
- B. See sections describing specific parts of the work for additional requirements.
- C. Where space is limited, install components to maximize space available for maintenance and to maximize ease of removal for replacement.
- D. In finished areas, conceal pipes, ducts, and wiring within the construction, unless otherwise indicated.
- E. In ceiling areas without a finished suspended ceiling, maintain minimum headroom clearance of 8 feet.
- F. Coordinate exact locations of fixtures and outlets with finish elements.
- G. Install work in such manner and sequence as to preclude, if possible, or at least to minimize, cutting and patching. Do not cut any structural elements.

3.3 Cleaning and Protection:

- A. Remove debris from concealed spaces prior to enclosing the space.
- B. Keep the site and the work free of waste materials and debris.
 1. Remove waste from site monthly.

2. When temperature exceeds or is expected to exceed 80 degrees F, remove waste at frequency necessary to prevent development of health hazards and nuisance odors.
 3. Keep hazardous and unsanitary materials in containers separate from other waste.
- C. Clean areas in which work is to be done to level of cleanliness necessary for proper execution of work., broom- and vacuum-clean the entire interior area and keep clean.
1. Where dust would impair execution of work, broom- and vacuum-clean the entire interior area and keep clean.
- D. Keep installed work clean, and clean again when soiled by other operations.
1. Provide periodic cleaning as required to prevent damage due to soiling.
 2. Remove liquid spills promptly.
- C. Protect installed work from soiling and damage.
1. Provide protective coverings as required.
 2. Provide protection coverings for work which may be damaged by subsequent operations.
 3. Where heavy abuse is expected, use minimum of plywood for protection.
 4. Maintain protective coverings until substantial completion.

3.4 Cutting and Patching Procedures

- A. Use specified cutting and patching procedures when cutting or patching is required for any of the following activities:
1. Fitting the parts of the work together.
 2. Installing ill-timed work.
 3. Removing and replacing defective and nonconforming work.
 4. Removing samples of work for testing.
 5. Making openings in elements of work for penetrations, such as for piping, conduits, duct, and the like.
 5. Uncovering work for observation.
 6. Repairing damage.
- B. Perform cutting and patching at earliest time feasible, unless otherwise indicated of directed by the architect.
- C. Use procedures specified in applicable product sections as well as those specified in this section:
1. Use procedures recommended by original installer, when such information is available.
 2. Where required, obtain approval of procedures by the architect.
 3. Cut using methods that are least likely to damage adjacent work and work to remain and which adjacent work and work to remain and which will provide proper surfaces for patching.
 4. Make cuts neatly with minimum disturbance of adjacent work.
 - a. Use appropriate tools intended for sawing or grinding and grinding and not for chopping or hammering.
 - b. Do not use pneumatic tools without prior approval.

5. Where installation of similar new work is included, perform patching in manner specified for installation of new work.
 6. Where new work is inserted into or through the work that is cut, fit the patched work tightly to the new work.
 7. Patch with seams which are durable and as invisible as possible.
 8. Repair substrate prior to patching finish.
- D. Employ skilled workers to perform cutting and patching work.
1. Use the original installer of the work to perform cutting and patching of the following:
 - a. Any products so indicated in the applicable product section.
- E. Work Exposed to View: Do not cut or patch in a manner that would result in a lessening of the building's aesthetic value, as determined by the architect.
1. Generally, cut from exposed side into concealed spaces to avoid unnecessary damage to finish
 2. Do not cut and patch in a manner that would result in substantial visual evidence of cut and patch work.
 3. Restore exposed patched finishes in a manner which eliminates evidence of patching and refinishing.
 - a. For continuous surfaces, extend refinish to nearest intersection, with the neat transition to adjacent surfaces.
 - b. For assemblies: Refinish entire unit.
 - c. Painted piping, conduit, and duct: Clean and repaint.
 1. Remove and replace work which is patched in a visually unacceptable manner.
- F. Concealed Work: Uncover the concealed work, cut and patch, and patch the covering work.
- G. Concrete and Masonry: Use saws or drills which produce a neat cut; remove in small sections.
- H. Insulation: Replace insulation whenever it is cut in order to modify the element it is insulating.
- I. Slabs on Grade: Use methods that will not crack or disturb adjacent slabs or partitions.
- J. Operational Elements: Maintain capacity to perform in the manner intended, including energy performance; do not cut or patch in any manner that would increase maintenance requirement, decrease life expectancy, or decrease safety.
- K. Safety-Related Elements: Do not cut or patch in a manner that would result in decrease safety.
- L. Fire/Smoke Barriers: Do not cut more than absolutely necessary.
1. Cut penetration holes to sizes required for penetration seal assemblies required.
 2. Patch all oversize holes and cuts made in error.
 3. Perform patching in a manner which complies in all respects with the original construction; if not possible, report nature of difficulty to the architect and request instructions.

M. Protect that part of the project which is exposed during cutting and patching operations from adverse weather.

N. Cover openings made whenever they are not in use.

3.5 Installation of Components:

A. Install all products in accordance with manufacturer's instructions and recommendations, whether conveyed in writing or not.

B. Mounting Heights: Where mounting heights are not indicated, mount at heights directed by the ENGINEER.

C. Separate incompatible materials with suitable materials or spacing.
1. Prevent cathodic corrosion.

D. Provide all anchors and fasteners required and use methods necessary to securely fasten work.
1. Allow for thermal expansion and contraction, and for building movement.

E. After installation, adjust operating components to proper operation.

3.6 Procedures for Correction of Work:

A. The following must be replaced (repair is not acceptable):
1. Damaged surfaces exposed to view which cannot be repaired without visible evidence of repair.
2. Components which cannot be repaired to proper operating condition.
3. Chipped and broken glass.
4. Scratched transparent materials.
5. Scratched reflective surfaces.

B. Repair or Replace:
1. Components which do not operate properly.
2. Surfaces exposed to view which cannot be cleaned to original condition.
3. Permanent facilities used during construction.
4. Other defective work.

C. Acceptable Repair Methods:
1. Replacing parts.
2. Refinishing.
3. Touching up with matching materials.
4. Proper adjustment of equipment.

D. When it is necessary to deviate from the contract documents in order to accomplish corrective action, submit a field correction request.

E. Restore permanent facilities used during construction to specified condition.

F. Restore existing facilities used during construction, and existing facilities affected by construction operations, to original condition.

3.7 Facility Startup:

- A. Put each item of equipment and each system into full, satisfactory operation.
- B. Prior to Startup:
 - 1. Verify that equipment and systems are complete, correctly connected to utilities, and tested.
 - a. Comply with requirements of manufacturer.
 - 2. Inspect and test as required to ensure that work is installed as specified and to determining suitability for energizing.
 - 3. Provide power and fuel for startup and testing.
 - 4. Change over from temporary to permanent utility sources.
 - 5. Re-adjust and lubricate operating components as required to ensure smooth and unhindered operation.
 - a. Check drive rotations, belt tension, control sequences, and other features which might cause damage if not properly adjusted.
 - 6. When specified or when required by manufacturer, have manufacturer's representative prepare for startup or supervise such preparation.
- C. Notify the ENGINEER at least 5 days prior to startup of each item and system.
- D. Execute startup under supervision of responsible personnel in accordance with the manufacturer's instructions.
 - 1. When specified or when required by manufacturer, have manufacturer's representative perform startup.
- E. After startup, adjust equipment and systems as required for proper operation.
 - 1. Where specified, perform tests or inspections to determine status of operation.
- F. Demonstrate the operation and maintenance of equipment and systems to personnel designated by the Owner, prior to final payment.
 - 1. Have final operating and maintenance data available during demonstration.
- G. For equipment and systems which have different operation at different seasons, demonstrate operation during subsequent seasons until fully demonstrated.

3.8 Instruction of the Owner's Personnel:

- A. Instruct personnel designated by the Owner in the operation and maintenance of equipment and systems, prior to final payment.
 - 1. Explain all modes of operation and types of maintenance required.
 - 2. Demonstrate all functions, including startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown.
 - 3. Review terms of warranties and procedures for obtaining warranty services.
 - 4. Review maintenance agreements and other similar commitments which extend past final completion.

5. Have operating and maintenance data available for use during instruction.
 - a. Review contents in detail.
 - b. Prepare and insert additional data when need for such becomes apparent during instruction.
- B. Arrange times and places of instruction with the Owner.
 1. Provide a minimum of 1 hour of instruction for each item of equipment and each system, unless otherwise specified.
- C. Provide instruction by qualified personnel of the Contractor, unless otherwise specified.
- D. For equipment and systems which have different operation at different seasons, provide instruction during subsequent seasons until all modes of operation have been covered.

3.9 Final Cleaning:

- A. Remove materials and equipment which are not part of the work and all debris from the site prior to substantial completion.
 1. Remove all surplus materials which are to remain property of the Contractor; obtain the Owner's instructions as to disposition of surplus material remaining on site and deliver, store, or dispose of as directed.
 2. Remove protective coverings.
 3. Remove temporary facilities.
- B. Dispose of debris in a lawful manner.
 1. Do not burn or bury debris on the site.
 2. Do not dispose of volatile wastes in storm or sanitary drains.
- C. Perform final cleaning prior to requesting inspection for substantial completion.
 1. Use only professional cleaners.
 2. Clean to the level of cleanliness that would be expected by a commercial building owner from a janitorial service.
- D. Clean entire project site and grounds.
 1. Clean up landscaped areas.
 2. Broom clean paved areas.
 3. Rake smooth all exposed earth surfaces.
 4. Remove snow and ice from building and site accesses.
- E. In spaces to be occupied, remove dirt, stains, and other foreign substances from all accessible surfaces and remove nonpermanent labels.
- F. Remove debris from roofs, gutters, downspouts, and roof drains.

G. In spaces not normally occupied, remove debris and surface dust and wipe equipment clean, removing excess lubrication, paint, and other foreign substances.

H. Remove paint and other coatings from permanent labels and from mechanical and electrical equipment nameplates.

I. Leave the project clean and ready for occupancy.

3.10 Project Completion Procedures:

A. Complete the work, prior to substantial completion, as required to obtain consent to occupancy from the governing authorities.

B. Arrange for final inspection by governing authorities to be accomplished prior to substantial completion.

1. Obtain certificate of occupancy.

C. If temporary locking systems differ from permanent locking systems, change over to permanent systems prior to substantial completion.

D. Final Extermination: Engage a licensed exterminator to make final inspection and rid the project of rodents, insects, and other pests.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01700**CONTRACT CLOSEOUT**PART 1 - GENERAL

1.1 Scope: This section covers requirements for closeout of work.

1.2 Requirements: The CONTRACTOR shall comply with the requirements stated in the General Conditions and in the Specifications for administrative procedures in closing out the Work.

1.3 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 will prepare a punchlist that will include a cost estimate for each particular item of work based upon mobilization, labor, materials, and equipment costs as required by Louisiana Revised Statute 38:2248.B. The dollar amounts so established for uncompleted or unsatisfactory minor work shall be withheld by the OWNER, exclusive of statutory retainage, until the work is satisfactorily completed. Listed items shall be paid for upon expiration of the 45 day lien period. 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, fittings, specials, valves including pressure, leakage or other required tests.
2. Installation of all pumping equipment.
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 pipelines and other subterranean installations.

6. Installation or restoration of pavements including required tests for subbase, base and pavement materials. 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. Topsoiling, 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 if applicable to this project.

11. All required instructions for the OWNER'S operation and maintenance personnel including submittal of operations and maintenance manuals and warranties and bonds as specified elsewhere, if applicable to this project.

12. Installation of all valve pads, hydrants and service transfers.

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 reinspect 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 Supplemental Conditions and in accordance with Louisiana Revised Statute 38:2243.B. as outlined in 1.3.B above.

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 or corrected.

1.4 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 within five (5) 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 reinspect 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.

1.5 Reinspection Fees: Should the ENGINEER perform reinspections 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.

1.6 Contractor's Closeout Submittals To Engineer:

- A. Evidence of compliance with requirements of governing authorities.
- B. Project Record Documents: Requirements of Section 01720 - RECORD DRAWINGS.

- C. Operation and Maintenance Manual: Requirements of Section 01730 - OPERATION AND MAINTENANCE MANUAL.
- D. Warranties and Bonds: Requirements of Section 01740 - WARRANTIES AND BONDS.

1.7 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 reinspection 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.

1.8 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.

1.9 Contract Clear Lien Certificate and Payment of Retainage:

- A. Upon the OWNER'S acceptance of the work, the ENGINEER shall make filings with the Parish Clerk of Court as required by Louisiana State Public Contract Statute.

B. In accordance with the Louisiana State Public Contract Statute, the Clerk shall issue to the CONTRACTOR a Clear 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 of 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 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01710

CLEANING

PART 1 - GENERAL

1.1 Scope: This Section covers cleaning, which 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.

1.2 Disposal Requirements: Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 General:

- 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 on site 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 on site containers.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.2 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.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01715

PRECONSTRUCTION VIDEO FILMING OF PROJECT AREA

PART 1 - GENERAL

1.1 Scope: This section describes the requirements of video filming of the project area prior to construction.

PART 2 - PRODUCTS

2.1 General: The CONTRACTOR shall provide the OWNER with one (1) copy of the video film of the project area on DVD format.

PART 3 - EXECUTION

3.1 General: The CONTRACTOR shall be required to video film the entire project route in order to document preconstruction site conditions. The project area shall be covered at walking speed in order to clearly document details such as drainage patterns, landscaping, signage, structures, etc.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 01720**RECORD DRAWINGS**PART 1 - GENERAL

1.1 Scope: This Section covers technical requirements and information for the preparation and submission of Record Drawings.

1.2 General: As part of the contract drawings furnished, the CONTRACTOR will also be furnished with a full size set of Drawings for use in preparation of “Record Drawings”. The Record Drawings shall be a record of the construction as installed and completed by the CONTRACTOR. They shall include all the information shown on the contract set of drawings and a record of all deviations, modifications, or changes from those drawings, however minor, which were incorporated in the work, all additional work not appearing on the contract drawings, all changes which are made after final inspection of the contract work and the location and size of all uncharted existing utilities and structures encountered.

PART 2 - PRODUCT (NOT USED)PART 3 - EXECUTION

3.1 Record Drawings: The CONTRACTOR shall mark up the Drawings to show as-builts conditions, hereafter called Record Drawings. All changes from the contract plans which are made in work or additional information which might be uncovered in the course of construction, including uncharted structures and utilities, shall be accurately and neatly recorded as they occur by means of details and notes. All changes and/or required additions to the Record Drawings shall be clearly identified in a color contrasting to the blue line record drawing prints. The Record Drawings shall show the following information, but not be limited hereto.

A. The location and description of any utility lines or other installation of any kind or description known to or found to exist within the construction area. The location of exterior utilities includes actual measured horizontal distances from utilities to permanent facilities/features. These measurements shall be within an accuracy range of six (6") inches and shall be shown at sufficient points to permit easy location of utilities for future maintenance purposes. Measurements shall be shown for all change of direction points and all surface or underground components such as valves, manholes, drop inlets, cleanouts, meter, etc. The general depth of range of each underground utility line shall be shown (i.e. 3' to 4' depth). The description of exterior utilities includes the actual quantity, size and material of utility lines.

B. Correct grade or alignment of roads, structures or utilities if any changes were made from contract plans.

C. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the CONTRACTOR including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, etc.

D. The topography and grades of all drainage installed or affected as a part of the project construction.

3.2 Record Drawing Review: As a part of the prefinal inspection for each item of work the Record Drawings will be reviewed. They must comply with this specification prior to scheduling the final inspection, and/or prior to substantial completion of the item of work.

3.3 Record Drawing Final Submittal: Prior to scheduling the final acceptance inspection of the remaining work items, the Record Drawings shall be completed and delivered to the ENGINEER for his review and approval. If, upon review, the drawings are found to contain errors and/or omissions, they will be returned to the CONTRACTOR for corrections. Failure of any CONTRACTOR to make timely delivery of the Record Drawings on any/all items of work will be cause for the OWNER to delay final payment.

3.4 Withholding for Record Drawings: Failure by the CONTRACTOR to maintain current and satisfactory Record Drawings in accordance with these requirements will result in withholding from progress payments an amount determined by the ENGINEER as the value of the subject drawings, and will indicate this unearned amount on monthly payment estimates until the CONTRACTOR has fulfilled the contract requirements.

3.5 Drafting: All additions and corrections to the record drawings shall be neat, clean and legible.

3.6 Record Drawing Designation: When final revisions have been completed, each drawing shall be lettered or stamped with the words "RECORD DRAWINGS" in letters at least 3/16" high placed below the title block between the border and the trim line. The date of completion and the words "REVISED RECORD DRAWINGS" shall be placed in the revision block above the latest existing revision notation.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement: Record Drawings satisfactorily submitted, completed and accepted as specified shall be measured per Lump Sum job.

4.2 Payment: Record Drawings will be paid at the Contract unit price per Lump Sum job, which price and payment shall constitute full compensation for furnishing all field measuring and drafting work in accordance with the Drawings and Specifications.

4.3 Pay Item: Payment will be made under Record Drawings (01720) per Lump Sum Job.

- END OF SECTION -

SECTION 01730OPERATION AND MAINTENANCE MANUALPART 1 - GENERAL

1.1 Scope: This Section covers the preparation and content of Operation and Maintenance Manuals for equipment provided under this Contract.

1.2 Format:

- A. Prepare data in the form of an instructional manual.
- B. Binders: Commercial quality, 8½ x 11, three-ring binders with hardback, cleanable, plastic covers; four (4") inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- C. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; list title of Project; identify subject matter of contents.
- D. Arrange content by section numbers and sequence of Table of Contents of this Project Manual.
- E. Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- F. Text: Manufacturer's printed data, or typewritten data.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.3 Contents:

- A. Table of Contents: Provide title of Project; names, addresses, and telephone number of ENGINEER and CONTRACTOR with name of responsible parties; schedule of products and systems, indexed to content of the volume.
- B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems.

E. Type Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

1.4 Submittals:

A. Submit one (1) copy of completed volumes in final form fifteen (15) days prior to final inspection. Copy will be returned after final inspection with ENGINEER comments. Revise content of documents as required prior to final submittal.

B. Submit four (4) copies of revised volumes of data in final form within ten (10) days after final inspection.

1.5 Schedule: Manufacturer's field services, operation and maintenance manuals, and certificates of compliance, other certifications of competence, and test reports shall be provided for the items of equipment indicated in the following schedule:

SPEC. SECTION	TYPE OF EQUIPMENT	MFG'S FIELD SERVICE	OPER. & MAINT. MANUAL
13400	Well Pumps and Motors	No	Yes
13650	Chlorination Equipment	Yes	Yes
13700	Phosphate Feed System	Yes	Yes
13800	Submersible Pumps	Yes	Yes
13950	Forced Draft Aerator	No	Yes
16500	Variable Frequency Drives	Yes	Yes
16600	Waterworks Control Systems	Yes	Yes

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.1 Operation and Maintenance Manuals:

A. Method of Measurement: Operation and Maintenance Manuals, completed and accepted as specified, shall be measured per Lump Sum job.

B. Payment: Operation and Maintenance Manuals, measured as provided above, will be paid at the Contract Lump Sum price, based upon approved estimated percent complete at time of pay request, which price and payment shall constitute full compensation for furnishing all materials, equipment, labor, and incidentals necessary to complete this item in accordance with the Drawings and Specifications.

C. Pay Item: Payment will be made under Operation and Maintenance Manuals (01730) per Lump Sum Job.

- END OF SECTION -

SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 Scope: This Section includes preparation and submittal of product warranties and bonds.

1.2 Format:

A. Bind in commercial quality, 8½ x 11 inch three-ring side binders with hardback, cleanable, plastic covers.

B. Label cover of each binder with typed or printed title WARRANTIES AND BONDS, list title of Project; name, address and telephone number of CONTRACTOR and equipment supplier; and name of responsible principal.

C. The Table of Contents shall be neatly typed, in the sequence of the Table of Contents of the Operation and Maintenance Manual, with each item identified with the number and title of the specification Section in which specified, and the name of the product or work item.

D. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address and telephone number of responsible principal.

1.3 Preparation of Submittals: Obtain warranties and bonds, executed in triplicate by responsible Subcontractors, suppliers and manufacturers, within ten (10) days after completion of the applicable item or work. Except for items put into use with OWNER'S permission, leave date of beginning of time of warranty until the date of Substantial Completion is determined. Verify that documents are in proper form and contain full information. Co-execute submittals when required. Retain warranties and bonds until time specified for submittal.

1.4 Time of Submittals: Make submittal within ten (10) days after Date of Substantial Completion, prior to final Application for Payment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.
CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

DIVISION 2 - SITE WORK

- Section 02002 - STORM WATER POLLUTION PREVENTION PLAN (SWPPP)
- Section 02102 - CLEARING, GRUBBING AND STRIPPING
- Section 02202 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS
- Section 02203 - EXCAVATION, EMBANKMENT AND BACKFILL
- Section 02220 - EXCAVATION, BACKFILL AND COMPACTION OF UTILITY TRENCHES
- Section 02225 - BORING AND JACKING – CASING, PIPE AND SERVICE TUBING
- Section 02302 - BASE COURSE
- Section 02545 - CRUSHED STONE SURFACING
- Section 02701 - CULVERTS
- Section 02705 - FENCES
- Section 02706 - PORTLAND CEMENT CONCRETE WALKS AND DRIVES
- Section 02713 - TEMPORARY SIGNS, BARRICADES, AND BARRIERS
- Section 02730 - ACCESS ROAD
- Section 02903 - WARNING SIGNS

SECTION 02002**STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)**PART 1 - GENERAL

1.1 Scope: This Section covers the preparation and implementation of erosion and sedimentation control including all temporary and permanent erosion control measures of all disturbed areas.

1.2 SWPPP Plan: The Contractor shall establish a SWPPP Plan in accordance with the Drawings, Specifications and all applicable laws, rules and regulations.

1.3 SWPPP File: The Contractor shall establish and maintain a SWPPP file which shall include all completed inspection reports, certification forms, notices, permits, etc. The file shall be made available for review by the Owner, Engineer and/or regulatory agencies. This file shall be maintained by the Contractor for at least three years from the date of completion of the project.

1.4 Environmental Requirements: Protect adjacent properties, prevent soil and sediment erosion and minimize water quality degradation in receiving waters throughout the life of the contract.

1.5 Permit Requirements (For sites 5 acres or greater):

- A. Conform to LDEQ's Storm Water General Permit. The Storm Water General Permit is available at:

<http://www.deq.louisiana.gov/portal/default.aspx?tabid=245>

Use the downloadable form "LAR100000 Storm Water Discharges from Construction Activities 5 Acres or More".

- B. The Storm Water General Permit requires the submittal of a Notice of Intent. The Notice of Intent is available at:

<http://www.deq.louisiana.gov/portal/default.aspx?tabid=1837>

Use the downloadable form "CSW-G Storm Water Discharges Associated With Construction Activity 5 Acres or Greater".

- C. The Storm Water General Permit requires the submittal of a Notice of Termination. The Notice of Termination is available at:

<http://www.deq.louisiana.gov/portal/default.aspx?tabid=2562>

Use the downloadable form "CSW-T Notice of Termination for Storm Water Activity 5 Acres or Greater".

1.6 Permit Requirements (For sites less than 5 acres):

- A. Conform to LDEQ's Storm Water General Permit. The Storm Water General Permit is available at:

<http://www.deq.louisiana.gov/portal/default.aspx?tabid=245>

Use the downloadable form "LAR200000 Storm Water Discharges from Small Construction Activities (equal to or greater than 1 acre but less than 5 acres)".

- B. The Storm Water General Permit requires the submittal of a Completion Report. The Completion Report is available at:

<http://www.deq.louisiana.gov/portal/default.aspx?tabid=2562>

Use the downloadable form "SCACR Small Construction Activity Completion Report".

1.7 Referenced Standard: State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges," 2006 Edition.

Section 204	-	Temporary Erosion Control
Section 711	-	Rip Rap
Section 714	-	Slab Sodding
Section 715	-	Topsoil
Section 716	-	Vegetative and Fiber Mulch
Section 717	-	Seeding
Section 718	-	Fertilizer and Agricultural Lime
Section 720	-	Erosion Control Systems
Section 739	-	Hydro Seeding
Section 1002	-	Asphalt Materials and Additives
Section 1018	-	Miscellaneous Materials
Section 1019	-	Geotextile Fabrics

All references made therein to measurement and payment are deleted.

1.8 Submittals:

- A. Submit product data in conformance with Section 01340- "Shop Drawings, Samples and Project Data" of these Specifications.
- B. For sites greater than 5 acres, the Contractor shall submit the Notice Of Intent prior to the start of construction.
- C. For sites greater than 5 acres, the Contractor shall submit the Notice Of Termination upon completion of construction.

D. For sites less than 5 acres, the Contractor shall submit the Completion Report upon completion of construction.

PART 2 - PRODUCTS

2.1 General: Materials related to erosion control and soil stabilization shall conform to the following subsections of the Referenced Standard:

A.	Riprap	711
B.	Water	714.02
C.	Fertilizer (8-8-8)	1018.16
D.	Seed	1018.18
E.	Excelsior Matting	1018.24(b)
F.	Geotextile Fabric	1019
G.	Silt Fence	1019.01(b)

2.2 Bales: Hay or straw bales for siltation control and/or vegetation establishment shall be rectangular and shall be approved by the ENGINEER.

2.3 Sod: Sod shall be common St. Augustine.

2.4 Silt Fence: Silt fence for siltation control shall be LDOTD Type "F" filter fabric. Silt fence stakes shall be minimum of 60 inches in length and shall be 2-inch x 2-inch hardwood stakes driven 1'-6' into ground. Fence mesh shall be 14 ga. standard woven livestock wire with 6 inch x 6 inch spacing. Geotextile fabric shall be installed on upstream side of post. Geotextile fabric shall be trenched into the ground a minimum of 6 inches. Geotextile fabric shall overlap 6" at joints.

2.5 Rip-Rap: Materials used for rip rap shall conform to LDOTD Section 711 and shall be 55 lb. Class.

2.6 Geotextile Fabric: Underlayment for the rip rap shall conform to LDOTD Section 1019.01 (Class D) of the referenced Standard.

2.7 Gravel: Gravel for sediment filter shall be 2"-3" clean stone as specified on the Drawings.

2.8 Seed: Temporary grass seed shall be an approved quick-growing species suitable to the area, providing a temporary cover, which will not compete with permanent grasses. Rye grass is the only acceptable grass for winter cover. Permanent grass seed shall conform to the Referenced Standard. Seed shall comply with Section 717 of the Referenced Standard.

2.9 Fertilizer: Fertilizer shall comply with Section 718 of the Referenced Standard.

2.10 Rock Check Dams: Material on the upstream face shall be 2"-3" diameter clean stone over geotextile fabric. Material on the downstream face shall be Riprap and shall conform to Section 711 - 55 lb. Class of referenced Standard.

2.11 Erosion Control Blankets: Erosion control blankets shall be in accordance with 1018.23 of the referenced standard and as manufactured by Erosion Control Systems, Inc., American Excelsior Co. or approved equal.

2.12 Hydroseeding: Hydroseeding shall be in accordance with Section 739 of the Referenced Standard.

2.13 Mulches: Mulch shall comply with Subsection 1018.19 of the Referenced Standard. Emulsified Asphalt shall conform to Section 1002 of the Referenced Standard.

2.14 Temporary Construction Entrance / Inlet Sediment Filter: Material shall be 2"-3" diameter clean stone.

2.15 Silt Dike: Triangular silt dike shall be "Ultra-Silt Dike", 10.5" in height as manufactured by Ultratech International, Inc., Jacksonville, FL, (800) 764-9563.

2.16 Temporary Construction Entrance: Material shall be 2" - 3" diameter clean stone over filter fabric as specified in Section 1019.01 (Class D) of the Reference Standard.

PART 3 - EXECUTION

3.1 Preparation: The Contractor shall review the drawings and develop and implement a Storm Water Pollution Prevention Plan.

3.2 General:

A. The CONTRACTOR shall neatly dress and prepare areas designated for erosion control work as specified in the appropriate sections of these Specifications, as shown on the Drawings, or in the referenced publication. Installation shall be in accordance with the referenced publication.

B. Prepare only those areas that will be planted presently.

C. Allow for sod thickness in areas to be sodded.

D. Preparation of stripped areas: Till subgrade to a depth of at least four inches.

E. Fine-grade, roll, rake and drag lawn areas cutting down high spots and filling low spots, leaving a smooth, even surface of fine-textured soil complying with required grades.

3.3 Erosion Control and Slope Protection Implementation:

A. Place erosion control systems in accordance with Drawings and Storm Water Pollution Prevention Plan conforming to Section 720 of the referenced Standard and as may be dictated by site conditions in order to maintain the intent of the Specifications and Permits at no additional cost to OWNER.

B. Deficiencies or changes on Drawings or Storm Water Pollution Prevention Plan shall be implemented as site conditions change conforming to Section 204 of the referenced Standard.

C. OWNER has authority to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and to direct CONTRACTOR to provide immediate permanent or temporary pollution control measures at no additional cost to the OWNER.

D. Maintain temporary erosion control systems as directed by OWNER or governing authorities to control siltation during life of contract. CONTRACTOR shall respond to maintenance or additional work ordered by OWNER or governing authorities within 48 hours or sooner if required at no additional cost to the OWNER.

E. CONTRACTOR will be required to incorporate permanent erosion control features into project at earliest practical time to minimize need for temporary controls.

F. Seed and mulch temporary and permanent cut slopes as excavation proceeds to extent considered desirable and practical.

G. Slopes that erode easily or that will not be graded for a period of 14 days or more shall be temporarily seeded as work progresses with wheat, rye, or oats application at no additional cost to the OWNER.

H. Newly constructed storm drainage pipes and inlets shall be protected as required to ensure storm water sediment does not leave the site during rain events.

3.4 Seed: All disturbed areas shall be seeded. Seeding work shall be in conformance with the Reference Standard (LDOTD - Section 717).

3.5 Hydroseeding (Alternate): All disturbed areas shall receive hydroseed. Hydroseeding may be substituted as an alternate to seeding if desired. Hydroseeding, if utilized, shall be in conformance with Section 739 - Hydro-Seeding of the Reference Standard.

3.6 Fertilizer: All disturbed areas shall receive fertilizer. Fertilizer shall be installed in conformance with the Reference Standard (LDOTD - Section 718).

3.7 Erosion Control Blankets: Erosion Control Blankets shall be installed at areas disturbed with slopes equal to or steeper than 1:20 (5%). Erosion Control Blankets shall be installed in accordance with Section 720 of the Referenced Standard and in accordance with the manufacturer's recommendations.

3.8 Watering: When deemed necessary due to dry conditions, seeded areas shall be periodically watered at the direction of the OWNER.

3.9 Silt Fence: Silt fence stakes shall be driven a minimum of 12 inches into the ground. Fence post shall be installed at a maximum of 5 feet on center. Geotextile fabric shall be installed on upstream side of post. Geotextile fabric shall be trenched into the ground a minimum of 6 inches. Geotextile fabric shall overlap 6" at joints.

3.10 Rock Check Dams: Rock check dams shall be installed at the locations shown on the drawings. Rock check dams shall be installed where the nominal water depth is 3' or less. Rock check dams shall be installed over geotextile fabric. Rock check dams shall be removed once the site is stabilized.

3.11 Geotextile Fabric: Geotextile Fabric shall be installed in conformance with subsection 711.03(c) of the referenced Standard. Geotextile fabric shall be installed with the upstream end overlapping the downstream end 24" minimum. Geotextile fabric shall extend 12" beyond the limits of the rip-rap in all directions and shall be turned down and buried.

3.12 Rip-Rap: Riprap shall be installed in conformance with Section 711 of the referenced Standard. The CONTRACTOR shall neatly dress and prepare area designated for rip-rap/stone work. Rip-rap shall be 18" thick.

3.13 Inspections: The Contractor shall inspect site stormwater controls at least once every 14 calendar days, before anticipated storm events and within 24 hours after a storm event of 0.5 inches or greater.

3.14 Clean-up: All temporary measures, not directed by the ENGINEER to remain, shall be removed and disposed of in an environmentally sound manner. All areas redisturbed due to clean up shall receive permanent measures as specified herein.

3.15 Turf Maintenance: Maintain seeded areas from immediately after planting until the latest of: substantial completion of the project, or 60 days after date when seeding, sprigging, plugging, or sodding (as applicable) is substantially complete, or until an acceptable lawn is established.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement: Storm Water Pollution Prevention Plan Requirements including silt fence, seed, fertilizer, hydroseed, hay bales, erosion control matting, rock check dams, etc., completed and accepted as specified, shall be measured per Lump Sum job.

4.2 Payment: Storm Water Pollution Prevention Plan Requirements, measured as provided above, will be paid at the Contract Lump Sum price, based upon approved estimated percent complete at time of pay request, which price and payment shall constitute full compensation for furnishing all materials, equipment, tools, labor, hauling, traffic control, signs barricades, safety items, and incidentals necessary to complete this item in accordance with the Drawings and Specifications.

4.3 Pay Item: Payment will be made under Storm Water Pollution Prevention Plan (Including all temporary and permanent seed, fertilizer, hydroseed, erosion control blankets, silt fences, hay bales, rock check dams, etc.) (02002) per Lump Sum Job.

- END OF SECTION -

SECTION 02102**CLEARING, GRUBBING AND STRIPPING**PART 1 - GENERAL

1.1 Scope: This Section covers all clearing, grubbing and stripping work required for the construction of the project.

1.2 Clearing and Grubbing:

A. The CONTRACTOR shall clear and grub areas as designated on the Drawings or required by the ENGINEER dependent upon existing field conditions as required to construct the project.

B. Care shall be taken to leave nothing of material size or accumulated mass which thereafter may float or obstruct any pipe or waterway.

C. The CONTRACTOR shall not cut or injure any trees or other vegetation outside the limits of the areas on which work is to be done without permission and he shall guard against like action by his employees.

1.3 Stripping: The CONTRACTOR shall strip areas which are designated by the ENGINEER for the proposed location of any aboveground facility. The limits of the stripping shall be within the area so designated.

1.4 Right to Wood and Logs: The respective owners of the land over which an easement passes shall have the right to cut and remove logs and other wood of value in advance of the CONTRACTOR'S operations. All remaining logs and other wood removed in the course of clearing shall become the property of the CONTRACTOR.

PART 2 - PRODUCTS

2.1 Equipment:

A. Equipment used for clearing, grubbing and stripping shall be at the CONTRACTOR'S option.

B. Blasting will not be permitted.

PART 3 - EXECUTION

3.1 Clearing:

A. The CONTRACTOR shall cut or otherwise remove all trees, saplings, brush and vines, (except those trees and other vegetation marked for retention by the OWNER); windfalls, logs and trees lying on the ground; dead trees and stubs more than one foot high above the ground surface, but not their stumps; trees which have been partially uprooted by natural or other causes, including their stumps; and other matter such as snags, leaves, sawdust, bark and refuse.

B. Except where clearing is done by uprooting with machinery or where stumps are left longer to facilitate subsequent grubbing operations, trees, stumps, and stubs to be cleared shall be cut as close to the ground surface as practicable, with no more than six (6) inches remaining above the ground surface in the case of small trees, and twelve (12") inches in the case of large trees. Saplings, brush, and vines shall be cut off close to the ground.

3.2 Grubbing: The CONTRACTOR shall remove all stumps within the servitude or designated project area completely, remove all roots larger than three (3") inches in diameter to a depth of 18 inches, and remove all roots larger than 1/2 inch in diameter to a depth of six (6) inches. Such depths shall be measured from the existing ground surface or the proposed finished grade, whichever is lower.

3.3 Stripping: Topsoil shall be removed to its full depth where it occurs in areas to be filled or excavated and shall be stockpiled for use in finish grading. All precautions shall be taken to avoid contamination of topsoil by other excavated material and to prevent washing of topsoil by other excavated material and to prevent washing of topsoil into excavations, drainage or watercourses.

3.4 Depressions: Except in areas to be excavated, depressions caused by grubbing operations shall be filled with suitable material which shall be compacted to conform to the surrounding ground.

3.5 Disposal:

A. All material collected in the course of the clearing and grubbing that will not remain shall become the property of the CONTRACTOR and shall be disposed of in a manner satisfactory to the OWNER. Such disposal shall be carried on after removal of the materials in the clearing and grubbing operations and shall not be left until the final clean up period.

B. Burning shall not be done except at locations and in conformity with the regulations and requirements of the governing air pollution control and fire authorities. The CONTRACTOR shall make all necessary arrangements and pay for all necessary permits. The CONTRACTOR shall take all precautions necessary to prevent the spread of fire outside the immediate areas where burning is being done.

C. Prior to depositing surplus material at any off site location, the CONTRACTOR shall obtain a written agreement between himself and the owner of the property on which the disposal is proposed giving permission for the CONTRACTOR to enter and deposit the material at no expense to the project OWNER. A copy of the agreement shall be furnished to the OWNER.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 02202**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**PART 1 - GENERAL

1.1 Scope: This Section includes furnishing of all labor, materials, tools and equipment, and perform all operations necessary for demolition, abandonment and removal of those existing structures and other obstructions not designated or permitted to remain for construction as indicated on the Drawings and as directed by the ENGINEER.

1.2 Referenced Standard: Work shall conform to the following Section of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as may be modified herein:

Section 202 - Removing or Relocating Structures and Obstructions

Section 710 - Flowable Fill

Section 723 - Granular Material

All references made therein to measurement and payment are hereby deleted.

PART 2 - PRODUCTS

2.1 Backfill Material for Removal of Structures and Obstructions: Backfill material for removal of structures and obstructions shall be native material, if acceptable to ENGINEER. Where native material is unsuitable and where directed by the ENGINEER, select fill material shall be used for backfilling.

2.2 Select Fill: Select fill material shall have a unified soil classification (ASTM D 2487) as CL (A-2-4) (sand clay) or better with a plasticity index (PI) range of six (6) to fifteen (15) and locally known as "red dirt".

2.3 Granular Backfill: Granular Backfill shall be fine aggregate or sandy material shall be as specified in Section 1003.07 of the referenced Standard.

2.4 Flowable Fill: Flowable fill shall be a mixture of portland cement, fly ash, sand and water as specified as "Excavatable" in Section 710 of the Referenced Standard.

2.5 Non Shrink Cement Grout: Non-shrink cement grout shall consist of cement, aggregate and additives formulated to meet the following volume change requirements. Early volume change (within 24 hours) as tested by ASTM C 827 shall be limited to zero (0) percent shrinkage and four (4) percent maximum expansion. Long term volume change of hardened non-shrink cement grout (after 1 day for cure) shall conform to the Corps of Engineers Specification for Non-Shrink Grout, CRD-C621-82B. Shrinkage shall be zero (0) percent and expansion limited to a maximum of 0.4 percent volume change. Cement additives required to meet this specification shall be recommended by the grout manufacturer but shall be non-staining and non-metallic. Grout shall be equal to “Five Star” cement products manufactured by the U.S. Grout Corporation, Quikrete Companies, or approved equal.

PART 3 - EXECUTION

3.1 General: The CONTRACTOR shall remove, haul off and satisfactorily dispose of all structures and obstructions designated for demolition, etc. that would interfere with construction or are required to permit construction as designed. It shall include backfilling resulting trenches, holes, pits, etc. Debris or excess material shall be disposed of off the project site.

3.2 Material Difference in Conditions: If structures or obstructions are encountered which differ materially from those ordinarily encountered, said conditions shall be immediately reported to the ENGINEER and the scope of work determined and appropriate costs negotiated for a change order.

3.3 Salvage Material:

A. The Contractor shall salvage and deliver the following material to the Owner:
N/A

B. The point of delivery shall be: N/A

C. CONTRACTOR shall meet with OWNER prior to beginning work to determine which materials shall be salvaged. CONTRACTOR shall be responsible for delivering designated salvaged material to the OWNER. All other material and or equipment removed during the course of this work shall become the property of the Contractor.

3.4 Compaction: Compaction shall conform to Paragraphs 3.11 and 3.12 of Section 02203 - Excavation, Backfill and Compaction of Utility Trenches.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Removal of Structures and Obstructions:

A. Method of Measurement: Removal of Structures and Obstructions, completed and accepted as specified, shall be measured per Lump Sum job.

B. Payment: Removal of Structures and Obstructions, measured as provided above, will be paid at the Contract Lump Sum price, based upon approved estimated percent complete at time of pay request, which price and payment shall constitute full compensation for furnishing all materials, equipment, labor, hauling, traffic control, signs, barricades, safety items, and incidentals necessary to complete this item in accordance with the Drawings and Specifications.

C. Pay Item: Payment will be made under Removal of Structures and Obstructions (02202) per Lump Sum Job.

- END OF SECTION -

SECTION 02203**EXCAVATION, EMBANKMENT AND BACKFILL**PART 1 - GENERAL

1.1 Scope: This Section includes the work required to perform all excavation, embankment and backfill against structures and filling and grading as required to achieve the final site contours, to the lines, grades and locations shown on the Drawings and/or as directed by the ENGINEER as required to complete the work.

1.2 Referenced Standard: Work shall conform to the following Sections of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as may be modified herein:

Section 203	-	Excavation and Embankment
Section 802	-	Structural Excavation and Backfill

All references made therein to measurement and payment are deleted.

1.3 Applicable Publications: The publications listed below form a part of this Specification to the extent referenced. The publication may be referred to in the text by basic designation only:

A. American Society for Testing and Materials

D 698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort
D 1557	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
D 2487	Classification of Soils for Engineering Purposes (Unified Soil Classification System)
D 4318	Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

1.4 Submittals: Submit product data in accordance with provisions of Section 01340 - Shop Drawings, Samples and Project Data. Submittals of soil samples shall be provided to the ENGINEER. No borrow operations shall be permitted until soil tests have been completed and materials approved for use.

1.5 Quality Control: All soil used for embankment shall be classified in accordance with ASTM D 2487 and tested in accordance with Section 01410 - Testing Laboratory Services.

1.6 Definitions:

A. Degree of Compaction: Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698 or ASTM D 1557, Method D abbreviated hereinafter as percent laboratory maximum density, as applicable.

B. Unsatisfactory Materials: Unsatisfactory materials include materials classified in ASTM D 2487 as PT, OH, OL, ML, MH and any other materials deemed by ENGINEER as unsatisfactory.

PART 2 - PRODUCTS

2.1 Embankment Material: Embankment material shall be "Usable Soils" as defined in the Referenced Standard under Paragraph 203.06.1.

2.2 Backfill Material: Backfill material shall be "Usable Soils" as defined in the Referenced Standard under Paragraph 203.06.1.

2.3 Backfill Material Against Structures: Backfill material against structures shall be "Usable Soils" as defined in the Referenced Standard under Paragraph 203.06.1.

2.4 Top Soil: Loam and other humus type material that was stripped from the site and stockpiled under Specification Section 02202 - Clearing, Grubbing and Stripping shall be utilized as topsoil on disturbed and filled areas.

PART 3 - EXECUTION

3.1 General: All excavation, embankment and backfill work shall be in accordance with the Referenced Standard as modified herein.

3.2 Subgrade Preparation: The Contractor shall strip the top six (6") inches of topsoil prior to preparation of subgrade. "Unsatisfactory Material" in surfaces to receive fill or in excavated areas shall be removed and replaced with "Embankment Material". The subgrade surface shall be scarified to a depth of six (6") inches before the fill is started. Sloped surfaces steeper than one (1) vertical to five (5) horizontal shall be plowed, stepped, benched or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to minimum depth of six (6") inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of twelve (12") inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content at or above optimum that will readily facilitate obtaining the specified compaction with the equipment used. The subgrade shall be poof rolled in the presence of the ENGINEER. Approved compacted subgrades that are disturbed by the CONTRACTOR'S operations or adverse weather shall be scarified and compacted as specified herein to the required density prior to further construction thereon. Recomposition over underground utilities shall be by handtamping.

3.3 Muck Excavation: Muck excavation consists of the removal of water saturated soils, organic matter or other material not usable for foundation material. Materials which will decay or produce subsidence in the embankment, or materials containing decaying stumps, roots, logs, humus or other material are not satisfactory for use in the embankment. The ENGINEER will determine the material to be removed. Material which cannot be used shall be removed from the project site.

3.4 Excavation: Excavation work shall conform to the dimensions and elevations indicated for each building, structure, or footing, except as specified hereinafter and shall include trenching for utilities to a point five (5') beyond the building line of each building and/or structure and all work incidental thereto. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms. Excavations below indicated depths will not be permitted except to remove "Unsatisfactory Material". Excavated material meeting the requirements of PART 2 - PRODUCTS may be placed in the corresponding section of the permanent work or shall be separately stockpiled if it cannot be readily placed. Excavated material in excess of that required for the permanent work and all "Unsatisfactory Material" shall be properly disposed of off-site. "Unsatisfactory Material" encountered below the grades shown shall be removed as directed and replaced with "Embankment Material".

3.5 Embankment: Embankment construction consists of constructing embankments, including preparation of areas on which they are to be placed. Prior to beginning excavation, grading or embankment operations in an area, all necessary clearing and grubbing in that area shall have been completed. Embankment material shall be placed in uniform layers not exceeding 8" of uncompacted thickness or 6" when hand operated compactors are used. Each layer shall be placed for the full width of embankment, brought to a uniform moisture content, and compacted by approved methods before the next layer is placed. Operations shall be conducted to prevent lamination between lifts. Laminations between lifts shall be corrected prior to placing additional lifts. Surfaces of excavated areas and embankments shall be smooth and uniform. Material outside construction limits shall not be disturbed. Excavated material shall become the property of the CONTRACTOR. Soils from excavation areas may be used when approved in embankments or other finished sections. Surplus or unsatisfactory excavated material shall be disposed of by the CONTRACTOR. Excavation and rough grading shall be performed simultaneously, unless otherwise directed or permitted. Excavated material shall be placed sufficient to protect the integrity of the slope but in no case closer than three feet (3') from the edge of the ditch. The CONTRACTOR shall be responsible for the stability of embankments until final acceptance. Construction activities which may lead to subsequent embankment damage will not be permitted.

3.6 Backfilling: Backfilling consists of that work required to place fill against and/or adjacent to a structure to the lines and grades shown on the Drawings. Backfill shall be placed in horizontal layers not exceeding eight (8") inches in loose thickness, or six (6") inches when hand operated compactors are used. After placing, each layer shall be plowed, disked, or otherwise broken up, moistened or aerated as necessary, thoroughly mixed and compacted as specified. Backfilling shall not begin until construction below finish grade has been approved, underground utility systems have been inspected, tested and approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall not be placed in wet areas. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted in layers not more than four (4") inches in compacted thickness with power driven hand tampers suitable for the material being compacted. Backfill shall be placed carefully around

pipes to avoid damage to coatings or wrappings. Backfill shall not be placed against foundation walls prior to seven (7) days after completion of the walls. As far as practicable, backfill shall be brought up evenly on each side of the wall and sloped to drain away from the wall.

3.7 Compaction Requirements:

A. In-place density is designated as a percentage of the maximum in-place density as obtained from ASTM Test Method D 698 (Standard Proctor Density). The moisture content at the time of compaction shall be within a range of -2.0 percent and +2.0 percent of optimum or the lifts shall be reprocessed and recompacted. The following compaction requirements shall be met:

<u>Type of Construction:</u>	<u>Percent Laboratory Maximum Density</u>
Subgrade	100%
Embankment	95%
Backfill.....	95%

The subgrade shall be proof rolled in the presence of the ENGINEER. Approved compacted subgrades that are disturbed by the CONTRACTOR'S operations or adverse weather shall be scarified and compacted as specified herein to the required density prior to further construction thereon. Recomposition over underground utilities shall be by hand tamping.

3.8 Grading:

A. Grading of filled and unfilled area shall be to the lines and grades indicated on the Drawings or as specified by the ENGINEER. Grading shall be performed in conjunction with all of the necessary clearing, grubbing, stripping, filling, and compacting operations to the satisfaction of the ENGINEER. Grading shall be performed to such lines and grades as may be necessary to allow for the addition of loam, if required, to the proposed finished grade.

B. Grading shall be done by bulldozer or other approved means. Areas adjacent to structures and other areas inaccessible to heavy grading equipment shall be graded by manual methods.

C. Final grading shall be performed in such manner as to provide proper drainage from the project site. Finished grades shall be pitched to drain away from structures completed under this contract as indicated on the Drawings or as directed by the ENGINEER. In no case shall drainage from the project site be so altered or controlled as to result in damage, or the potential for damage, to adjacent property or to any portion of the work executed under this contract from erosion or flooding.

D. Areas shall be constructed true to grade, shaped to drain, and shall be maintained free of trash and debris until final inspection has been completed and the work has been accepted.

3.9 Drainage and Dewatering:

A. Drainage: Surface water shall be directed away from excavation and construction sites so as to prevent erosion and undermining of foundations. Diversion ditches, dikes and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site and the area immediately surrounding the site and affecting operations at the site shall be continually and effectively drained.

B. Dewatering: Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, pumps, ditches or trenches will not be permitted within three (3') feet of the foundation of any structure, except with specific written approval, and after specific provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in-site material. While the excavation is open, the water level shall be maintained continuously below the working level.

3.10 Capillary Water Barrier: **NOT REQUIRED THIS PROJECT** Capillary water barrier under concrete slabs on grade shall be placed directly on the subgrade and shall be compacted with a minimum of two (2) passes of a hand-operated plate-type vibratory compactor.

3.11 Vapor Barrier: Vapor barriers shall be placed over the capillary water barrier and shall be overlapped a minimum of twelve (12") inches at joints.

3.12 Protection: Settlement or washing that occurs in graded, topsoiled, or backfilled areas prior to acceptance of the work shall be repaired and grades re-established to the required elevations and slopes.

3.13 Topsoil Placement: Stockpiled topsoil in accordance with Section 02102 Clearing, Grubbing and Stripping paragraph 3.3, shall be evenly spread over all disturbed earthen areas and fill areas to a depth of three (3") inches. The topsoil shall be neatly raked in preparation to receive seeding, fertilization or sodding.

3.14 Backfill of Mud Pit: All contents of mud pits including pumped sand, clay, drilling fluids, water, etc., shall be removed from the pits before backfilling. Pits shall be backfilled with the excavated material in layers not exceeding twelve (12") inches and mechanically compacted to 95% standard proctor density. Should any additional material be required to complete backfill of the mud pits, that material shall be approved by ENGINEER before installation.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 02220**EXCAVATION, BACKFILL AND COMPACTION OF UTILITY TRENCHES**PART 1 - GENERAL

1.1 Scope: This Section covers excavation, backfill and compaction associated with the installation of all utility mains for this project.

1.2 General:

A. Work specified under this section shall be satisfactorily executed, regardless of subsurface materials encountered, as shown on the Drawings or as otherwise directed by the ENGINEER.

B. Although it is the intention to adhere to the Drawings, the CONTRACTOR is informed that the locations of proposed utilities and other structures shown on the Drawings are approximate. The ENGINEER reserves the right to make changes in location, lines, and grades where such adjustments may be necessary or advantageous.

C. Excavation, dewatering, sheeting, and bracing shall be carried out in such a manner as to eliminate any possibility of undermining or disturbing the foundations of any existing structure or any work previously completed under this contract.

1.3 Care and Restoration of Property:

A. Excavating machinery, cranes, and all other heavy equipment, shall be operated with care to prevent damage to trees. Where required, trees within or adjacent to the work site shall be braced by suitable means at the ENGINEER'S direction.

B. Branches, limbs, trunks and roots shall not be cut except by permission of the ENGINEER. All cutting shall be smoothly and neatly done without splitting or crushing. In case of cutting or unavoidable damage to branches, limbs and trunks of trees, the cut or damaged portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.

C. Cultivated hedges, shrubs, and plants which might be injured by the CONTRACTOR'S operations shall be protected by suitable means or shall be dug up and temporarily replanted and maintained. After the construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of kind and quality at least equal to the kind and quality existing at the start of the work. Where cultivated hedges, shrubs and plants in physical interference with the work exist and encroach upon highway right-of-way, they shall be replanted inside the property line of their respective owner. If said owner desires, he may replant such cultivated hedges, shrubs and plants at other areas within his property after removal by the CONTRACTOR.

D. On paved surfaces, the CONTRACTOR shall not use or operate tractors, bulldozers, or other power operated equipment of which the treads of which are so shaped as to cut or otherwise damage such surfaces.

E. All lawns, paved surfaces, roadways, and structures which have been damaged by the CONTRACTOR'S operations shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of operations.

F. The restoration of existing property of structures shall be done as promptly as practicable and shall not be left until the end of the construction period.

1.4 Applicable Publications: The publication listed below forms a part of this specification to extent referenced. The publication is referred to in the text by the basic designation only:

American Society for Testing and Material

D 698-78 Test Methods for Moisture - Density Relations of Soils and Soil- Aggregate Mixtures, Using 5.5 lb. (2.49 kg) Rammer and 12 inch (304.8 mm) Drop

D 2487-85 Classification of Soils for Engineering Purposes

State of Louisiana Department of Transportation and Development,
"Louisiana Standard Specifications for Roads and Bridges, 2006 Edition"

Section 701	-	Culverts and Storm Drains
Section 726	-	Bedding Material
Section 1003	-	Aggregates
Section 1019	-	Geotextile Fabric and Geocomposite Systems

PART 2 - PRODUCTS

2.1 Backfill Material for Water Mains: Backfill material for water mains shall be native material, if acceptable to the ENGINEER. Where native material is unsuitable and where directed by the ENGINEER, select fill material shall be used for backfilling.

2.2 Select Fill Material: Refer to Specification Section 02201 - Select Fill Material.

PART 3 - EXECUTION

3.1 General Preparation:

A. The CONTRACTOR shall make excavations in such a manner and to such a width as will give suitable room for or laying and adjoining pipe; shall furnish and place all sheeting, bracing, and supports; shall do all pumping, and draining; and shall render the bottom of the excavation firm and dry and in all respects acceptable.

B. In no case shall the earth be plowed, scraped, or dug by machinery so near to the finished grade at the bottom of the excavations as to result in disturbance of material below said grade. The last of the material to be excavated shall be removed with pick and shovel just before placing pipe. All loose materials shall be removed from the bottom of the excavation so that the bottom shall be in an undisturbed condition.

3.2 Separation of Surface Materials:

A. From areas within which excavations are made, loam and topsoil shall be carefully removed and separately stored to be used again as directed; or, if the CONTRACTOR prefers not to separate surface materials, he shall furnish, without additional compensation, clean loam and topsoil at least equal in quantity and quality to that excavated. When excavations are made in paved surfaces the pavement shall be removed so as to provide a clean uniform edge with a minimum disturbance of remaining pavement.

B. If pavement is removed in large amount or pieces, it shall not be mixed with other excavated material, but shall be disposed of away from the work site before the remainder of the excavation is made.

3.3 Sheeting and Bracing:

A. The CONTRACTOR shall furnish, place, and maintain such sheeting and bracing as may be required to support the sides of excavation, to prevent any movements which might in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures from undermining or other damage.

B. Wherever possible, sheeting shall be driven ahead of the excavation to avoid loss of material from behind the sheeting. If it is necessary to excavate below the sheeting, care shall be taken to avoid trimming behind the face along which the sheeting shall be driven. Care shall be taken to prevent voids outside the sheeting; but, if voids are formed, they shall be filled immediately with sand and compacted.

C. The ENGINEER may direct that any timber used for sheeting and bracing be cut off at any specified elevation.

D. All sheeting and bracing not left in place shall be removed carefully so as not to endanger the work or other structures, utilities, or property. All voids left or caused by withdrawal of sheeting shall immediately be backfilled with sand and compacted by ramming with tools especially adapted to that purpose, or by other means as may be directed.

3.4 Drainage:

A. At all times during construction, the CONTRACTOR shall temporarily provide, place and maintain ample means and devices with which to remove promptly, and dispose properly of, all water entering trenches and other excavations, or water that may flow along or across the site of the work. Excavations shall be kept dry until the pipes and appurtenances to be built therein have been completed, to such extent that they will not be damaged. At that time, the CONTRACTOR may remove such temporary means and devices.

B. All water pumped or drained from the work shall be disposed of in a manner satisfactory to the ENGINEER, without undue interference with other work or damage to pavements, other surfaces, or property.

3.5 Excess Excavation:

A. If, in the opinion of the ENGINEER, the material at or below the depth to which excavation for pipes would normally be carried is unsuitable for foundation, it shall be removed to such widths and depths as directed by the ENGINEER and shall be replaced with suitable material. A change order shall be negotiated for suitable material purchase and installation.

B. Where the bottom of the excavation shall, by error of the CONTRACTOR, have been taken to a depth greater than the depth specified, shown on the Drawings, or directed by the ENGINEER, said condition shall be corrected by refilling to the proper grade with screened gravel, crushed stone or shell, or the design shall be altered in a fashion acceptable to the ENGINEER to compensate for said error. The costs of all corrective measures shall be borne by the CONTRACTOR.

C. If, through failure or neglect of the CONTRACTOR to conduct the excavation work in the proper manner, the surface of the subgrade is in an unsuitable condition for proceeding with construction, the CONTRACTOR shall, at his own expense, remove the unsuitable material and replace it with suitable material, compacted to meet with the approval of the ENGINEER before any work is placed thereon. Failure of the CONTRACTOR to control surface or ground waters adequately, premature excavation at the work site, or other manifestations of the CONTRACTOR'S neglect or improper conduct of work, as determined by the ENGINEER, shall be grounds for requiring removal and replacement of unsuitable subgrade without additional compensation.

3.6 Trench Excavation in Fill: Before laying pipe in areas of fill, the following procedure shall be required:

A. Fill material shall be placed and properly compacted to final grade or to three feet above the top elevation of the pipe, whichever is less. Under certain circumstances the CONTRACTOR may request modification of this requirement. Any modification must be detailed in writing and approved by the ENGINEER.

B. Particular care shall be taken to ensure maximum consolidation of material under the pipe location.

C. The pipe trench shall then be excavated in the prescribed manner as though in undisturbed soil.

3.7 Miscellaneous Excavation: If the ENGINEER requires excavation for work not indicated on the Drawings or in the Specifications, the CONTRACTOR shall make such additional excavation in accordance with the Specifications for such work. The CONTRACTOR shall be issued a change order for extra work. These provisions of the Specifications do not include the additional excavation involved if the ENGINEER elects to lower a utility line below the grade indicated on the Drawings issued, if applicable to this project; payment of this work will be made for the respective paycut depth.

3.8 Excavation Near Existing Structures:

A. Excavation near an existing structure shall not be allowed closer to the structure than the depth of the excavation below the bottom of the foundation without shoring the excavation with sheeting.

B. The CONTRACTOR'S attention is directed to the fact that site piping and other underground utilities may exist within or immediately adjacent to the areas of proposed construction. Some of the site piping is indicated on the Drawings; however, no attempt has been made to show all piping, and the completeness and accuracy of the information is supplied for the purpose of providing the CONTRACTOR with an indication as to the approximate locations of site piping at the work areas so that he will be made aware of their presence.

C. All utility lines shall be located by the CONTRACTOR on the ground with pipe locator equipment well ahead of the work at all times. All such locations shall be plainly marked by coded paint symbols on pavement or by marked stakes in the ground. Such locations shall be established at least 24 hours in advance of all excavation. All such location work shall be provided by the CONTRACTOR, to the satisfaction of the ENGINEER, at no extra cost.

D. As the excavation approaches pipe, conduits, or other underground structures, digging by conventional trenching machine methods shall be discontinued. Only manual methods of excavating shall be employed around buried structures. The CONTRACTOR shall include manual excavation in the work to be done under this contract. No additional compensation shall be paid to the CONTRACTOR for excavations by hand.

3.9 Protection of Existing Structures:

A. All existing pipes, poles, wires, fences, curbing, property line markers, and other structures which, in the opinion of the OWNER, must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from damage by the CONTRACTOR. In case of damage, the CONTRACTOR shall notify the property owner so that the proper steps may be taken to repair any and all damage done. When the property owners do not wish to make the repairs themselves, all damage shall be repaired by the CONTRACTOR; or, if not promptly done by him, the owner may have the repairs made at the expense of the CONTRACTOR.

B. All existing piping shall be supported by suitable means so that the piping does not fail when tamping and settling occurs. No separate item is provided for timber piping supports.

C. The CONTRACTOR shall not be compensated for any additional work involved if existing piping or underground structures cross the trench line transversely above or below the utility line.

3.10 Relocation and Replacement of Existing Structures:

A. If, in the course of construction, the CONTRACTOR encounters existing piping and/or structures of any kind not indicated on the Drawings, or otherwise provided for, which encroach upon or are encountered near and substantially parallel to the edge of the excavation and which, in the opinion of the ENGINEER, will impede progress to such an extent that satisfactory construction cannot proceed, they shall be relocated, removed (later to be restored), or replaced as follows:

1. Whenever the CONTRACTOR encounters any of the conditions as described above and is so ordered in writing, he shall do the whole of or such portions of the work as directed; change the location of, remove and later restore, or replace such structures; or assist the OWNER thereof in so doing. For such work the CONTRACTOR shall be issued a change order for extra work.

2. In removing existing pipes or structures as described above, the CONTRACTOR shall use care to avoid damage to materials, and the OWNER shall include for payment only those new materials which, in his judgement, are necessary to replace those unavoidably damaged.

B. When fences interfere with the CONTRACTOR'S operations, he shall remove and, unless otherwise specified, later restore them to the condition at least as good as that in which they were found immediately before the work was begun, all without additional compensation unless a specific pay item has been provided in the bid form for such work. The restoration of fences shall be done as promptly as possible and not left until the end of the construction period.

3.11 Backfilling and Compaction - General:

A. Backfilling shall be done as promptly as is consistent with non-injury to the work but no backfilling shall be done without the ENGINEER'S express permission.

B. A bulldozer or other blade shall not be used in placing backfill; however, placement of backfill by mechanical equipment with various type buckets may be permitted at the ENGINEER'S approval.

C. The backfill material shall be free from cinders, ashes, refuse, boulders, rocks or stones, unsuitable organic material or other material which in the opinion of the ENGINEER is unsuitable. Where excavated material or any portion thereof is deemed unsuitable for backfilling material, the CONTRACTOR shall procure and place approved suitable materials, as ordered by the ENGINEER.

D. Where the excavation is in a paved area, an area to be paved, an unpaved vehicular traveled way, or the shoulder of a paved roadway, a suitable pavement base shall be provided in accordance with the Drawings.

3.12 Backfilling in Open Trench:

- A. As soon as practicable after the pipe has been placed and the pipe joints have been properly made, the backfilling shall begin, and shall continue without delay. If a screened gravel, shell, or concrete envelope is not used, the backfill material shall be placed simultaneously on both sides of the pipe, so that there will be no displacement of pipe alignment in strict conformance with manufacturers recommendation. In placing the material, care shall be taken that stones do not strike the pipe.
- B. The backfill at the sides of the pipe up to the top of the pipe shall be hand placed and thoroughly compacted using approved hand tampers.
- C. The backfill up to a level of one foot above the top of the pipe shall be placed in six (6) inch layers, leveled along the length and width of the trench and thoroughly compacted with approved hand tampers.
- D. Care shall be taken in the use of mechanical tampers not to injure or move the pipe or to cause the pipe to be supported unevenly. Mechanical tampers shall not be used within one foot of the top of the pipe.
- E. The backfill in the remainder of the excavation above the tamped backfill, or above the top of the screened gravel or sand envelope, if used, shall be placed in appropriate machine methods. Tamping will not be required in earth surface areas not subject to vehicular traffic. Backfilling or tamping with trenching machines is prohibited.
- F. No large masses of backfilling material shall be dropped into the tamped layers of backfill until one foot of earth backfill has been placed over the top of the pipe.
- G. Compaction by water jetting will not be permitted, unless specifically authorized by the ENGINEER.
- H. Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material.
- I. No compacting shall be done when the material is too wet to be compacted properly; at such times the compacting work shall be suspended until the previously placed materials have dried out sufficiently to permit proper compacting, or such other precautions shall be taken as necessary to obtain proper compacting.
- J. All backfilled trenches in traveled areas shall be thoroughly surface tamped with a kinetic energy tamping machine approved by the ENGINEER.
- K. All backfilled trenches in untraveled areas shall be compacted in 12" maximum loose lifts to 90% minimum Standard Proctor density at $\pm 2\%$ optimum moisture (ASTM D 698).

L. All backfilled trenches beneath local roads, drives, walks or other improvements shall be compacted in 9" maximum loose lifts to 95% minimum Standard Proctor density at $\pm 2\%$ optimum moisture (ASTM D 698).

3.13 Select Fill Material: Select fill material shall be placed and compacted to 95% of the maximum Standard Proctor Density at $\pm 2\%$ of optimum moisture content. Material shall be placed in maximum 9" loose layers and mechanically compacted until the required density is reached. Compaction tests will be performed and paid for by the OWNER.

3.14 Excavated Material:

A. General

1. Excavated material shall be placed so as minimize the inconvenience to occupants traveling on streets and driveways or adjoining properties. Excavated material shall not be deposited on private property unless written consent of the owner or owners thereof has been filed with the ENGINEER.

2. It is expressly understood that no excavated materials shall be removed from the site of the work or disposed of by the CONTRACTOR except as directed or approved by the ENGINEER, or as noted below.

3. Suitable excavated material will be used as backfill, fill for embankments, or other parts of the work in accordance with the appropriate sections of the Specifications.

4. Surplus excavated material, if any, shall be disposed of by the CONTRACTOR in a legal and environmentally sound manner.

B. Clean Up and Restoration of Work Site

1. Upon completion of the backfilling, the streets or property shall be cleaned, surplus material removed, and the surfaces restored to the condition existing before ground was broken. If the CONTRACTOR fails to promptly remove such surplus material, the ENGINEER may have the same done, and charge the cost thereof as money paid to the CONTRACTOR.

2. Material excavated from private property shall be disposed of by the CONTRACTOR at his own expense. If the CONTRACTOR fails to remove such surplus material, the ENGINEER may have the same done, and charge the cost thereof as money paid to the CONTRACTOR.

3.15 Borrow: Should material excavated under the work of this contract be unsuitable or if insufficient quantity for completion of the necessary backfilling operations, the CONTRACTOR shall furnish approved backfill material. Approved backfill to replace unsuitable material shall be paid for separately at the contract bid price or at a negotiated price. Approved backfill to supplement insufficient quantity for completion shall not be paid for separately and shall be considered as a subsidiary obligation under this Contract.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 02225**BORING AND JACKING - CASING, PIPE AND SERVICE TUBING**PART 1 - GENERAL

1.1 Scope: This Section covers the installation of steel casing and pvc pipe by boring and jacking. This Section also covers the installation of polyethylene pipe by horizontal directional boring. This Section also covers the installation of polyethylene service tubing by piercing.

1.2 General Requirements: Boring, jacking and/or piercing of utility mains, services and casings, shall be performed in order to avoid extensive surface restoration and to conform to State Highway or railway regulations. Generally, all boring, jacking and/or piercing of pipe or service tubing will be performed without casing, except where directed by the ENGINEER, indicated on the Drawings, or as required by the State Highway Department or railway company.

1.3 Contractor Qualifications: The CONTRACTOR shall be fully equipped and experienced in the installation of pipe by the boring, jacking and/or piercing methods, both with and without casing.

1.4 Miscellaneous Requirements: Those persons conducting the boring, jacking and/or piercing operations shall be responsible for determining the location, elevation and extent of all utilities, underground structures and/or obstructions in the vicinity of the installation whether shown on the Drawings or not shown on the Drawings.

1.5 Submittals: Submittals shall be provided in accordance with Section 01340 - SHOP DRAWINGS, SAMPLES AND PROJECT DATA.

PART 2 - PRODUCTS

2.1 Casings: The minimum diameter and wall thickness of the steel casing shall be 14" and 0.3125" (5/16") respectively. Casing pipe shall be Grade B ASTM A252 seamless standard or electric weld pipe with minimum yield strength of 35,000 psi. The pipe shall have an external coating of asphaltic tar. No internal coating will be required.

2.2 End Seals: Casing end seals shall be flexible S-shaped, specially compounded synthetic rubber end seals with stainless steel bands and clamps. The casing end seals shall be Model S manufactured by Pipeline Seal and Insulation or approved equal.

2.3 Casing Spacers: Casing spacers shall be constructed of fusion coated steel bands, ribbed inner liner, stainless steel hardware and glass reinforced runners. The casing spacers shall be Model C12G-2 as manufactured by Pipeline Seal and Insulation or approved equal.

PART 3 - EXECUTION

3.1 General:

- A. The work shall be conducted in such a manner as to safeguard property and minimize interference with highway and other operations.
- B. Methods, scheduling and safety procedures shall be in accord with the permit from the regulatory authority or owner of the facility being crossed.
- C. All methods of boring, jacking and/or piercing operations under State Highways, Parish Roads and/or Railways shall be subject to final approval by the respective agency.

3.2 Installation of Casing and/or Water Pipe by Conventional Boring and Jacking:

- A. When practical, the boring operation shall start in a tight sheeted pit or trench, located at the lower end of the line.
- B. The hole shall be mechanically bored. Jetting and washing methods shall not be used. Boring shall be confined to the Drilling Mud Bore Method or the Dry Bore Method.
- C. The Drilling Mud Bore Method shall be conducted as follows: The cut shall be made with an open type bit that leaves the cuttings in place. A gel-forming colloidal drilling fluid consisting of approximately 2.5% (by weight) of high grade carefully processed bentonite shall be used to consolidate the cuttings, seal the walls of the hole, and furnish lubrication for subsequent removal of cuttings and installation of the pipe or casing immediately thereafter. Field adjustment of the percentage of bentonite may be required to accommodate varying soil conditions. Immediately following the completion of the boring operation, the water pipe or casing shall be driven into the bored hole by hydraulic jacks.
- D. The Dry Bore Method shall be conducted as follows: The hole shall be mechanically bored. While the earth is removed automatically by the boring device, the pipe or casing shall be jacked into the soil ahead of the boring device. During the boring and jacking operation, the water pipe or casing shall be driven ahead of the auger to prevent material from falling, flowing or sliding into the opening of the pipe or casing so as to avoid undermining of pavement or underground structures.
- E. The casing or pipe shall be installed in the bored hole immediately after the hole is completed.

- F. Adequate provisions shall be made to withstand the reaction of the jacks. Once started, the operation of boring and jacking, and installing the casing and/or water pipe shall proceed as rapidly as possible. During non-working hours, adequate protection shall be used at the heading and the portal shall be closed.
- G. Overcutting of the hole in excess of one (1") inch over the O.D. of the pipe or casing shall be remedied by pressure grouting the entire length of the installation.
- H. Steel casing shall be butt welded by certified welders and all welds shall be full penetration single butt welds in accordance with API Standard 1104.
- I. The pipe and/or casing shall be installed in the bored hole in such a manner that the pipe and joints will not be subjected to damaging compression loads. Push-on and mechanical joints shall not be subjected to any tension during or after installation.
- J. Non-corrosive metallic locator wire shall be carefully attached to PVC or polyethylene water main with duct tape at five (5') foot intervals prior to being installed in the bore.
- K. A properly designed and fitted cap or plug shall be used to close and seal the ends of the pipe and/or casing against mud or water during installation.

3.3 Installation of Carrier Pipe Through Casing:

- A. Following the installation of the casing, the pipe shall be assembled and jacked or pulled through the casing. Push-on and mechanical joints shall not be subjected to any tension during or after installation. Pipe installed in the casing will be paid for under a separate pipe pay item.
- B. Non-corrosive metallic locator wire shall be carefully attached to PVC or polyethylene water main with duct tape at five (5') foot intervals prior to being installed in the casing.
- C. The ends of the casing shall be sealed. The end seals shall be as detailed on the Drawings.
- D. Casing spacers shall be installed on the water main prior to installation of water main into the casing. The number of casing spacers shall be as detailed on the Drawings.
- E. Water mains inside the casings shall be installed with joint retainers. The joint retainers shall be as detailed on the Drawings.

3.4 Installation of Polyethylene Water Main or Service Tubing by Directional Boring:

- A. Directional boring shall be accomplished by use of remotely controlled, steerable, guided boring equipment. Line and grade shall be controlled by a guidance system that relates the actual position of the boring equipment to the design position, both horizontally and vertically. Tolerance of two (2) inches for line and one and one half (1½) inches for grade shall not be exceeded. Active steering information shall be monitored and transmitted to the operation console.
- B. Directional boring techniques involve establishing a pilot hole to the design grade and location and simultaneously back-reaming the pilot hole while pulling the water pipe through the established hole. Back-reaming shall be conducted to increase the diameter of the pilot hole while using bentonite clay fluid to stabilize the hole and facilitate installation of the water pipe. The simultaneous pull-back operation involves pulling the pipeline length back through the drilling mud along the reamed hole pathway. The diameter of the reamer shall be no greater than a factor of 1.33 times the outside diameter of the pipe.
- C. Axial tension force readings and torque readings shall be monitored. Pull back speed rates of 2 feet per minute shall not be exceeded.
- D. Non-corrosive metallic locator wire shall be carefully attached to PVC or Polyethylene water main with duct tape at five (5') foot intervals prior to being installed in the bore.
- E. The HDPE pipe should be cut to length only after, it is in thermal equilibrium with the surrounding soil (usually overnight). To accommodate any potential contraction the pipe shall be pulled out an extra 4% (4 feet per 100 feet) to insure the pipe ends remain extended beyond the design point.
- F. In order to provide for stress relief and thermal adjustment, no connections to PE pipe shall be accomplished until a period of 0.25 hours per L.F. of P.E. pipe (or no less than 24 hours) has expired after successful completion of the installation.
- G. Upon completion of the pipe installation and connection to adjacent pipe systems, backfilling and compaction shall be completed in accordance with Section 02220 - Excavation, Backfill and Compaction of Trenches.

3.5 Installation of Polyethylene Service Tubing by Underground Piercing:

- A. Underground piercing shall be accomplished by use of pneumatically powered underground piercing equipment.
- B. The hole shall be created by use of a pneumatically powered piercing tool. Jetting and washing methods shall not be used. Line and grade shall be established by use of a starting cradle for the piercing tool which establishes line and grade for the route. The piercing operation shall start in a tight sheeted pit or trench, located at the lower end of the line.

- C. Underground piercing techniques involve establishing a hole to the design grade and location then simultaneously retrieving the piercing tool while pulling the polyethylene service tubing through the established hole. The simultaneous pull-back operation involves pulling the pipeline length along the pierced pathway. The diameter of the piercing tool shall be no greater than a factor of 1.33 times the outside diameter of the polyethylene service tubing.
- D. A properly designed and fitted cap or plug shall be used to close and seal the ends of the polyethylene service tubing against mud or water during installation.
- E. Non-corrosive metallic locator wire shall be carefully attached to polyethylene service tubing with duct tape at five (5') foot intervals prior to being installed in the hole.
- F. Once started, the piercing operation and installing the polyethylene service tubing shall proceed as rapidly as possible. During non-working hours, adequate protection shall be used and the heading and the portal shall be closed.
- G. The polyethylene service tubing should be cut to length only after, it is in thermal equilibrium with the surrounding soil (usually overnight). To accommodate any potential contraction the pipe shall be pulled out an extra 4% (4 feet per 100 feet) to insure the pipe ends remain extended beyond the design point.
- H. In order to provide for stress relief and thermal adjustment, no connections to polyethylene service tubing shall be accomplished until a period of 0.25 hours per L.F. of polyethylene service tubing (or no less than 24 hours) has expired after successful completion of the installation.
- I. Upon completion of the installation and connection to adjacent pipe systems, backfilling and compaction shall be completed in accordance with Section 02220 - Excavation, Backfill and Compaction of Trenches.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 02302**BASE COURSE**PART 1 - GENERAL

1.1 Scope: This work consists of furnishing and placing a base course on a prepared subgrade in accordance with the Specifications and in conformity with the lines, grades thicknesses as shown on the Drawings or established by the ENGINEER.

1.2 Reference Standard: Work shall conform to the following Section of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as may be modified herein:

Section 203	-	Excavation and Embankment
Section 302	-	Class II Base Course
Section 401	-	Aggregate Surface Course
Section 1003	-	Aggregates
Section 1019	-	Geotextile Fabric and Geocomposite Systems

All references made therein to measurement and payment are deleted.

1.3 Applicable Publications: The publications listed below form apart of this Specification to the extent referenced. The publication may be referred to in the text by basic designation only:

American Society for Testing and Materials

D698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort
D2487	Classification of Soils for Engineering Purposes (Unified Soil Classification System)
D4759	Practice for Determining the Specification Conformance of Geosynthetics
D5732-95	Test Method for Stiffness of Nonwoven Fabrics Using the Cantilever Test
D5818-95	Practice of Obtaining Samples of Geosynthetics from a Test Section for Assessment of Installation Damage

1.4 Submittals: Submit sample and gradation certification in accordance under Section 01340 - Shop Drawings, Samples and Product Data.

PART 2 - PRODUCTS

2.1 Base Course: Base course shall be "Stone" conforming to Section 1003.03.1 of the referenced standard. (Refer to Drawings for thicknesses)

2.2 Geotextile Fabric: Geotextile fabric shall meet the requirements for Class D geotextile fabric of Subsection 1019 of the Referenced Standard.

PART 3 - EXECUTION

3.1 General: All work related to this Section shall conform to applicable provisions of the referenced Standard except as amended herein.

3.2 Subgrade Preparation: Subgrade shall be prepared in conformance with Section 02203 - Excavation, Embankment and Backfill.

3.3 Geotextile Fabric: Geotextile fabric shall be installed beneath the crushed stone base course in accordance with Section 203.11 of the referenced standard.

3.4 Base Course: Base course shall be placed to result in a compacted thickness as shown on the Drawings. Compaction shall be in accordance with Paragraph 302.07 of the referenced Standard. Minimum compaction shall be 95% of Standard Proctor Density (ASTM 698/2487) within plus or minus of three (3%) percent of optimum moisture content.

3.5 Protection of Roadways: Construction operations shall not damage adjacent pavement surfaces, edges or joints.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 02545**CRUSHED STONE SURFACING**PART 1 - GENERAL

1.1 Scope: This Section covers the furnishing and installing of crushed stone surfacing over geotextile fabric in accordance with these Specifications and in conformity with the lines, grades and thicknesses shown on the Drawings or established by the ENGINEER.

1.2 Referenced Standard: Work shall conform to the following Sections of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as may be modified herein:

Section 203	-	Excavation and Embankment
Section 401	-	Aggregate Surface Course
Section 1003	-	Aggregates
Section 1019	-	Geotextile Fabric and Geocomposite Systems

All references made therein to measurement and payment are deleted.

1.4 Submittals: Submit product data in accordance with provisions of Section 01340 - Shop Drawings, Samples and Project Data.

PART 2 - PRODUCTS

2.1 Crushed Stone: Crushed stone surfacing shall be in accordance with the referenced standard and the following gradation:

<u>Stone Size</u>	<u>Percent Passing</u>
1"	100
3/4"	90-100
3/8"	20-55
#4	0-10

2.2 Geotextile Fabric: Geotextile fabric shall meet the requirements for Class D geotextile fabric of Subsection 1019 of the referenced standard.

PART 3 - EXECUTION

3.1 General: All work related to this section shall conform to applicable provisions of the referenced specification. Construct all crushed stone surfacing to the lines, depth and grades as shown on the Drawings.

3.2 Subgrade Preparation: Subgrade preparation consists of filling and grading as specified in Section 02203 – Excavation and Embankment. The subgrade shall then be proof rolled with a sheepsfoot roller. The surface course shall be installed on a neat, smooth subgrade free of vegetation, mud and other objectionable material as identified by the ENGINEER.

3.3 Geotextile Fabric: Geotextile fabric shall be installed beneath the crushed stone surface in accordance with Section 203.11 of the referenced standard.

3.4 Construction of Crushed Stone Surfacing: The crushed stone surface shall be placed, shaped and compacted in accordance with Section 401 of the Referenced Standard which requires the use of a pneumatic tire or steel wheel roller. The surface shall be tight and smooth.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 02701**CULVERTS**PART 1 - GENERAL

1.1 Scope: This Section covers the installation of reinforced concrete drainage pipe and catch basins.

1.2 Reference Standard: Work shall conform to the following Sections of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as may be modified herein:

Section 701 - Culverts and Storm Drains

Section 702 - Manholes, Junction Boxes, Catch Basins, and End Treatments

Section 901 - Portland Cement Concrete

All references made therein to measurement and payment are deleted.

1.3 Submittals: Submit product data in accordance with provisions of Section 01340 - Shop Drawings, Samples and Project Data.

PART 2 - PRODUCTS

2.1 General: Materials related to stormwater drainage piping and catch basins shall conform to the following subsections of the referenced publication as specifically listed herein:

(1) Portland Cement Concrete	901
(2) Portland Cement	1001.01
(3) Fine Sand	1003.02(a)
(4) Sewer Brick.....	1004.01
(5) Preformed Joint Fillers.....	1005.01
(6) Reinforced Concrete Pipe	1006.03
(7) Frames, Grates and Covers For Manholes, Catch Basins, and Junction Boxes.....	1018.04
(8) Geotextile Fabric and Geocomposite Systems	1019

2.2 Reinforced Concrete Drainage Pipe: Reinforced concrete drainage pipe shall conform to ASTM C76 Class III, Wall A, B or C.

2.3 Pipe Joints: Joints for reinforced concrete pipe shall be Type 3.

2.4 Portland Cement Concrete: Portland cement concrete shall be Class M, 3,000 psi in accordance with Section 901 of the referenced Standard.

2.5 Flyash: No flyash shall be used in concrete.

2.6 Mortar: Mortar shall consist of one (1) part portland cement, two (2) parts mortar sand and water as required for proper consistency.

PART 3 - EXECUTION

3.1 Reinforced Concrete Drainage Pipe: Reinforced concrete pipe for stormwater drainage shall be installed in conformance with Section 701 of the referenced standard and in accordance with Section 02220 - Excavation, Backfill and Compaction of Trenches of these specifications.

3.2 Reinforced Concrete Pipe Joints: Joints of reinforced concrete pipe shall be wrapped a minimum of eighteen (18") inches on each side of the joint with geotextile fabric as opposed to twelve (12") on each side as noted in the referenced publication.

3.2 Catch Basins: Catch basins shall be installed in conformance with Section 702 of the referenced standard and Section 02201 - Excavation, Filling and Backfilling for Buildings and Structures of these specifications except as specified below:

A. The bottoms of all catch basins shall contain benches and they shall be constructed to allow smooth flow through the system. Grout shall extend to a height of six (6") inches for fifteen (15") inches and eighteen (18") inches diameter pipe and a height of 1/3 diameter of pipe for twenty-four (24") inches pipe and larger at all outside edges and shall slope to the invert of the catch basin.

B. Walls may be of 4" x 8" x 16" (nominal) solid sand & gravel brick or of portland cement concrete reinforced with ½" steel bars vertical on 8" O.C. and ½" steel bars horizontal 12" O.C. Vertical bars shall extend into the top and bottom of the catch basin to within 2" of the outside edge.

C. On all masonry constructed catch basins, both the interior and exterior walls shall be coated with a half (½") inch thick layer of mortar.

D. The outside crown of all pipe entering or leaving a catch basin shall be below the elevation of the top of grates and/or gutter inverts.

E. All rings and covers, frames and grates shall be delivered unpainted and after installation shall be coated with asphaltic varnish in accordance with Sections 702.03 and 1008.07 of the referenced standard.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 02705**FENCES**PART 1 - GENERAL

1.1 Scope: This Section covers the furnishings of all labor, materials, tools and equipment, and performing all operations necessary to install fencing as indicated on the Drawings and as directed by the ENGINEER.

1.2 General: The only fence to be removed and replaced under this Contract are those shown on the Drawings or authorized by ENGINEER. The CONTRACTOR shall not be compensated for fence removal and replacement conducted at the CONTRACTOR'S option to accommodate construction. The CONTRACTOR shall not be compensated for removal and replacement of fence which was damaged by the CONTRACTOR. Fence damaged by the CONTRACTOR and not scheduled to be removed and replaced under the Contract, shall be removed from the project and a fence of equal quality, workmanship and design shall be installed in its place at no separate pay.

1.3 Referenced Standard: Work shall conform to the following Sections of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as may be modified herein:

Fences	Section 705
Portland Cement Concrete (Class R)	901
Fence and Guard Rail	1010
Timber & Timber Preservatives	1014
Miscellaneous Materials	1018

All references made therein to measurement and payment are deleted.

1.4 Submittals: Submittals shall be provided in accordance with Section 01340 - Shop Drawings, Samples And Project Data. Submittals shall included the following:

- A. Manufacturer's recommended installation instructions.
- B. Manufacturer's certificates of conformance with Specifications.
- C. Product data cut sheets and shop drawings.

PART 2 - PRODUCTS2.1 Chain Link Fence and Gates:

- A. Fabric: Fabric shall be woven in two (2) mesh from No. 9 gauge heavily galvanized wire. The height of the fence fabric shall be 72 inches. The chainlink fence fabric shall be galvanized after weaving.

B. Barbed Wire: Barbed wire shall consist of 3 strands of 12 ½ gauge wire with four (4) round or half round barbs spaced five (5) inches apart. Wire shall be steel in accordance with ASTM A 121.

C. Line Posts: Line posts shall be 2 3/8 inch outside diameter and weigh 3.65 lb. per linear foot.

D. End, Corner and Pull Posts: End, corner and pull posts shall be four (4) inches outside diameter and weigh 9.10 lb. per linear foot.

E. Top Rails and Intermediate Rails: Top rails and intermediate rails shall be 1 5/8 inch outside diameter and weigh 2.27 lb. per linear foot.

F. Brace Rails: Brace rails shall be 2 7/8 inch outside diameter and weigh 5.79 lb. per linear foot.

G. Gate posts: Gate posts shall be four (4) inches outside diameter and weigh 9.10 lb. per linear foot.

H. Post Caps: Steel pipe posts shall be capped with caps of the manufacturer's standard material, as approved; posts shall have arms projecting outward and formed with tongues or other approved means for attachment of the barbed wire.

I. Gates: The gates shall be double swing gates as indicated on the Drawings. Gates shall be of woven wire fabric in suitable, amply braced frames. Hinges shall be of approved material and of ample strength. The gates shall be provided with suitable latches and provisions for locking an automatic galvanized steel back stops to hold them in the open position.

J. Padlock: A heavy brass or bronze padlock shall be furnished with each gate. The padlocks shall be equal to locks manufactured by Yale and Towne, Corbin, or approved equal and shall have two (2) keys per each lock installed.

K. Galvanizing: Material used in the fence construction, shall be galvanized with a heavy coating (not less than two ounces per square foot of surface) of zinc smelter using the hot dip process. The surface areas of tubular steel shall be the area of both inside and outside surfaces.

L. Ground Rods: 5/8" nominal diameter x 8' long Copperweld rod, Burndy type GAR.

2.2 Barbed Wire Fence and Gates:

A. Barbed Wire: Barbed wire shall consist of 3 strands of 12 ½ gauge wire with four (4) round or half round barbs spaced five (5) inches apart. Wire shall be steel in accordance with ASTM A 121.

B. Treated Timber Posts and Braces: Posts shall be round. Braces shall be round or square. Treated timber posts and braces shall be in accordance with Section 1014 of the referenced standard.

C. Steel Posts and Braces: Steel posts and braces shall be equipped with corrugations, knobs, notches, holes or studs so placed and constructed as to engage a substantial number of fence wires in proper position. Posts may be punched with holes in such position and of such size as will not unduly impair the strength of the posts. Posts with punched tabs used for fastening wires are not acceptable. Corner, end and bracing posts shall be supplied with necessary holes and with galvanized bolts of standard commercial quality or other satisfactory substitute, such as castings, for fastening braces to the posts. Line posts, anchor plates and braces shall comply with ASTM A 702, except that a hardness test may not be substituted for the tensile test. Steel posts, anchor plates and braces shall be galvanized in accordance with ASTM A123.

D. Staples and Nails: Staples and nails shall be made of galvanized steel wire. Minimum galvanized coating shall be not less than 0.20 ounce per square foot when tested in accordance with ASTM A 90.

E. Metal Fasteners for Steel Posts: Metal fasteners for steel posts shall be galvanized steel-wire fasteners or clamps and shall be satisfactory for use with the type of steel post furnished. Wire shall not be less than 0.120 inch diameter. Galvanized coating shall not be less than 0.20 once per square foot when tested in accordance with ASTM A 90.

F. Gates: Steel used in fabricating gates shall be galvanized in accordance with ASTM A 653 Coating Designation G60 (A653M Coating Designation Z180).

G. Gate Posts: Treated timber posts shall comply with Section 1014. Metals posts shall be made of galvanized steel pipe, standard weight, complying with ASTM A 53.

H. Gate Hardware: Hinges, washers, nails, staples, welded chains and latches shall be galvanized, of acceptable quality, and of satisfactory type for use with the gate and posts selected.

2.3 Wood Fence and Gates

A. Wood Pickets: Vertical timber pickets shall be standard 1"x 6" x 6' number 2 grade "DOG EARED" cedar pickets.

B. Wood Runners: Horizontal wood runners for wood fence shall be standard 2"x4"x10ft. number 2 grade pressure treated timber. The degree of treatment shall be equal to "Penta" 0.25.

C. Line Posts: Line posts shall be 2 3/8 inch outside diameter and weigh 3.65 lb. per linear foot.

D. End and Corner Posts: End and corner posts shall be 4" inch outside diameter and weigh 9.10 per linear foot.

- E. Post Caps: Steel pipe posts shall be capped with caps of the manufacturer's standard material, as approved.
- F. Screws: Fasteners for attaching pickets to runner shall be standard galvanized steel self sinking 2 1/4" long wood screws. Two (2) required each picket at each runner.
- G. Galvanizing: Ferrous material used in the fence construction, shall be galvanized with a heavy coating (not less than two ounces per square foot of surface) of zinc smelter using the hot dip process. The surface areas of tubular steel shall be the area of both inside and outside surfaces.
- H. Gate Lock: A gate lock shall be required at each wooden gate. The gate lock shall be designed to accommodate a maximum of five (5) padlocks. Each padlock shall be capable of opening the gate independently of the other padlocks. The gate lock shall be "5 Padlock Multi-lock" as manufactured by Tayhope Enterprises, LTD. of Aberdeen, United Kingdom, Gate Closures, Inc., or approved equal.

2.4 Woven Wire Fence and Gates:

- A. Woven Wire: Woven wire shall comply with Subsection 1010-02 of the referenced Standard.
- B. Posts and Braces: Posts and braces shall be either steel or treated timber in accordance with Subsection 1010.3 of the referenced Standard.
- C. Gates: Gates shall be in accordance with subsection 1010.6 of the referenced Standard.
- D. Padlock: A heavy brass or bronze padlock with a shackle chain shall be furnished with each gate. The padlock shall be equal to locks manufactured by Yale and Towne, Corbin, or approved equal and shall have two (2) keys per each lock installed.
- E. Galvanizing: All steel material used in gate construction, shall be galvanized in accordance with ASTM A525, G90, Coating Designation x 1.25 Commercial.
- F. Ground Rods: 5/8" nominal diameter x 8' long Copperweld rod, Bundy type GAR.

2.5 Rebuilt Fence and Gates: The Contractor shall take down and rebuild existing fence utilizing existing fencing materials. Fence shall be rebuilt in the same manner as specified for new fence.

2.6 Concrete: Portland cement concrete for setting posts shall attain a minimum average 28-day compressive strength of 1,800 psi. Concrete shall be Class R in accordance with Section 03300 - Cast-in-Place Concrete.

PART 3 - EXECUTION

3.1 Erection of Chain Link Fence and Gates:

- A. The fences and gates shall be erected by skilled mechanics in accordance with the recommendations of the manufacturer.
- B. The post shall be embedded as indicated on the Drawings. Posts shall be set in cast-in-place concrete at least nine (9) inches and no greater than one (1) foot in diameter and three (3) feet below grade. The top of the post bases shall be crowned to shed water or installed to grade.
- C. Fabric shall be connected to line posts with No. 9 gauge wire clips every 12 inches; to top rail with No. 9 gauge wire clips every 12 inches; to terminal, corner and gate posts with 1/4 inch by 3/4 inch tension bars tied with No. 11 gauge one (1) inch wide steel bands and secured with 3/8 inch diameter bolts and nuts every 12 inches; and to tension wire with No. 11 gauge hog clips every 12 inches.
- D. The fence shall follow the contours of the ground as nearly as is practical.
- E. Posts shall be spaced a maximum of ten (10') feet on centers.
- F. Corner, gates and pull posts shall be braced as recommended by the manufacturer and as approved.
- G. Two (2) grounding devices shall be installed at the project site. The devices shall be spaced a maximum of three hundred (300') feet on centers and at a minimum shall be installed on opposing diagonal corners of the new chain link fence.

3.2 Erection of Barbed Wire Fence and Gates:

- A. The fences and gates shall be erected by skilled mechanics in accordance with the recommendations of the manufacturer.
- B. The post shall be embedded as indicated on the Drawings.
- C. Barbed wire shall be connected to line posts with No. 9 gauge wire clips every 12 inches; to terminal, corner and gate posts with 1/4 inch by 3/4 inch tension bars tied with No. 11 gauge one (1) inch wide steel bands and secured with 3/8 inch diameter bolts and nuts every 12 inches; and to tension wire with No. 11 gauge hog clips every 12 inches.
- D. The fence shall follow the contours of the ground as nearly as is practical.
- E. Posts shall be spaced a maximum of ten (10') feet on centers.
- F. Corner, gates and pull posts shall be braced as recommended by the manufacturer and as approved.

G. Wood posts shall be placed with small end up. Tops of posts shall be set to required grade and alignment. Cutting of wood post tops will be allowed only when approved. Cut ends shall be treated with two (2) applications of the same type preservative used for post treatment. Wire shall be stretched taut.

3.3 Erection of Wood Fence and Gates:

A. The fences and gates shall be erected by skilled mechanics in accordance with the recommendations of the manufacturer. Posts shall be set in cast-in-place concrete. The top of the post bases shall be crowned to shed water or installed to grade.

B. The fence shall follow the contours of the ground as nearly as is practical.

C. Posts shall be spaced a maximum of eight (8') feet on centers.

D. Wood pickets shall be installed with a 1/8" gap-typical.

3.4 Erection of Woven Wire Fence:

A. The fences and gates shall be erected by skilled mechanics in accordance with the recommendations of the manufacturer. Posts shall be set in cast-in-place concrete at least nine (9) inches and no greater than one (1) foot in diameter and three (3) feet below grade.

B. Wood posts shall be set small end up. The top of the post bases shall be crowned to shed water or installed to grade.

C. Woven wire shall be fastened to line posts with galvanized staples for wood posts and galvanized steel wire fasteners or clamps for metal posts.

D. The fence shall follow the contours of the ground as nearly as is practical.

E. Posts shall be spaced a maximum of ten (10) feet on centers.

F. Corner, gates and pull posts shall be adequately braced.

G. Ground rods shall be located and spaced along each segment of fence, at maximum 500 foot intervals.

3.5 Rebuilt Fence: When specified, the contractor shall take down, move back and rebuild existing fence. Fence shall be rebuilt in the same manner as specified for new fence. Rebuilt ornamental fence, picket fence or other special type fence shall be equal in all respects to existing fence.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 02706**PORTLAND CEMENT CONCRETE WALKS AND DRIVES**PART 1 - GENERAL

1.1 Scope: The CONTRACTOR shall furnish all labor, materials, tools and equipment, and perform operations necessary for construction of portland cement concrete walks, drives and incidental pavements.

1.2 Submittals: Submit product data in accordance with provisions of Section 01340 - Shop Drawings, Samples and Project Data.

1.3 Applicable Publication: 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 Society for Testing and Material (ASTM) Publications:

D994 Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)

B. American Association of State Highway and Transportation Officials (AASHTO) Publication:

M148 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

1.4 Referenced Standard: Conform to the following sections of the State of Louisiana, Department of Transportation and Development, "Standard Specifications for Roads and Bridges", 2016 Edition, except as modified herein:

Section 706 - Concrete Walks, Drives, and Incidental Paving
Section 806 - Reinforcement
Section 901 - Portland Cement Concrete
Section 1005 - Joint Materials for Pavements and Structures
Section 1011 - Concrete Curing Material

All references made therein to measurement and payment are deleted.

PART 2 - PRODUCTS

2.1 Portland Cement Concrete: This material shall be equal to that as designated as Class M in Section 901 of the Referenced Standard with a minimum average compressive strength at 28 days of 3,000 psi.

2.2 Curing Compound: This material shall conform to AASHTO Designation M148 and be on the LDOTD Qualified Products list. The curing compound shall be white pigmented.

2.3 Fiber Reinforcement: All concrete pavement shall be reinforced with the use of collated, fibrillated polypropylene 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 (1 ½ lbs./C.Y.) pounds 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.

2.4 Joint Material: Joint material shall be either bituminous type or wood. Bituminous type shall consist of asphalt and cellular fibers and conform to ASTM Designation D1751. The bituminous type shall be "Seal Tight" Fiber Expansion Joint Filler as manufactured by W.R. Meadows of Elgin, Illinois, (800) 342-5976. Wood type shall be clear heart redwood.

2.5 Removable Expansion Joint Cap: The removable expansion joint cap shall be "Removable Expansion Joint Cap Strip" as manufactured by AFCO Plastic Products of Olive Branch, Mississippi, (601) 895-8686 of the sizes shown on the Drawings.

2.6 Joint Sealant: Joint sealant shall be Sonneborn Sonomeric Sealant CT 1 or approved equal.

2.7 Steel Reinforcement: Steel reinforcement shall conform to Subsection 1009 of the Referenced Standard, except that all reinforcement shall be Grade 60.

2.8 Bar and Wire Supports: Bar and wire supports shall be commercially fabricated from steel or plastic. Steel supports shall be provided with sandplates. Plastic supports shall be provided with a round base. Bar and wire supports shall be as manufactured by MEDCO and available through Construction Materials of Alexandria, Louisiana, (318) 448-4448.

PART 3 - EXECUTION

3.1 General (New Construction): Walks, drives and incidental paving shall be constructed by the CONTRACTOR in the best workmanlike manner. The underlying subgrade, as well as the finish surface, shall conform to the requirements of these Specifications and of the Drawings. Walks, drives and paving shall be constructed on compacted subgrade. Subgrade shall be compacted as specified in Section 02203 - Excavation, Embankment and Backfill.

3.2 Protection of Adjacent Surfaces: Buildings or structures directly adjacent to concrete work shall be protected during all phases of construction. Protection methods shall include, but not be limited to barricades or padding to prevent building damage by all construction equipment and visqueen plastics or heavy canvas secured to the building at a minimum height of three (3') feet to prevent staining or concrete spatter of building surfaces. All protection methods shall be approved by the ENGINEER prior to the start of construction.

3.3 Portland Cement Concrete Walks, Drives and Incidental Paving: This work shall conform to Section 706 - "Concrete Walks, Drives and Incidental Paving" of the Referenced Standard. All work related to this Section shall conform to the applicable provisions contained in the Referenced Standard, except as revised herein.

3.4 Sidewalks: The CONTRACTOR shall reconstruct the four (4") inch thick portland cement concrete sidewalks where shown or as directed. The new sidewalk shall be constructed on a compacted, prepared subgrade.

3.5 Drives: The CONTRACTOR shall reconstruct the concrete driveways where shown or as directed. The new driveways shall be constructed on a compacted, prepared subgrade. New driveways shall be constructed flush with the existing driveway surface.

3.6 Finishing: Finishing concrete by either machine or hand may be used. Pavement surface shall be finished with a broom finish conforming to subsection 706.03(d) of the referenced Standard.

3.7 Joints: Expansion, longitudinal and dummy joints shall be constructed as detailed on the Drawings.

3.8 Curing Compound: All pavement shall receive white pigmented spray sealant curing compound upon completion of finish work.

3.9 Backfill and Compaction: Refer to Section 02203 - Excavation, Embankment and Backfill.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 02713**TEMPORARY SIGNS, BARRICADES, AND BARRIERS**PART 1 - GENERAL

1.1 Scope: This Section covers minimum project construction signing, barricades, traffic control devices, other materials, and manpower required for proper routing, regulation, direction, and maintenance of vehicular traffic and pedestrian traffic during construction of the project.

1.2 Reference Standard:

A. Work shall conform to the following Section of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as modified herein:

Section 713 - Temporary Traffic Control
Section 729 - Traffic Signs and Devices
Section 737 - Painted Traffic Striping
Section 1018 - Miscellaneous Materials

All references made therein to measurement and payment are hereby deleted.

B. Work shall conform to the United States Department of Transportation Federal Highway Administration Manual on Uniform Traffic Control Devices.

PART 2 - PRODUCTS

2.1 Temporary Signs, Barricades, Barriers and Pavement Markings: Refer to Section 713 - Temporary Control of the referenced Standard.

2.2 Painted Traffic Striping: Refer to the Referenced Standard Section 737 - Painted Traffic Striping and Section 1015.08 - Temporary Pavement Markings.

2.3 Signs: Refer to the Referenced Standard Section 729 - Traffic Signs and Devices and Section 1015.04(b) - Temporary Sign Panels.

2.4 Warning Lights: Refer to the Referenced Standard Section 1018.12 - Barricade Warning Lights.

PART 3 - EXECUTION

3.1 General:

A. The CONTRACTOR shall be responsible for providing safe and expeditious movement of traffic through 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 driving or walking public.

B. Remove temporary equipment and facilities when no longer required, restore area to original, or to specified conditions.

C. Portions of this project are located along heavily traveled streets. The CONTRACTOR is required to maintain at least one lane for traffic with barricades and flagmen at all times.

D. CONTRACTOR shall video document the condition of existing paved surfaces within the construction limits. Documentation may prevent pavement repairs at the CONTRACTOR'S expense. All paved surfaces damaged due to the CONTRACTOR'S operations will be replaced at the CONTRACTOR'S expense.

3.2 Signing Sequences: Signing sequence shall conform with the "Manual on Uniform Traffic Control Devices." These requirements shall be considered a minimum standard necessary to meet contractual obligations. Additional signs as may be necessary for the safety of the public and construction crews shall be the CONTRACTOR'S sole responsibility and shall not relieve him of any liability in connection thereof.

3.3 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.

B. The CONTRACTOR shall provide at least five (5) working days notification to the ENGINEER and to the applicable governing authority of the necessity to close any portion of a roadway carrying vehicles or pedestrians so that the final approval by the applicable governing authority can be obtained. At no time will more than one (1) lane of a roadway be closed to vehicles and pedestrians. With such closings, adequate provision shall be made for the safe expeditious movement of each.

C. The CONTRACTOR shall also be responsible for notifying Fire, Police and Ambulance Departments whenever roads are impassible at least 24 hours in advance of any closure.

D. 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 preconstruction traffic control scheme.

E. The CONTRACTOR shall immediately notify the OWNER of any vehicular or pedestrian safety or efficiency problems incurred as a result of the construction of the project.

F. Construction signing, detours, and traffic control devices shall be in accordance with the Louisiana Manual of Uniform Traffic Control Devices.

G. The CONTRACTOR shall maintain pedestrian traffic with the use of plywood, handrails, temporary steps, etc. as required to safely and satisfactorily maintain public access to sidewalks, entrances, etc.

H. The CONTRACTOR shall erect barricades with flashing lights on public streets where construction excavation, debris, equipment, material, etc. is left overnight. All materials furnished and work performed as provided by this section shall be considered as a subsidiary obligation under this contract with no separate pay item provided.

3.4 Existing Signage: Any existing signs in conflict with lane closure signs and/or other construction signs shall be covered or temporarily taken down as required, at no additional cost. Only one signing sequence shall be visible at any one time.

3.5 Removal and Replacement of Existing Signs: Existing signs removed for construction shall be reinstalled to original location or relocated as directed by the ENGINEER at no additional cost to OWNER.

3.6 Removal of Temporary Signs: Remove temporary equipment and facilities when no longer required, restore grounds, to original, or to specified conditions.

3.7 Final Pavement Striping: The Contractor shall replace all striping damaged or removed by the Contractor's operations. Final pavement traffic striping shall match existing striping and shall be installed in conformance with Section 737 - Painted Traffic Striping of the referenced Standard.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement: Temporary Signs, Barricades and Barriers, including satisfactory installation and maintenance of signs, barricades, traffic control and safety items, completed and accepted as specified shall be measured per Lump Sum job.

4.2 Payment: Temporary Signs, Barricades and Barriers, measured as provided above, will be paid at the Contract Lump Sum price, based upon approved estimated percent complete at time of pay request, which price and payment shall constitute full compensation for furnishing all signs, barricades, traffic control and safety items in accordance with the Drawings and Specifications.

4.3 Pay Item: Payment will be made under Temporary Signs, Barricades and Barriers (02713) per Lump Sum Job.

- END OF SECTION -

SECTION 02730**ACCESS ROAD**PART 1 - GENERAL

1.1 Scope: This work consists of furnishing and placing a base course and surface course on a prepared subgrade surface for the access road(s) and within the site(s) to the limits shown on the Drawings in accordance with the Specifications and in conformity with the lines, grades, thicknesses and typical cross section shown on the Drawings or established by the ENGINEER.

1.2 Reference Standard: Work shall conform to the following Sections of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as may be modified herein:

- Section 203 - Excavation and Embankment
- Section 302 - Class II Base Course
- Section 401 - Aggregate Surface Course
- Section 1003 - Aggregates
- Section 1019 - Geotextile Fabric and Geocomposite Systems

All references made therein to measurement and payment are deleted.

1.3 Submittals: Submittals, samples and certificates of compliance shall be provided in accordance with Section 01340 - Shop Drawings, Samples and Project Data.

PART 2 - PRODUCTS

2.1 Embankment: All material used for embankment shall be "Usable Soils" in accordance with paragraph 203.06(a) of the referenced standard.

2.2 Geotextile Fabric: Geotextile fabric shall meet the requirements for Class D geotextile fabric of Subsection 1019 of the referenced standard.

2.3 Base Course: All materials for base course shall be "Stone" conforming to Section 1003.03.1 of the referenced standard.

2.4 Surface Course: All material for surface course shall be "Stone" conforming to Section 1003.05.1 of the referenced standard and the following gradation:

<u>Stone Size</u>	<u>Percent Passing</u>
1-1/2"	100
3/4"	50-100
#4	35-65
#40	10-32
#200	3-15

PART 3 - EXECUTION

3.1 General: All work related to this Section shall conform to applicable provisions of the referenced specification except as amended herein.

3.2 Stripping: Topsoil removal from areas to receive fill shall be stripped in accordance with Section 02102 - Clearing, Grubbing and Stripping, Paragraph 3.3.

3.3 Surface Preparation (Subgrade): After completion of all stripping, the entire earth surface on or against which fill is to be placed shall be thoroughly broken and compacted to a depth of six (6") inches to 98% standard proctor density within (2%) percent optimum moisture content. If for any cause, this broken surface becomes compacted in such a manner that, in the opinion of the ENGINEER, a plane of seepage or weakness might be induced, it shall again be adequately scarified before depositing material thereon.

3.4 Embankment: Embankment shall be placed in horizontal benches not exceeding nine (9) inches in loose depth and then compacted. Layers shall be started full out to the slope stakes and shall be carried substantially horizontal and parallel to the access road with sufficient crown or slope to provide satisfactory drainage during construction. When the surface crown or slope to previously compacted layer is too smooth to bond properly with the succeeding layer, it shall be adequately scarified before the next layer is placed thereon. After spreading and prior to compaction, each layer shall be broken down with two (2) complete coverages of a loaded disk. No material shall be placed on surfaces that are muddy, frozen or contain frost. Each layer shall be spread uniformly on a prepared surface which has been moistened or dried as necessary and scarified or otherwise broken up in such a manner that the fill will bond on the surface on which it is to be placed. When the moisture content and conditions of the spread layers are satisfactory, each layer shall be compacted to not less than 98% of standard proctor density within two (2%) percent optimum moisture content.

3.5 Base Course: The installation of the base course shall conform to the applicable subsections of the Reference Standard. Base course shall be placed in six (6") inch loose lifts. Compaction shall be in accordance with Paragraph 302.07 of the referenced Standard. Minimum compaction shall be 98% of standard proctor density within two (2%) percent optimum moisture content.

3.6 Geotextile Fabric: Geotextile fabric shall be installed beneath the crushed stone base course and the soil subgrade in accordance with Section 203.11 of the referenced standard.

3.7 Surface Course: The installation of the surface course shall conform to the applicable subsections of the Reference Standard. The Contractor shall construct all surface course to the lines, depth and grades as shown on the Drawings. Surface course shall be a minimum of three (3") inches thick unless otherwise shown on the Drawings. The surface course shall be placed, shaped and compacted in accordance with Section 401 - Aggregate Surface Course of the Reference Standard which requires the use of a pneumatic tire or steel wheel roller. The surface shall be tight and smooth.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 02903**WARNING SIGNS**PART 1 - GENERAL

- 1.1 Scope: This Section covers the furnishing and installation of informational signage at the Well Site as shown on the Drawings and specified herein.
- 1.2 Submittals: Submit product data and cut sheets in accordance with the provisions of Section 01340 - Shop Drawings, Samples and Product Data.

PART 2 - PRODUCTS

- 2.1 Sign Panels: Sign panels to be 0.080" aluminum with reflective face. Sizes, layouts and quantities are as shown on the Drawings.

PART 3 - EXECUTION

- 3.1 Installation: Attach one (1) of each sign to the fencing at the locations described herein. Signs shall be secured to the fence with No. 9 gauge aluminum wire clips (4 per sign).
- 3.2 Locations: Sign mounting locations shall be on each of the four (4) sides of the well site.
- 3.3 Cleaning: Remove any protective films upon completion of installation.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.
CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

DIVISION 3 - CONCRETE

Section 03100 - CONCRETE FORMWORK
Section 03200 - CONCRETE REINFORCEMENT
Section 03300 - CAST-IN-PLACE CONCRETE

SECTION 03100

CONCRETE FORMWORK

PART 1 - GENERAL

1.1 Scope: This Section includes the furnishing of all labor, materials, tools and equipment, and perform all operations necessary to furnish, place, finish, and cure portland cement concrete for those structures requiring form work.

1.2 Referenced Standard: Work shall conform to the following Sections of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as may be modified herein:

Section 805 - Structural Concrete

All references made therein to measurement and payment are deleted.

1.3 Submittals: Submit product data in accordance with provisions of Section 01340 - Shop Drawings, Samples and Project Data.

1.4 Storage and Handling:

A. Forms shall be stored in a neat and orderly fashion and protected from damage.

B. If any form is deemed by the ENGINEER to be unfit for use, it shall be removed from the job.

C. Forms shall be cleaned and stacked immediately after stripping from concrete.

PART 2 - PRODUCTS

2.1 General: Materials shall conform to applicable provisions of Sections or Subsections referred to in the Referenced Standard.

PART 3 - EXECUTION

3.1 General: All work related to this Section shall conform to the applicable provisions contained in the Referenced Standard.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 **Scope:** This Section includes furnishing of all labor, materials, tools and equipment, and perform all operations necessary for concrete reinforcement work indicated on the Drawings and as directed by the ENGINEER.

1.2 **Referenced Standard:** Work shall conform to the following Sections of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as may be modified herein:

Section 806 - Reinforcement

All references made therein to measurement and payment are deleted.

1.3 **Submittals:** Submittals consisting of mill certificates and steel bending fabrication drawings and bar tests shall be provided in accordance with Section 01340 - Shop Drawings, Samples and Product Data.

PART 2 - PRODUCTS

2.1 **General:** Reinforcement shall conform to Subsection 1009 of the Referenced Standard, except that all reinforcement shall be Grade 60.

2.2 **Bar and Wire Supports:** Bar and wire supports shall be commercially fabricated from steel or plastic. Steel supports shall be provided with sandplates. Plastic supports shall be provided with a round base. Bar and wire supports shall be as manufactured by MEDCO and available through Construction Materials of Alexandria, Louisiana, (318) 448-4448.

PART 3 - EXECUTION

3.1 **General:** All work related to this Section shall conform to the applicable provisions contained in the Referenced Standard.

PART 4 - MEASUREMENT AND PAYMENT

4.1 **Method of Measurement and Payment:** This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 03300**CAST-IN-PLACE CONCRETE**PART 1 - GENERAL

1.1 Scope: This Section covers all operations necessary for cast-in-place concrete work indicated on the Drawings and specified herein.

1.2 Referenced Standard: Work shall conform to the following Sections of the State of Louisiana, Department of Transportation and Development, "Louisiana Standard Specifications for Roads and Bridges", 2016 Edition, except as may be modified herein:

Section 901 - Portland Cement Concrete

Section 902 - Portland Cement Concrete for Minor Structures.

All references made therein to measurement and payment are deleted.

1.3 Submittals: Submit product data in accordance with provisions of Section 01340 - Shop Drawings, Samples and Project Data.

PART 2 - PRODUCTS

2.1 General: Material for portland cement concrete shall conform to the applicable sections and subsections for the Referenced Standard.

2.2 Flyash: No flyash shall be used for any structure for this project.

2.3 Portland Pozzolan Cement: No portland pozzolan cement shall be used for any structure for this project.

2.4. Non-Shrink Cement Grout: Non-shrink cement grout shall consist of cement, aggregate and additives formulated to meet the following volume change requirements. Early volume change (within 24 hours) as tested by ASTM C827 shall be limited to zero (0) percent shrinkage and four (4) percent maximum expansion. Long term volume change of hardened non-shrink cement grout (after 1 day for cure) shall conform to the Corps or Engineers Specification for Non-Shrink Grout, CRD-C621-82B. Shrinkage shall be zero (0) percent and expansion limited to a maximum of 0.4 percent volume change. Cement additives required to meet this specification shall be recommended by the grout manufacturer but shall be non-staining and non-metallic. Grout shall be equal to "Five Star" cement products manufactured by the U.S. Grout Corporation.

2.5 Non-Shrink Epoxy Grout: Non-shrink epoxy grout shall meet plastic volume changes within the first four (4) hours of zero (0) percent shrinkage and four (4) percent maximum expansion as tested by ASTM C827. Restrained hardened epoxy grout shall have zero (0) percent shrinkage as tested by ASTM C537. Epoxy grout shall have zero (0) percent expansion in volume change after set under constant temperature conditions. Epoxy grout shall be 100 percent solids formulated with resin, hardener and aggregate as recommended by the manufacturer. Epoxy grout shall be equal to “Five Star” epoxy products manufactured by the U.S. Grout Corporation.

PART 3 - EXECUTION

3.1 General: All work related to this Section shall conform to the applicable provisions contained in the Referenced Standard.

3.2 Concrete Compressive Strength: The average compressive strength in 28 days of portland cement concrete shall be as follows:

Item	28 Day Compressive Strength (PSI)	Structural Class
Thrust Blocking, Pipe Bollards, Fence Posts	1,800	R
Valve Pads, Sidewalks	3,000	M
Wellhead Foundation	3,800	A

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.

CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

DIVISION 5 - METALS

Section 05500 - MISCELLANEOUS METALS

SECTION 05500**MISCELLANEOUS METALS**PART 1 - GENERAL

1.1 Scope: This Section covers manufactured metal and shop built items such as fabricated steel pipe supports, electrical control panel rack, pipe bollards, pipe supports, etc.

1.2 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 36	Standard Specification for Carbon Structural Steel
A 123-84	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
A 386-78	Zinc Coating (Hot-Dip) on Assembled Steel Products.
A 446-85	Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural. Physical Quality.

C. American Welding Society (AWS) Publication:

D1.1-86	Structural Welding Code - Steel

D. Military Specifications (mil spec.)

MIL-C-18480A (Docks) and AM3	Coating Compound, Bituminous, Solvent, Coal Tar Base

1.3 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 A 123, A 386, A 446, or A 525, 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.

1.4 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.

1.5. Submittals: Submit shop drawings, etc., in accordance with Section 01340 -Shop Drawings, Samples & Project Data.

A. 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.

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.

1.6 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.

1.7 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

2.1 Pipe Supports: 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. Each flange shall be secured to concrete floor by a minimum of two (2) expansion bolts. Saddle supports shall be Grinnel Figure No. 264 or approved equal. Where used under base fittings, a suitable flange shall be substituted for the saddle. Pipe supports to be coated with same coating system to be used on the aboveground piping as specified herein.

2.2 Pipe Bollards: Pipe bollards shall be as shown on the Drawings. The pipe shall be six (6) inch diameter, Schedule 40 wall thickness .

2.3 Anchors, Bolts and Fastening Devices:

A. Anchors, bolts, etc. shall be furnished as necessary for installation of the work of this Section.

B. Material shall be as noted on the Drawings. If not noted, provide in 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.

C. 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.

2.4 Electrical Rack: The mounting frame for the electrical panels shall be constructed of Schedule 40 galvanized steel pipe sized as indicated on the Drawings. The electrical panels shall be attached to the pipe frame with hot dipped galvanized channel, 1 5/8" x 1 5/8" x 12 gauge. 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.

2.5 Electrical Control Shed Roof Panel: The electrical control shed roof panels shall be 24 gauge galvanized painted steel ribbed panel formed from flat coiled sheets. Panels shall be finished with "KYNAR" finish with color selected by OWNER.

2.6 Ladder for Steel Aerator Tower: Standard ASTM A-36 structural steel components including legs, beams, angles, plates, rails, etc., all welded steel assembly in conformance with AWWA D100-96 for welding. The ladder shall be painted in accordance with Section 09900.

2.7 Aerator Tower: All steel components of aerator towers shall be A36. Legs of tower shall be 8" Schedule 40 steel pipe conforming to ASTM A53 Grade A. Hand rails shall be 1 1/2" Schedule 40 steel pipe conforming to ASTM A53 Grade A. Entire structure shall be painted in accordance with Section 09900.

PART 3 - EXECUTION

3.1 Examination:

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.2 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.

3.3 Installation:

- A. Install items plumb and level, accurately fitted, 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.

3.4 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.

3.5 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.

3.6 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.

3.7 Erection Tolerances:

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Alignment: 1/4 inch.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.

CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

DIVISION 9 - FINISHES

Section 09900 - PAINTING

SECTION 09900**PAINTING**PART 1 - GENERAL

1.1 Scope: The work includes painting and finishing of all exposed ductile cast iron pipe, fittings, valves, pipe supports, etc., which are not shop painted by the manufacturer. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified under other sections of the Work.

1.2 Submittals: Submit the following in accordance with provisions of Section 01340 - Shop Drawings, Samples And Project Data. Manufacturer's current printed product description, materials safety and technical data sheets shall be furnished for all coating systems. Detailed mixing, thinning and application instructions, minimum and maximum application temperature, and curing and drying times between coats shall be furnished for epoxy and moisture cure polyurethane.

1.3 Delivery and Storage:

A. Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label.

B. Job Conditions: Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50°F and 90°F unless otherwise permitted by the paint manufacturer's printed instructions.

PART 2 - PRODUCTS

2.1 Material Quality: Provide the best quality grade of the various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable.

2.2 Manufacturers: Manufacturer shall be Tnemec or approved equal.

2.3 Paint Schedule: The following schedule is not intended to be a complete list of materials and work required but a guide to the type, quality and finish required for the various surfaces. Paint all exposed surfaces whether or not colors are designated in "schedules", except where the natural finish of the material is specifically noted as a surface not to be painted.

PAINTING SCHEDULE			
SUBSTRATE	PRIME/SHOP COAT	FIELD INTERMEDIATE	FINISH COAT
Exposed or Aboveground Steel , Including Pipe Supports, Mechanical Equipment, Piping and Valves in Valve Pit, Etc.	Series 90-97 Tnemec-Zinc at 3.0 - 4.0 mils DFT	Series 66 HI-Build Epoxiline at 4.0 - 6.0 mils DFT	Series 1074U Endura- Shield II at 3.0 - 5.0 mils DFT
Exposed or Aboveground Ductile Iron , Including Valves, Mechanical Equipment, Fabricated Flanged Ductile Iron Pipe and Flanged Ductile Iron Fittings, Piping and Valves in Valve Pit, Etc.	Series 66 HI-Build Epoxiline at 4.0 - 6.0 mils DFT	Series 66 HI-Build Epoxiline at 4.0 - 6.0 mils DFT	Series 1074U Endura- Shield II at 3.0 - 5.0 mils DFT

PART 3 - EXECUTION

3.1 Inspection:

- A. Applicator must examine the areas and conditions under which painting work is to be applied and must notify the CONTRACTOR in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the ENGINEER.
- B. Starting of painting work will be construed as the Applicator's acceptance of the surfaces and conditions within any particular area.
- C. Do not paint over mildew, dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.

3.2 Surface Preparation:

- A. General: Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
 - 1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify ENGINEER in writing of any anticipated problems in using the specified coating systems with substrates primed by others.

2. Remove all hardware, hardware accessories (including hinges), machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted. Provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items.

3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Schedule the cleaning and painting so that contaminants from the cleaning process will not fall onto wet, newly-painted surfaces.

B. Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by mechanical cleaning to SSPC - SP11.

1. Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these Specifications.

2. Clean and touch up with the same type shop primer.

C. Aluminum and Galvanized Surfaces: Clean free of oil and surface contaminants with an acceptable nonpetroleum based solvent.

3.3 Materials Preparation:

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in clean condition, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density, and stir as required during the application of the materials. Do not stir surface film into the material. Remove the film, and if, necessary, strain the material before using.

D. Apply paint in accordance with the manufacturer's directions. Use applicators and techniques best suited for the substrate and type of material being applied.

3.4 Application:

A. Scheduling and Painting:

1. Apply the first coat materials to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

2. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lighting or loss of adhesion of the undercoat or as recommended by manufacturer.
- B. Apply each material at not less than the manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.
- C. Apply a prime coat of material which is required to be painted or finished and which has not been coated by others. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- D. Primer coats may be omitted for surfaces specified to receive factory applied primer if primer is compatible with finish coats; touch-up as required.
- E. Sand and dust between coats to remove visible defects.
- F. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
- G. Do not apply additional coats until completed coat has been viewed by ENGINEER. Each coat shall be viewed by ENGINEER.
- H. Apply paint only when moisture content of surfaces is within manufacturer's recommended limits, and dew point levels.
- I. Apply paint materials using clean brushes, rollers or spraying equipment.
- J. Finish coats shall be smooth, free of brush marks, streaks, laps or pile-up of paint, skipped or missed areas.
- K. Make edges of paint adjoining other materials or colors clean and sharp without overlapping.
- L. For Pigmented (Opaque) Finishes, completely cover to provide an opaque, smooth surface of uniform finish, color appearance, and coverage. Cloudiness, spotting, laps, brush marks, runs, sags, ropiness or other surface imperfection will not be acceptable.
- M. On completed work, match approval samples for color, texture and coverage. Remove, refinish or repair work not in conformance with specified requirements.

3.5 Cleaning and Protection:

A. Clean up:

1. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.
2. Upon completion of painting work, clean paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
3. Cloths, cotton waste and other debris that might constitute a fire hazard shall be placed in closed metal containers and removed at the end of each day. Upon completion of the work, staging, scaffolding, and containers shall be removed from the site or destroyed in an approved manner. Paint and other deposits on adjacent surfaces shall be removed and the entire job left clean and acceptable.

B. Protection:

1. Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing and replacing, and repainting, as acceptable to the ENGINEER.
2. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
3. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.6 Colors: The OWNER shall make color selections from the paint manufacturer standard color selection charts.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.
CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

DIVISION 13 - SPECIAL CONSTRUCTION

- Section 13100 - TEST WELL PILOT HOLE
- Section 13200 - WATER TEST WELLS
- Section 13300 - WATER PRODUCTION WELLS
- Section 13400 - WATER WELL PUMP & MOTOR
- Section 13500 - WATER SAMPLING AND ANALYSIS
- Section 13600 - WATER WELL ABANDONMENT
- Section 13650 - CHLORINATION EQUIPMENT
- Section 13700 - PHOSPHATE FEED SYSTEM
- Section 13800 - HORIZONTAL SUBMERSIBLE BOOSTER PUMP
ASSEMBLIES
- Section 13900 - GROUND STORAGE TANKS
- Section 13950 - ALUMINUM FORCED DRAFT AERATOR

SECTION 13100**TEST WELL PILOT HOLE**PART 1 - GENERAL

1.1 Scope: This Section covers the drilling of pilot hole(s) to determine the location, thickness, and other characteristics of underground aquifer(s). The CONTRACTOR shall furnish all materials, labor, equipment, tools, etc. to complete all work as required and intended by the Specifications and Drawings.

1.2 Issuance of Work Order for Water Well Pilot Hole: See Specification Section 01010 - Summary of Work. The authorization to proceed with the test well pilot hole will be commensurate with the Notice To Proceed. The information and recommendations provided by the CONTRACTOR, based on his analysis of the pilot hole data, will be used by the OWNER to determine the specifics (if any) of constructing a water test well at the site indicated on the Drawings.

1.3 Quality Assurance:

A. The CONTRACTOR shall employ only competent workmen for this contract, and all applicable work shall be performed by or under the supervision of an experienced well driller.

B. A qualified ground water hydrologist, retained by the CONTRACTOR, shall review all available data, including but not limited to, the driller's log, electric logs, sieve analysis, etc., and recommend the most probable formation(s) that will meet the intent and purpose of the water supply project. The hydrologist shall recommend to the ENGINEER, in writing, all major water production well characteristics as described herein.

1.4 Submittals: Submittals shall include at least the following and shall be provided in accordance with Section 01340 - Shop Drawings, Samples and Project Data.

A. Name, address and telephone number of a competent ground water hydrologist who shall evaluate the test data for the CONTRACTOR and supply a professional experience resume showing evaluation of similar ground water supply systems.

B. Names, addresses, and telephone numbers of three (3) references where similar work in the same formations was completed by the hydrologist for the purpose of constructing a ground water supply system.

C. A complete description of major pieces of drilling equipment to be used for this project.

- D. A list of materials with sizes, and grade or weight to be used for the pilot hole construction.
- E. Five (5) copies of each geophysical log marked as field prints to the ENGINEER upon completion of the logging procedures.
- F. Five (5) copies each of Phase I Contractor's Report.

1.5 Codes:

- A. The CONTRACTOR shall comply with all applicable requirements of the Louisiana Department of Transportation and Development; the Louisiana Department of Health; and the Louisiana Department of Natural Resources.
- B. In drilling of the pilot hole, due precaution shall be taken by the CONTRACTOR to maintain the premises in a sanitary condition to avoid, as much as is practical, the entrance of contaminated water into fresh water-bearing formations.

1.6 Basis of Payment: Payment to the Contractor for the pilot hole work shall be based on the maximum depth obtained by the electrical log.

PART 2 - PRODUCTS

2.1 Drilling Water: All water used for well drilling and development shall be potable and properly chlorinated to prevent groundwater contamination. See Specification Section 01500 - TEMPORARY FACILITIES.

2.2 Drilling Mud: Should drilling mud be necessary, a commercial bentonite-type shall be used during the drilling operations. The viscosity of the mud shall be sufficient to carry the heaviest drilled material to the surface. No organic-type mud shall be allowed.

2.3 Geophysical Logs: The geophysical logs of the pilot hole shall be made by person(s) or commercial firms experienced in geophysical logging to verify the depth, thickness and character of the water-bearing sands and/or salinity of the water. The geophysical logs shall be as follows:

- A. A standard driller's log consisting of a visual log of all formations at intervals of ten (5') feet. The log shall note the character of the material and the exact depth of each change in material. Samples of sand shall be collected by the CONTRACTOR for the ENGINEER at five (5') foot intervals or at any change for each water bearing strata being investigated. Each sample shall be bagged and clearly labeled in one (1) pint cloth sample bags and marked as to depth, sample number, and date of collection.
- B. A standard electric log with one (1) spontaneous potential and two (2) resistivity curves, including one (1) for a short normal spacing of sixteen inches (16") and one (1)

for a long normal spacing of sixty four (64") inches. The scale of the electric log shall be determined as dictated by the condition of the site geology.

C. A radioactivity log which measures the natural formation gamma radiation level in standard API units.

PART 3 - EXECUTION

3.1 Pilot Hole:

A. The CONTRACTOR shall drill a pilot hole to the depth(s) indicated in the Specifications or, if in a productive formation, continue to the formation change in material. The diameter of the pilot hole will not be less than is required for logging equipment to enter the hole.

B. The pilot hole is for the purpose of ascertaining a suitable water supply production well location, obtaining geological and hydrological data, collecting geological samples and determining the nature, thickness and altitude of the water-bearing formations and overlying strata from the surface downward to depths indicated by the ENGINEER.

C. The pilot hole shall be large enough in diameter to accommodate geophysical survey instruments for the purpose of obtaining the specified geophysical logs, and shall be drilled to a reasonable and plumb alignment, to the specified base depth or, if in a productive formation, continued to the formation change in material.

D. During and after the pilot hole has been drilled to the depth specified, the CONTRACTOR shall obtain the geophysical logs described in Paragraph 2.3 Geophysical Logs for the full drilled depth of the pilot hole. The logs shall be made to verify the depth, thickness and character of the water-bearing sands and salinity of the water.

3.2 Phase I Contractor's Report: The CONTRACTOR'S Hydrologist shall review the formation sand samples and field copies of the geophysical logs obtained from the pilot hole and make a recommendation to either continue with the test well or abandon this pilot hole site, and advise the ENGINEER as to the likelihood of a new site needing to be pursued. The Phase I Contractor's Report shall include as a minimum the following information:

A. Driller's log of pilot hole, signed and dated by the well driller (or drilling machine operator). The log will record the materials penetrated to the nearest foot.

B. Geophysical Logs (Electric logs, Radioactivity Logs and Drillers log).

C. Lab analysis of sand formation permeability.

- D. Effective grain size, uniformity coefficient of sand, graph of cumulative percent retained versus grain size of sand.
- E. Static water level measurements, along with the times that the measurements were made.
- F. Recommended strata to be screened and developed into a test well.
- G. Recommended screen slot size and sieve analysis of gravel pack, if required, to be used should the production well be constructed.

3.3 Over Drilling: If the drilled pilot hole is deeper than the interval to be screened. A cement-bentonite slurry plug shall be placed in the open hole. The plug shall extend from the bottom of the pilot hole upward to a depth within twenty feet of the bottom of the proposed screen setting or to the top clay or shale layer underlying the sand to be screened.

3.4 Termination of Work: The OWNER may decide not to proceed with the water test well after all or portions of the pilot hole work has been completed. The Owner shall then notify the CONTRACTOR in writing of his decision ,and the CONTRACTOR shall then terminate any and all pilot hole work, plug and abandon the pilot hole, and restore the site to as near as possible to its original condition.

3.5 Plug and Abandon Hole: In the event the CONTRACTOR is unable to locate a water-bearing formation of adequate permeability and thickness to facilitate construction of the proposed production well, the Owner may order the hole to be plugged and abandoned. This work shall be in accordance with Specification Section 13600 - WATER WELL ABANDONMENT.

3.6 Backfill of Mud Pit: All contents of mud pits including pumped sand, clay, drilling fluids, water, etc. shall be removed from the pits before backfilling. Pits shall be backfilled with the excavated material in layers not exceeding twelve (12") inches and mechanically compacted to 95% standard proctor density. Should any additional material be required to complete backfill of the mud pits, that material shall be approved by Engineer before installation.

3.7 Filling and Grading: Upon completion of work, all disturbed areas shall be dress graded. Grading work shall result in positive drainage and in a surface finish suitable for mowing.

3.8 Alternate Test Well Pilot Hole Sites: In the event the CONTRACTOR is unable to locate a water-bearing formation of adequate permeability and thickness to facilitate construction of the proposed production well at the initial location, the OWNER may instruct the CONTRACTOR to drill again, under the same conditions and unit prices as prevailed at the first site, at another mutually acceptable location to be provided by the OWNER. The CONTRACTOR shall be paid for pilot holes, logging, testing, water sample, etc. in accordance with the bid proposal cost schedule.

3.9 Failure to Perform Work: A satisfactory pilot hole acceptable under these specifications shall be completed to the depth designated. If the CONTRACTOR fails to drill a pilot hole to the depth specified by the ENGINEER, the hole shall be declared abandoned. Any phase in which the CONTRACTOR voluntarily stops work or fails to complete in a satisfactory manner within the overall limit set by this contract shall be considered as abandoned by him and no payment shall be made for any part of that drilling work.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Pilot Hole(s):

A. Measurement: Pilot hole(s) measurement will be per linear foot drilled, logged and accepted. This includes all geophysical logs.

B. Payment: Pilot hole(s), in placed and accepted, will be paid at the contract unit price per linear foot. Basis of payment for pilot hole work shall be based on actual depth obtained and recorded on the electrical log.

C. Pay Items: Payment will be made under Pilot Hole To a Base Depth of XX Feet, (13100), per L.F.

4.2 Pilot Hole Analysis:

A. Measurement: The pilot hole analysis including static water level measurement, comparison of driller's log, geophysical and electric logs to existing data and Phase I Contractor's Report will be measured per the lump sum job performed and accepted.

B. Payment: The pilot hole analysis will be paid at the contract unit price per lump sum job performed and accepted.

C. Pay Items: Payment will be made under Pilot Hole Analysis, (13100), per Lump Sum.

- END OF SECTION -

SECTION 13200**WATER TEST WELLS**PART 1 - GENERAL

1.1 Scope: This Section covers the completion of water test well(s) to determine the quantity and quality of water available in an underground aquifer(s). The CONTRACTOR shall furnish all materials, labor, equipment, tools, etc. to complete all work as required and intended by the Specifications and Drawings.

1.2 Issuance of Work Order for Water Test Well Construction: See Specification Section 01010 - Summary of Work. If the results of the pilot hole work warrant and indicate the suitability of one or more of the water bearing stratas in regards to both quality and potential quantity, the CONTRACTOR will then be authorized by the OWNER to proceed with the construction of the water test well. The information and recommendations provided by the CONTRACTOR, based on his analysis of the pilot hole data, will be used by the OWNER to determine the specifics (if any) of constructing a water test well at the site indicated on the Drawings.

1.3 Quality Assurance:

A. The CONTRACTOR shall employ only competent workmen for this contract, and all applicable work shall be performed by or under the supervision of an experienced well driller or pump installer/mechanic.

B. A qualified ground water Hydrologist, retained by the CONTRACTOR, shall review all available data, including but not limited to, pumping tests, water sampling and analysis, etc., and recommend the most probable formation(s) that will meet the intent and purpose of the water supply project. The hydrologist shall recommend to the ENGINEER, in writing, all major production well characteristics as described herein.

1.4 Submittals: Submittals shall include at least the following and shall be provided in accordance with Section 01340 - Shop Drawings, Samples and Project Data.

A. Name, address and telephone number of a competent ground water hydrologist who shall evaluate the test data for the CONTRACTOR and supply a professional experience resume showing evaluation of similar ground water supply systems.

B. Names, addresses, and telephone numbers of three (3) references where similar work in the same formations was completed by him for the purpose of constructing a ground water supply system.

- C. Name, address and telephone number of an independent laboratory which is to perform chemical analysis of all water samples in accordance with Specification Section 13400 - Water Sampling and Analysis.
- D. A complete description of major pieces of drilling equipment to be used for this project.
- E. A list of materials with sizes, and grade or weight to be used for the test well construction.
- F. Five (5) copies each of Phase II Contractor's Report.

1.5 Codes:

- A. The CONTRACTOR shall comply with all applicable requirements of the Louisiana Department of Transportation and Development and the Louisiana Department of Health and Hospitals.
- B. In drilling and reaming of the pilot hole, due precaution shall be taken by the CONTRACTOR to maintain the premises in a sanitary condition to avoid, as much as is practical, the entrance of contaminated water into fresh water-bearing formations.

1.7 Basis of Payment: It is anticipated that one (1) water test well will be constructed under this Contract to the sizes and depths as shown on the Drawings. Should final construction and quantities differ from the Drawings and Specifications, final compensation shall be adjusted by the bid unit prices.

PART 2 - PRODUCTS

2.1 Drilling Water: All water used for well drilling and development shall be potable and properly chlorinated to prevent groundwater contamination. See Specification Section 01500 - TEMPORARY FACILITIES.

2.2 Drilling Mud: Should drilling mud be necessary, a commercial bentonite-type shall be used during the drilling operations. The viscosity of the mud shall be sufficient to carry the heaviest drilled material to the surface. No organic-type mud shall be allowed.

2.3 Temporary Casing: The temporary casing shall be steel ASTM A53, Grade B, 4" diameter, 0.237" wall thickness. The temporary casing shall be furnished in sections of not more than 20' in length. The temporary casing shall be provided with screwed couplings.

2.4 Temporary Screen: The temporary screen shall have 4" diameter and be of sufficient length to allow for test pumping and developing at the specified rates and times. The temporary screen shall be constructed of stainless steel type 304.

PART 3 - EXECUTION

3.1 Test Well Construction:

A. If results of the pilot hole work warrant and indicate the existence of potential water bearing sands, the CONTRACTOR shall ream the pilot hole to a diameter of 9 7/8" and set a non-permanent test casing and screen in the deepest formation to be investigated. The test casing and screen is for use in obtaining water samples and determination of "apparent" specific capacity and static water level of the formation being investigated. The test casing and screen shall have a minimum diameter of four (4") inches.

B. The drilling method of reaming the pilot hole shall be the same as the original pilot hole drilling procedure. Only commercial bentonite-type drilling fluid shall be used. No organic-type drilling mud shall be allowed.

C. Upon completion of reaming, the CONTRACTOR shall set four (4") inch minimum diameter stainless steel well screen, up to fifty (50') feet in length to appropriate intervals designated by the ENGINEER to test the formation(s) selected for development. The screen material shall be of sufficient strength to be retrieved from the test well. The screen slot size shall retain at least ninety (90%) percent of the gravel pack material (if used) for this temporary test well. The well screen shall be securely connected to four (4") inch diameter steel casing and be of sufficient material strength to be removed from the well upon the completion of the test well procedures.

D. The casing and screen shall be placed in the test well hole at the designated stratum, gravel packed, if necessary, and development started as soon as possible. This is to preclude drilling fluid intrusion into the sampling interval as much as reasonably possible.

3.2 Test Well Development: After the screen is set, development (as outlined below) shall continue until the water is clean, and free of drilling fluid and fine sand. Development shall continue until the well is fully developed or produces a sustained yield of not less than 50 gallons per minute (GPM) and for a minimum time of twelve (12) hours.

A. Development with Air: The CONTRACTOR shall develop the test well with an adequate size air compressor as long as the yield increases or to the satisfaction of the ENGINEER. If, in the opinion of the ENGINEER, proper development is not being achieved with air, the procedure outlined in paragraph B, below shall be applied.

B. Development with Surge Plunger, Jetting Tool, or Tandem Agitator with Air Compressor: When development with air has failed to produce the desired yield, a solid or valved surge plunger, jetting tool or agitator shall be used. The surging, jetting, or agitating shall be started slowly at first and increased as the yield increases and continued until satisfactory results are obtained.

3.3 Test Pump and Pumping:

A. The CONTRACTOR shall provide an electrically driven centrifugal test pump, capable of producing a minimum capacity of fifty (50) gpm with adequate total dynamic head considering static level, friction losses and well drawdown.

B. The test pump shall be lowered to near the bottom of the screen. Each screened interval shall be pumped separately. Only screened intervals in separate and distinct sand formations shall be pumped.

C. A foot valve shall be required in the intake suction pipe or a check valve immediately above the submersible pump bowl of the test pump to prevent instantaneous recharge to the aquifer.

D. The test well will be continuously pumped for a period of 24 hours at a constant rate of 50 gpm. The discharge of the test pump will be measured by means of a circular orifice meter and the water level measured to the nearest inch with an electrical device. An air line shall be required for water level measurements if the water surface cannot be determined between the casing and the pump column with an electrical device. Measurement of the yield and water level will be made every five (5) minutes for the first one (1) hour of the test and then every fifteen (15) minutes for the next two (2) hours. Measurements between three (3) hours and five (5) hours should be made thirty (30) minutes apart and then after five (5) hours and until the end of the test they can be made hourly. The Hydrologist may elect to make suggestions to the ENGINEER as to time intervals for the water measurements.

E. Each stratum shall be pumped or developed for a minimum of twelve (12) hours before a representative water sample from that interval is collected.

F. At the end of the twelve (12) hour pumping interval, and after the pump is shut down, the recovery of the water level shall be measured and recorded for a period of twelve (12) hours or until the water level has reached the original static level. The schedule of the recovery measurements shall be made at the same time intervals that the measurements were made during the pumping portion of the test.

G. Care shall be exercised to seal off all other water-bearing formations from the stratum being tested.

H. Water pumped from the test well shall be conducted to a place adjacent to the well site or to right-of-way within a reasonable distance to where it will be possible to dispose of the water without damage to property or the creation of a nuisance.

I. Should field testing of the water quality prove questionable to meet the intent of this ground water supply project, further test pumping may be authorized by the ENGINEER.

3.4 Water Sample Collection and Analysis: See Specification Section 13500 - Water Sampling and Analysis.

3.5 Phase II Contractor's Report: The CONTRACTOR'S Hydrologist shall review the test pumping data by appropriate analysis techniques and provide the following information:

- A. Recommend strata(s) to be screened and developed into a production well.
- B. Recommend the screen slot size and sieve analysis of gravel pack to be used should the permanent well be constructed.
- C. Aquifer transmissivity,
- D. Aquifer formation permeability,
- E. Radius of influence,
- F. Degree of development of the production well.
- G. Well specific capacity.
- H. Well efficiency of the production well.
- I. Coefficient of transmissivity of the formation screened (short-term).
- J. Coefficient of transmissivity of the formation screened (long-term).
- K. Estimated yield capacity, from each sand interval recommended, if applicable, in gallons per minute.
- L. Apparent safe yield of the well in gallons per day.
- M. Projected long-term pumping level in the production well.
- N. Recommended capacity for the permanent pumping equipment for the production well.
- O. Recommended pump bowl setting depth for the recommended yield

- P. Recommended record of well construction indicating length of casing, screen, lap pipe, etc.
- Q. Record of pumping test data, including times and corresponding water levels, discharge rates, recharge, etc.
- R. Provide comparison of the results of the laboratory analysis described in Specification Section 13500 - Water Sampling and Analysis, against E.P.A. Primary and Secondary Drinking Water Standards.

3.6 Testing of Additional Strata(s) in the Original Test Hole:

- A. If results of the pilot hole work indicate the existence of multiple potential water bearing sands, the CONTRACTOR may be ordered to investigate additional stratas in the original test hole. If this work is so ordered by the Engineer, the Contractor shall remove the original temporary casing and screen from the test well and install a cement-bentonite plug. This plug shall extend from the bottom of the drilled hole to the bottom of the water bearing strata to be investigated.
- B. Upon completion of installation of the cement-bentonite plug, the CONTRACTOR shall "recondition" the hole as necessary to allow for the installation of the temporary well screen and casing as described above. The strata shall then be developed and tested as described above.
- C. This procedure shall be repeated for each strata to be investigated.
- D. If the ENGINEER orders the testing of additional strata(s) in the original test hole, said authorization will be issued immediately without regard to the status of the results of chemical analyses being conducted on the prior water samples. The timely issuance of this authorization is meant to reduce idle downtime of the CONTRACTOR'S equipment and personnel and costs associated thereto.

3.7 Termination of Work: The OWNER may decide not to proceed with the permanent water production well after all or portions of the test well work have been completed. The OWNER shall then notify the CONTRACTOR in writing of his decision, and the CONTRACTOR shall then terminate any and all test well work, plug and abandon the test well, and restore the site to as near as possible to its original condition.

3.8 Plug and Abandon Test Hole/Well: In the event the CONTRACTOR is unable to locate a water-bearing formation of adequate permeability and thickness to facilitate construction of the proposed production well, the Owner may order the test well to be plugged and abandoned. This work shall be in accordance with Specification Section 13600 - Water Well Abandonment.

3.9 Alternate Test Well Sites: In the event the CONTRACTOR is unable to locate a water-bearing formation of adequate permeability and thickness to facilitate construction of the proposed production well at the initial location, the OWNER may instruct the CONTRACTOR to develop other test well(s), under the same conditions and unit prices as prevailed at the first site, at another mutually acceptable location to be provided by the OWNER. The CONTRACTOR shall be paid for reaming, casing, screen, pumping and development, testing, water sample, etc. in accordance with the bid proposal cost schedule.

3.10 Backfill of Mud Pit: All contents of mud pits including pumped sand, clay, drilling fluids, water, etc. shall be removed from the pits before backfilling. Pits shall be backfilled with the excavated material in layers not exceeding twelve (12") inches and mechanically compacted to 95% standard proctor density. Should any additional material be required to complete backfill of the mud pits, that material shall be approved by Engineer before installation.

3.11 Filling and Grading: Upon completion of work, all disturbed areas shall be dress graded. Grading work shall result in positive drainage and in a surface finish suitable for mowing.

3.12 Completion of Work: The CONTRACTOR shall remove the temporary casing and screen from the test well upon completion of the test well work and plug and abandon the test well in accordance with Specification Section 13600 - Water Well Abandonment and restore the site to as near as possible to its original condition.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Test Well No. X - Install Cement Plug:

A. Measurement: Cement plugs, installed to isolate differing stratas for test purposes, at the direction of the Engineer, will be measured per the linear foot, based on the distance from the bottom of the drilled hole, (or top of previous plug, as the case may be) to the bottom of the strata being investigated.

B. Payment: Cement plugs, in place and accepted, will be paid at the contract unit price per the linear foot installed and accepted.

C. Pay Items: Payment will be made under Test Well No. X – Install Cement Plug, (13200), per linear foot.

4.2 Test Well No. 1- Screen Initial Strata in Original Test Hole:

A. Measurement: The test wells will be measured per the linear foot of casing and screen installed.

B. Payment: Test wells, in place and accepted, will be paid at the contract unit price per the linear foot of casing and screen installed and accepted.

C. Pay Items: Payment will be made under Test Well No. 1 – Screen Initial Strata in Original Test Hole, (13200), per linear foot.

4.3 Test Well Development:

A. Measurement: The test well development will be measured per each development performed and accepted. This includes conducting and recording test pumping, collection and analysis of water samples and Phase II Contractor's report.

B. Payment: The test well development will be paid at the contract unit price per each strata investigated, performed and accepted.

C. Pay Items: Payment will be made under Test Well Development, (13200), per Each.

4.4 Test Well No. X - Screen Alternate Strata in Original Test Hole:

A. Measurement: The test well, screened in alternate strata(s) in the original test hole, will be measured per the linear foot of casing and screen installed.

B. Payment: Test well, screened in alternate strata(s) in the original test hole, in place and accepted, will be paid at the contract unit price per the linear foot of casing and screen installed and accepted.

C. Pay Items: Payment will be made under Test Well No. X – Screen Alternate Strata in Original Test Hole, (13200), per linear foot.

- END OF SECTION -

SECTION 13300**WATER PRODUCTION WELLS**PART 1 - GENERAL

1.1 Scope: This Section covers the construction of a water production well including reaming/conditioning of the test well(s), geophysical logs, etc., to determine the location, thickness, and other characteristics of underground aquifer(s); reaming of the pilot hole for installation of the well casing; cementing of the well casing; the setting of the well screen and lap pipe, well development, water sample collection and analysis, etc. The CONTRACTOR shall furnish all materials, labor, equipment, tools, etc. to complete all work as required and intended by the Specifications and Drawings.

1.2 Issuance of Work Order for Water Production Well Construction: See Specification Section 01010 - Summary of Work. If the results of the pilot hole work and test well work warrant and indicate the suitability of one or more of the water bearing stratas in regards to both quality and potential quality, the CONTRACTOR will then be authorized by the OWNER to proceed with the construction of the permanent water production well(s). The information and recommendations provided by the CONTRACTOR, based on his analysis of the pilot hole data and test well data, will be used by the OWNER to determine the specifics (if any) of constructing a water production well(s) at the site(s) indicated on the Drawings.

1.3 Quality Assurance:

A. The CONTRACTOR shall employ only competent workmen for this contract, and all applicable work shall be performed by or under the supervision of an experienced well driller or pump installer/mechanic.

B. A qualified ground water hydrologist, retained by the CONTRACTOR, shall review all available data, including but not limited to, the driller's log, electric logs, sieve analysis, pumping tests, water sampling and analysis, etc. to determine the most probable formation(s) that will meet the intent and purpose of the water supply project. The hydrologist shall recommend to the ENGINEER, in writing, all major water production well characteristics as described herein.

C. All equipment furnished under this Specification shall be new and unused, shall be the standard product of manufacturers having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of five (5) years.

1.4 Product Delivery, Storage and Handling:

A. Inspection of Material at Delivery Point:

1. When delivered to the site, and prior to unloading, the CONTRACTOR shall inspect all pipe, valves, valve boxes and accessories for loss, damage or lack of specified identification and markings.
2. Any defective or improper material shall be immediately marked and shall not be unloaded. Defective or improper material shall not be considered for payment as "material stored on or at the site".

B. Handling: In shipping, storing and installing pipe, valves and accessories shall be kept in a sound, undamaged condition. They shall, at all time, be handled with care and shall not be dropped, dumped or bumped against any other object. Any material(s) damaged shall be so marked and immediately removed from the job site.

C. Storing:

1. Pipe shall be stored off the ground on skids or pallets. Pipe shall be stacked with spigot ends projecting from the stack in opposite directions for alternate rows.
2. Valves, valve boxes, couplings, fittings, etc. shall be kept clean and dry.

D. Defective Materials: All materials found at any time during the progress of the work to have cracks, flaws, or other defects will be rejected and so marked and the CONTRACTOR shall promptly remove such defective material from the work site.

1.5 Submittals: Submittals shall include at least the following and shall be provided in accordance with Section 01340 - Shop Drawings, Samples and Project Data.

A. Name, address and telephone number of a competent ground water hydrologist who shall evaluate the test data for the CONTRACTOR and supply a professional experience resume showing evaluation of similar ground water supply systems.

B. Names, addresses, and telephone numbers of three (3) references where similar work in the same formations was completed by the hydrologist for the purpose of constructing a ground water supply system.

C. A complete description of major pieces of drilling equipment to be used for this project.

D. A list of materials with sizes, and grade or weight to be used for the production well construction.

- E. Five (5) copies of each geophysical log marked as field prints to the ENGINEER upon completion of the logging procedures.
- F. Name, address and telephone number of an independent laboratory which is to perform chemical analysis of all water samples in accordance with Specification Section 13400 - Water Sampling and Analysis.
- G. Five (5) copies each of Phase I Contractor's Report.
- H. Five (5) copies each of Phase II Contractor's Report.
- I. An additional copy of all drilling reports, logs and test analysis reports shall be submitted to the Engineer for submittal to LDH Engineering Services.

1.6 Codes:

- A. The CONTRACTOR shall comply with all applicable requirements of the Louisiana Administrative Code "*Title 51- Public Health – Sanitary Code, Part XII - Water Supplies*" and "*Title 56 - Public Works, Part 1 - Water Wells*".
- B. In drilling and reaming of the pilot hole, due precaution shall be taken by the CONTRACTOR to maintain the premises in a sanitary condition to avoid, as much as is practical, the entrance of contaminated water into fresh water-bearing formations.
- C. Upon the completion of all work, the CONTRACTOR shall complete the "Water Well Registration Long Form (DNR - GW-1)". The original shall be filed with the Department of Natural Resources. The CONTRACTOR shall keep the second copy of the triplicate form and the third copy shall be sent to the ENGINEER for delivery to the OWNER.

1.7 Basis of Payment: It is anticipated that two (2) water production wells will be constructed under this Contract to the sizes and depths as shown on the Drawings. Should final construction and quantities differ from the Drawings and Specifications, final compensation shall be adjusted by the bid unit prices.

PART 2 - PRODUCTS

2.1 General: The CONTRACTOR shall construct one (1) water production well with associated screen, casing, pump, motor, valves, piping, etc. It is desired that the well be constructed to a capacity of 300 gpm, minimum.

2.2 Drilling Water: All water used for well drilling and development shall be potable and properly chlorinated to prevent groundwater contamination. See Specification Section 01500 - TEMPORARY FACILITIES.

2.3 Drilling Mud: Should drilling mud be necessary, a commercial bentonite-type shall be used during the drilling operations. The viscosity of the mud shall be sufficient to carry the heaviest drilled material to the surface. No organic type mud shall be allowed.

2.4 Geophysical Logs: The geophysical logs of the pilot hole shall be made by person(s) or commercial firms experienced in geophysical logging to verify the depth, thickness and character of the water-bearing sands and/or salinity of the water. The geophysical logs shall be as follows:

A. A standard driller's log consisting of a visual log of all formations at intervals of ten (5') feet. The log shall note the character of the material and the exact depth of each change in material. Samples of sand shall be collected by the CONTRACTOR for the ENGINEER at five (5') foot intervals or at any change for each water bearing strata being investigated. Each sample shall be bagged and clearly labeled in one (1) pint cloth sample bags and marked as to depth, sample number, and date of collection.

B. A standard electric log with one (1) spontaneous potential and two (2) resistivity curves, including one (1) for a short normal spacing of sixteen inches (16") and one (1) for a long normal spacing of sixty four (64") inches. The scale of the electric log shall be determined as dictated by the condition of the site geology.

C. A radioactivity log which measures the natural formation gamma radiation level in standard API units.

2.5 Casing: The casing shall be of the nominal diameters with minimum wall thickness shown on the Drawings and of the length(s) required to suit field conditions. The casing shall be ASTM A 409 Type 304L stainless steel. The casing shall be furnished in interchangeable sections of not more than 40' in length. The casing shall be provided with plain ends for field welding.

2.6 Cement Bentonite Slurry: Cement bentonite slurry shall consist of a mixture of cement, bentonite and water consisting of not more than eight (8%) percent bentonite by dry weight of the cement and a maximum of ten (10) gallons of water per 95 pound sack of cement.

2.7 Neat Cement: Neat cement shall consist of a mixture of cement and water consisting of not more than five (5) gallons of water per 95 lb. sack of cement.

2.8 Well Screen: The well screens shall be of the diameters shown on the Drawings, and of the length(s) required to suit field conditions. The maximum slot opening will be recommended by the Contractor's hydrologist based upon his analysis of the sand samples. Well screens shall be of the continuous slot wire-wrapped design to provide maximum open area to reduce entrance velocity, increase hydraulic efficiency and promote more effective development. The well screens shall be constructed of v-shaped trapezoidal wire continuously wrapped around an array of equally spaced support rods. The surface wire shape shall cause the slot opening to widen inwardly to minimize clogging. Each junction of wire/rod contact shall be resistance welded. The screens and end fittings shall be made of Type 304L stainless steel. Well screens shall be designed to withstand a minimum installation depth of 1,000 feet. The minimum screen tensile strength shall be twice the total weight of the screen and any standard wall blank casing suspended below the top screen joint. The tensile strength shall be calculated as the total rod area

times material yield strength. The bottom of the screen shall be equipped with a back pressure valve which shall be cement grouted after the well development has been accepted by the ENGINEER as specified hereinafter. The well screen shall be "HI-FLOW (HI-Q)" as manufactured by Johnson Screens, a Weatherford Company, or approved equal. The well screen shall be selected so as to provide a maximum 0.1 fps entrance velocity.

2.9 Lap Pipe: The lap pipe shall be of the diameters with minimum wall thickness shown on the Drawings and of the length(s) required to suit field conditions. The lap pipe shall be ASTM A409, Type 304L stainless steel. The top end of the screen shall be attached to the lap pipe which shall extend into the bottom of the casing and shall be secured thereto in a secure manner, centered in the casing with a neoprene or other approved seal. The lap pipe will be attached to the screen by welding. The lap pipe shall have two (2) sets of centralizers, one close to the screen and one close to the top.

2.10 Gravel: The type and size gravel to be used shall be determined from the analysis of the sand from the water bearing formation. The gravel shall be washed, screened and without sharp edges. No limestone, crushed gravel or shale rock shall be used.

PART 3 - EXECUTION

3.1 General Installation:

A. Equipment, materials, installation, workmanship, fabrication, assembly, erection, examination, inspection and testing shall be in accordance with manufacturer's recommendations and standard construction procedures. Install piping straight and true to bear evenly on supports. Installation shall include furnishing the required oil and grease, if any, for initial operation.

B. Keep the interior and ends of new piping and existing piping thoroughly cleaned of water and foreign matter. Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping and fittings so that water and foreign matter will not enter the pipes or fittings. Inspect piping before placing into position.

3.2 Inspections:

A. The ENGINEER shall have the right to inspect, test or witness tests of all materials or equipment to be furnished under these Specifications, prior to their shipment from the point of manufacture. The ENGINEER shall be notified in writing prior to initial shipment, in ample time so that arrangements can be made for inspection by the ENGINEER.

B. Field pump tests shall not be conducted until such time that the entire installation is complete and ready for testing.

C. The CONTRACTOR shall furnish the ENGINEER with his detailed plan and procedure for conducting the required field pumps tests. The tests shall not be conducted until the ENGINEER has reviewed the procedure.

3.3 Pilot Hole:

A. The CONTRACTOR shall drill a pilot hole to the depth(s) indicated in the Specifications or, if in a productive formation, continue to the formation change in material. The diameter of the pilot hole will not be less than is required for logging equipment to enter the hole.

B. The pilot hole is for the purpose of ascertaining a suitable water supply production well location, obtaining geological and hydrological data, collecting geological samples and determining the nature, thickness and altitude of the water-bearing formations and overlying strata from the surface downward to depths indicated by the ENGINEER.

C. The pilot hole shall be large enough in diameter to accommodate geophysical survey instruments for the purpose of obtaining the specified geophysical logs, and shall be drilled to a reasonable and plumb alignment, to the specified base depth or, if in a productive formation, continued to the formation change in material.

D. During and after the pilot hole has been drilled to the depth specified, the CONTRACTOR shall obtain the geophysical logs described in Paragraph 2.4 Geophysical Logs for the full drilled depth of the pilot hole. The logs shall be made to verify the depth, thickness and character of the water-bearing sands and salinity of the water.

3.4 Phase III Contractor's Report: The CONTRACTOR'S Hydrologist shall review the formation sand samples and field copies of the geophysical logs obtained from the pilot hole and make a recommendation to either continue with the well or abandon this hole and advise the ENGINEER as to the likelihood of a new site needing to be pursued. The Phase III Contractor's Report shall include as a minimum the following information:

A. Driller's log of pilot hole, signed and dated by the well driller (or drilling machine operator). The log will record the materials penetrated to the nearest foot.

B. Geophysical Logs (Electric logs, Radioactivity Logs and Drillers log).

C. Lab analysis of sand formation permeability.

D. Effective grain size, uniformity coefficient of sand, graph of cumulative percent retained versus grain size of sand.

E. Static water level measurements, along with the times that the measurements were made.

F. Recommended strata to be screened and developed into a production well.

G. Recommended screen slot size and sieve analysis of gravel pack, if required, to be used should the production well be constructed.

3.5 Over Drilling: If the drilled pilot hole is deeper than the interval to be screened. A cement-bentonite slurry plug shall be placed in the open hole. The plug shall extend from the bottom of the pilot hole upward to a depth within twenty feet of the bottom of the proposed screen setting or to the top clay or shale layer underlying the sand to be screened.

3.6 Reaming of the Pilot Hole: The pilot hole shall be reamed by hydraulic rotary method or the reverse circulation method to a diameter required for the prudent working of the casing and at least six (6") inches larger than the outside diameter of the casing.

3.7 Casing: The bottom of the casing will be set at the top of the selected sand stratum aquifer as determined in the field. The top of the casing shall extend at least 18" above the well foundation. The casing shall be set in one continuous string. The CONTRACTOR shall keep an accurate record of the number and lengths of pipe installed in the well. The casing shall be fitted with sufficient centralizers to assure proper alignment inside the hole as it proceeds downward into position. The casing shall be set within the limits of plumbness and alignment as specified by AWWA A100 - Water Wells, Section 4.7.9. The Contractor shall test the installed casing for plumbness. The Contractor shall utilize any of the test procedures for plumbness as outlined in Appendix D of AWWA A100. Results of said tests shall be provided to Engineer in the format specified in Appendix D of AWWA A100. Casing which exceeds the maximum recommended deviation shall be removed and reset.

3.8 Cementing: The annular space between the casing and the hole shall be filled with cement bentonite slurry or neat cement. No method of cementing will be approved that does not specify the forcing of mixture or grout from the bottom of the space to be filled upwards to the ground surface. The grouting shall be done continuously in one operation until the grout overflows on the ground surface. No work will be permitted on the well until seventy-two (72) hours after the cementing operation unless quick-set cement is used.

3.9 Underreaming: The well hole below the casing shall be underreamed to a diameter at least fourteen (14) inches greater than the screen diameter. After the hole has been underreamed to the total depth required for the screen setting, the wall of the underreamed hole will be cleaned and made ready to receive the screen. The diameter of the underreamed hole shall be sufficient to allow pumping the design yield rate at no greater than five (5) times the natural flow limit of the formation.

3.10 Gravel Packing: The gravel pack sand size shall be determined by the CONTRACTOR on the basis of the test hole formation sand size analysis and shall be approved by the ENGINEER. Samples of gravel pack sand shall be submitted for analysis before approval by the ENGINEER. All gravel shall be disinfected in accordance with AWWA C654- "Disinfection of Wells" by mixing calcium hypochlorite with the gravel as it is placed in the well. The calcium hypochlorite shall be granulated (70%) and a minimum of 100 lbs. will be used in the well. The annular space between the screen and the wall of the underreamed hole shall be completely filled with the selected gravel. The gravel pack shall extend up into the space between the casing and the lap pipe a distance of five (5') feet. The gravel pack shall be placed in the well in such a way that bridging and voids will be eliminated. The gravel shall be sterilized with a fifty parts per million (50 ppm) chlorine solution as it is placed in the well. After development, and testing of the well, the gravel level will be measured and returned to a point five (5') feet below the top of the lap pipe if found deficient. The CONTRACTOR will pump water from the bottom of the well and supply clean water to the well for reverse

circulation while gravel is being placed. The gravel shall be protected in an appropriate manner to prevent contamination when stockpiled on the job site. At no time shall the gravel materials be placed in direct contact with the soil.

3.11 Development of the Well: After the screen has been set, the CONTRACTOR shall develop the well to remove all drilling mud and fine sand. Development shall consist of continuous pumping, agitation, on-off pumping, high capacity pumping and other approved methods. Well developing and pumping shall continue until the water is continuously free from sand and turbidity. If required for full development and cleaning of mud from the well, the CONTRACTOR shall furnish and place into the well screen and immediate area outside the screen a solution of sodium hexametaphosphate or other chemicals for dispersion of the mud in sufficient quantity to penetrate the formation for ten (10') feet in diameter adjacent to the screen which shall be allowed to set in the well a minimum of twelve (12) hours; and then pumped out until the well flows clear of mud, turbidity or discoloration. The development process will be accomplished by the use of a test pump capable of pumping 150% of the expected yield against the total expected lift. The pump should also be capable of variable discharges, some as low as 10% of the expected or design discharge. It is expected that the discharge at particular rates may be held constant for a period of as much as two (2) hours. This test pump shall have no check or foot valve so as to permit backwashing the well when the power is shut off. Any sand damage to the pump is the responsibility of the CONTRACTOR. During development, the CONTRACTOR shall provide the ENGINEER with reasonable yield estimates and water level measurements at specified times to determine the increase in specific capacity. The development shall continue until the ENGINEER decides further development is unnecessary. After the development has been completed the level of the top of the gravel in the space between the casing and the lap pipe shall be brought up to at least five (5') feet above the top of the screen. Then the well seal between the lap pipe and the casing will be set.

3.12 Production Well Testing: The production well will be continuously pumped for a period of 48 hours at a constant rate equal to the design or expected rate of discharge. The discharge of the test pump will be measured by means of a circular orifice meter and the water level measured to the nearest 100th of a foot with an electrical device. Measurement of the yield and water level will be made every five (5) minutes for the first one (1) hour of the test and then every fifteen (15) minutes for the next two (2) hours. Measurements between three (3) hours and five (5) hours should be made thirty (30) minutes apart and then after five (5) hours and until the end of the test they can be made hourly. After the pump is shut down, recovery measurements of the water level shall be made for a period equal to twelve (12) hours or until the water level has reached the original static level. The schedule of the recovery measurements shall be made at the same time intervals that the measurements were made during the pumping portion of the test. After testing of the well is completed and the test pump removed, the well shall be sounded and if there is any sand or other material inside the well, this material shall be cleaned out of the well. The CONTRACTOR shall provide his Hydrologist with the well testing data for preparation of the Phase III Contractor's Report.

3.13 Water Sample Collection and Analysis: See Specification Section 13500 - WATER SAMPLING AND ANALYSIS.

3.14 Phase II Contractor's Report: The CONTRACTOR'S Hydrologist shall review testing pumping data by appropriate analysis techniques and provide the Phase II Contractor's Report. The Phase II Contractor's Report shall include, as a minimum, the following information:

- A. Static water level measurements, along with the times that the measurements were made.
- B. Aquifer transmissivity,
- C. Aquifer formation permeability,
- D. Radius of influence,
- E. Degree of development of the production well.
- F. Well specific capacity.
- G. Well efficiency of the production well.
- H. Coefficient of transmissivity of the formation screened (short-term).
- I. Coefficient of transmissivity of the formation screened (long-term).
- J. Estimated yield capacity from each sand interval recommended, if applicable, in gallons per minute.
- K. Apparent safe yield of the well in gallons per day.
- L. Projected long-term pumping level in the production well.
- M. Recommended capacity for the permanent pumping equipment for the production well.
- N. Recommended pump bowl setting depth for the recommended yield
- O. Recommended record of well construction indicating length of casing, screen, lap pipe, etc.
- P. Record of pumping test data, including times and corresponding water levels, discharge rates, recharge, etc.
- Q. Provide comparison of the results of the laboratory analysis described in Specification Section 13500 - Water Sampling and Analysis, against E.P.A. Primary and Secondary Drinking Water Standards.

3.15 Well Guarantees:

A. The CONTRACTOR guarantees hereunder that the well will not produce sand in the water in quantities above 5 mg/l for a period of one year after acceptance, measured when well is operated prudently.

B. By evaluation of the final pumping tests of the well and the Hydrologist Report, the ENGINEER will determine the 48 hours specific capacity of the well in gallons per minute per foot of drawdown and the coefficient of transmissibility of the water bearing formation being drawn on by the well in gallons per day per foot. If the well's efficiency is less than 80% and/or pumping rate is less than the design or expected production at the end of the well development operations, the CONTRACTOR will continue the development operations to improve the well's efficiency until it equals or exceeds the required production.

C. If during the guarantee period the production of the well falls below the limit established above, the CONTRACTOR will, upon written notice from the ENGINEER, take whatever steps are necessary to improve the flow rate of the well. Such reworking or improvement of the well within the guarantee period of one year shall be subject to the same tests as specified for the new well.

D. Test pump draw down will not be brought lower than five (5') feet above the top of the screen.

3.16 Disposal of Water: Water pumped from the well shall be conducted to a place adjacent to the well site or to the right-of-way within a reasonable distance to where it will be possible to dispose of the water without damage to property or the creation of a nuisance. The CONTRACTOR shall provide suitable means of disposing of water and mud pumped from the well in a manner to pipe or channel such wastes so as to prevent the creation of nuisances or objectionable flows or deposits of materials.

3.17 Completed Well Registration: Upon the completion of all work, the CONTRACTOR shall complete the "Water Well Registration Long Form (DOTD-GW-1)" in accordance with State Act 535 (1972). The original shall be filed with LDOTD. The CONTRACTOR shall keep the second copy of the triplicate form and the third copy shall be sent to the ENGINEER for delivery to the OWNER.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Permanent Well Pilot Hole:

A. Measurement: Pilot hole measurement will be per linear foot drilled, logged and accepted. This includes all geophysical logs.

B. Payment: Pilot hole, in placed and accepted, will be paid at the contract unit price per linear foot. Basis of payment for pilot hole work shall be based on actual depth obtained and recorded on the electrical log.

C. Pay Items: Payment will be made under Permanent Well Pilot Hole, (13300), per L.F.

4.3 Pilot Hole Analysis:

A. Measurement: The pilot hole analysis including static water level measurement, comparison of driller's log, geophysical and electric logs to existing data and Phase III Contractor's Report will be measured per the lump sum job performed and accepted.

B. Payment: The pilot hole analysis will be paid at the contract unit price per lump sum job performed and accepted.

C. Pay Items: Payment will be made under Pilot Hole Analysis, (13300), per Lump Sum.

4.4 Cement Plug:

A. Measurement: Cement plugs, installed to isolate over drilled pilot hole from bottom of screen, at the direction of the Engineer, will be measured per the linear foot, based on the distance from the bottom of the drilled hole to the bottom of the screen.

B. Payment: Cement plugs, in place and accepted, will be paid at the contract unit price per the linear foot installed and accepted.

C. Pay Items: Payment will be made under Cement Plug, (13300), per linear foot.

4.5 Permanent Well Casing:

A. Measurement: Permanent well casing will be measured per linear foot of the size installed and accepted. This includes reaming of pilot hole, cement grout seal and centralizers.

B. Payment: Permanent well casing will be paid at the contract unit price per linear foot installed and accepted.

C. Pay Items: Payment will be made under Permanent Well Casing, (13300), per linear foot.

4.6 Well Screen:

A. Measurement: Well screen will be measured per linear foot of the size installed and accepted. This includes underreaming, gravel pack, washout plug and back pressure valve.

B. Payment: Well screen will be paid at the contract unit price per linear foot installed and accepted.

C. Pay Items: Payment will be made under Well Screen, (13300), per linear foot.

4.7 Well Lap Pipe:

- A. Measurement: Well lap pipe will be measured per linear foot installed and accepted, including centralizers.
- B. Payment: Well lap pipe will be paid at the contract unit price per linear foot installed and accepted.
- C. Pay Items: Payment will be made under Well Lap Pipe, (13300), per linear foot.

4.8 Well Development:

- A. Measurement: Well development will be measured per lump sum job performed and accepted. This includes all development pumping, well production testing, water sample collection, analysis and report for EPA Primary and Secondary Containments, disinfection and Phase IV Contractor's Report.
- B. Payment: Well development will be paid at the contract unit price per lump sum job performed and accepted.
- C. Pay Items: Payment will be made under Well Development, (13300), per lump sum.

- END OF SECTION -

SECTION 13400**WATER WELL PUMP AND MOTOR**PART 1 - GENERAL

1.1 Scope: This Section covers the pump installation, motor installation, test pumping, etc. The CONTRACTOR shall furnish all materials, labor, equipment, tools, etc. to complete all work as required and intended by the Specifications and Drawings.

1.2 Issuance of Work Order for Water Production Well Construction: See Specification Section 01010 - Summary of Work. If the results of the water production well work warrant and indicate the suitability of one or more of the water bearing stratas in regards to both quality and potential quantity, the CONTRACTOR will then be authorized by the OWNER to proceed with the installation of the permanent pump, motor, column assembly, etc. The information and recommendations provided by the CONTRACTOR, based on his analysis of the production well data and test well data, will be used by the OWNER to determine the specifics (if any) of constructing a water production well at the site indicated on the Drawings.

1.3 Quality Assurance:

A. The CONTRACTOR shall employ only competent workmen for this contract, and all applicable work shall be performed by or under the supervision of an experienced well driller or pump installer/mechanic.

B. All equipment furnished under this Specification shall be new and unused, shall be the standard product of manufacturers having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of five (5) years.

1.4 Product Delivery, Storage and Handling:

A. Inspection of Material at Delivery Point:

1. When delivered to the site, and prior to unloading, the CONTRACTOR shall inspect all pipe, valves, valve boxes and accessories for loss, damage or lack of specified identification and markings.

2. Any defective or improper material shall be immediately marked and shall not be unloaded. Defective or improper material shall not be considered for payment as "material stored on or at the site".

B. Handling: In shipping, storing and installing pipe, valves and accessories shall be kept in a sound, undamaged condition. They shall, at all time, be handled with care and shall not be dropped, dumped or bumped against any other object. Any material(s) damaged shall be so marked and immediately removed from the job site.

C. Storing:

1. Pipe shall be stored off the ground on skids or pallets. Pipe shall be stacked with spigot ends projecting from the stack in opposite directions for alternate rows.

2. Valves, valve boxes, couplings, fittings, etc. shall be kept clean and dry.

D. Defective Materials: All materials found at any time during the progress of the work to have cracks, flaws, or other defects will be rejected and so marked and the CONTRACTOR shall promptly remove such defective material from the work site.

1.5 Submittals: Submittals shall include at least the following and shall be provided in accordance with Section 01340 - Shop Drawings, Samples and Project Data.

A. A list of materials with sizes, and grade or weight to be used for the production well construction.

B. Data on the characteristics and performance of each pump. Data shall include guaranteed performance curves, based on actual shop tests, which show that they meet the specified requirements for head, capacity, efficiency, NPSHR, brake horsepower and input KW. Curves shall be submitted on 8½" by 11" sheets, at as large a scale as is practical. Curves shall be plotted from no flow at shut off head to pump capacity at minimum specified TDH. Catalog sheets showing a family of curves will not be acceptable.

C. Complete master wiring diagrams, elementary or control schematics, including coordination with other electrical control devices operating in conjunction with the Well Control System. Suitable outline Drawings shall be furnished for approval before proceeding with manufacture. Standard preprinted sheets of drawings simply marked to indicate applicability to this contract will not be acceptable.

D. Drawings showing the layout of the Well Pump Control Panel shall be furnished. The layout shall indicate every device mounted on the door with complete identification.

E. A list of manufacturer's recommended spare parts to be supplied, with the manufacturer's current price for each item. Include gaskets, seal, etc. on the list. List bearings by the bearing manufacturers numbers only.

F. Complete motor data including certified motor curves.

G. Shop and erection drawings showing all important details of construction and dimensions.

H. Descriptive literature, bulletins, and/or catalogs of the equipment.

1.6 Codes: The CONTRACTOR shall comply with all applicable requirements of the Louisiana Department of Transportation and Development and the Louisiana Department of Health.

1.7 Start-up Services: A factory representative of each major component manufacturer, who has complete knowledge of proper operation and maintenance, shall be provided for a minimum of two (2) hours to instruct representatives of the OWNER and the ENGINEER on proper operation and maintenance. The service will be performed only after all test pumping has been conducted, and electrical controls, have been installed and determined to be operational. Once all systems have been determined to be operational, the CONTRACTOR will notify the ENGINEER, in writing, to coordinate a date and time to perform the start-up.

1.8 Operation & Maintenance Manual: Complete operations and maintenance manuals shall be provided in accordance with Section 01730 - Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 General: The CONTRACTOR shall provide and install the pumps, motors, column assembly, etc.

2.2 Pump: Pump bowls, suction and discharge cases shall be of Type 304 Stainless Steel. Wear rings shall have the minimum practical clearance to the mating cylindrical surface of the impeller to provide adequate sealing independent of vertical positioning of the impellers. Bowls and cases shall have sleeve type bushings to support and guide the shaft. Bushing material shall be NBR. A sand collar shall be provided to protect the suction case bearing from abrasive in the liquid pumped. The discharge case shall have vanes to deliver the flow of water with minimum turbulence. The intermediate stages shall be selected to provide the maximum efficiency with least number of stages. Impeller shall be Type 304 Stainless Steel, machined, balanced, and filed for optimum performance and minimum vibration. The design shall be non-overloading for the capacity of the motor selected. The impeller shall be securely fastened to the bowl shaft with taper collets of ASTM A582, Grade 416 stainless steel. Bowl shaft shall be of sufficient diameter to transmit the pump horsepower with a liberal safety factor and rigidly support the impellers between the bowl or case bearings. The bowl shaft material shall be high chrome stainless steel of ASTM A276, Grade 410. The pump shall have a built-in check valve located at the top of the pump to prevent water backflow and subsequent pump back spin. The suction adaptor shall be Type 304 Stainless Steel designed to serve as the suction inlet, the lower bearing housing and the motor adaptor piece. The coupling housing portion shall be designed to prevent the entrance of abrasive material into the top end of the motor. The pump suction shall include a stainless steel strainer. The net inlet area shall be equal to at least five (5) times the impeller inlet area. The coupling connecting the motor to the pump bowl assembly shall be of sufficient size and strength to withstand maximum torque generated by the motor plus added safety factor. The coupling shall be of 329 stainless steel and keyed or splined to the pump

shaft. The pump shall be capable of producing 300 gpm @ 320' TDH, 40 HP and min 80% efficiency. The pump and motor shall be non-overloading at any point on the curve. The pump assembly shall be Model 300S as manufactured by Grundfos or approved equal. The pump and motor shall be non-overloading at any point on the curve.

2.3 Pump Column: The discharge pipe shall be steel, ASTM A53, Grade A electric weld prime line pipe, 6" diameter, 0.280" wall thickness with standard tapered pipe threads in accordance with ANSI B1.20.1. The discharge pipe shall be furnished in interchangeable sections of not more than twenty-one (21') feet in length. The discharge pipe shall be coupled together with threaded sleeve couplings. The threaded sleeve couplings shall be manufactured of steel, ASTM A 53. The top column section shall be factory machined and fitted for connection to the discharge base in a satisfactory manner so that no cutting or machine work in the field will be required.

2.4 Surface Discharge Elbow and Base: The discharge elbow shall be fabricated steel and shall be provided with a Class 150 ANSI 6" diameter raised face flange on the discharge side. The discharge elbow shall have an integral steel base and lifting lugs of sufficient strength to lift the entire head, column pipe and pump/motor assembly safely for installation and servicing operations. A threaded connection shall be provided in the head base for a terminal box. The base shall also be provided with threaded openings for a well vent and a water level indicator.

2.5 Motor: The motor shall be a 460 volt, 3 phase, 60 Hertz, 40 HP, not more than 3,450 rpm at no load and shall be of proper size to drive the pump continuously under the total head specified with a maximum operating temperature of 90°C. The motor shall be designed for continuous duty under water service. The motor thrust bearings shall have ample capacity to carry the weight of all the rotating parts plus the hydraulic thrust of the pump impellers, and have an ample safety factor. This factor should be based on an average life expectancy of five (5) years operation at twenty-four (24) hours per day. The motor shall be full voltage starting and shall conform to the standards of the National Electrical Manufacturers Association. The motor shall be water lubricated and hermetically sealed. The motor housing shall be stainless steel. The motor shall be as manufactured by Franklin or approved equal.

PART 3 - EXECUTION

3.1 General Installation:

A. Equipment, materials, installation, workmanship, fabrication, assembly, erection, examination, inspection and testing shall be in accordance with manufacturer's recommendations and standard construction procedures. Install piping straight and true to bear evenly on supports. Installation shall include furnishing the required oil and grease, if any, for initial operation.

B. Keep the interior and ends of new piping and existing piping thoroughly cleaned of water and foreign matter. Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping and fittings so that water and foreign matter will not enter the pipes or fittings. Inspect piping before placing into position.

C. The CONTRACTOR shall check all motors for correct clearance and alignment and for correct lubrication in accordance with manufacturer's instructions. The CONTRACTOR shall check direction of rotation of all motors and reverse connections if necessary.

D. The CONTRACTOR shall submit a certificate from the equipment manufacturer stating that the installation of the equipment is satisfactory, that the equipment is ready for operation, and that the operating personnel have been suitable instructed in the operation, lubrication and care of each unit.

3.2 Pipe and Fittings:

A. Inspect, test, and approve piping before installing. Provide fittings for changes in direction of piping and for all connections. Make changes in piping sizes through tapered reducing pipe fittings; do not use bushings.

B. Joint compound for pipe threads shall be polytetrafluoroethylene (PTFE) pipe thread tape or PTFE powder and oil; apply only on male threads. Provide exposed ferrous pipe threads with one coat of zinc chromate primer applied to a minimum dry film thickness of one mil.

C. Provide supports as shown on Drawings.

3.3 Inspections:

A. The ENGINEER shall have the right to inspect, test or witness tests of all materials or equipment to be furnished under these Specifications, prior to their shipment from the point of manufacture. The ENGINEER shall be notified in writing prior to initial shipment, in ample time so that arrangements can be made for inspection by the ENGINEER.

B. Field pump tests shall not be conducted until such time that the entire installation is complete and ready for testing.

C. The CONTRACTOR shall furnish the ENGINEER with his detailed plan and procedure for conducting the required field pumps tests. The tests shall not be conducted until the ENGINEER has reviewed the procedure.

3.4 Installation of Pumping Equipment: The CONTRACTOR shall furnish and install the pump, well head fittings, and motor equipment as specified elsewhere herein. The installation shall include the assembly of the pump and motor, column pipe, well head fittings, and all auxiliary equipment specified or supplied under this contract, as required to turn over to the OWNER a complete installation with all parts installed, connected, adjusted, tested, and in operable condition.

3.5 Field Pump Tests:

A. Operational Tests: The pump, motor, and controls once completely installed shall be given operational tests to substantiate and record the operation of the equipment at the design head, capacity, speed and horsepower as herein specified. The pump shall be tested at start-up and voltage, current and other significant parameters shall be recorded. Perform test on pumps, drivers, and equipment, including visual equipment checks to ensure compliance with approved shop drawings; pump start-run to ensure proper operation and to detect leakage of piping, valves and fittings; sequence of operation check; verification that required pump accessories have been provided; test of specified indicating lights; and additional inspections and tests necessary to ensure that the entire pump installation is correct, complete, and ready for operation. If the pump performance does not meet the Specifications, corrective measures shall be taken or the pump shall be removed and replaced with a pump which satisfies the conditions specified. A 24 hour operating period of the pumps will be required before acceptance. During this 24-hour operating period, the OWNER shall supply all power necessary. The operational test will be conducted only after the well and discharge piping has received Department of Health and Hospitals approval.

B. Hydrostatic Tests: Hydrostatically test piping system as described in Section 15120, Paragraph 3.4.

3.6 Disposal of Water: Water pumped from the well shall be conducted to a place adjacent to the well site or to the right-of-way within a reasonable distance to where it will be possible to dispose of the water without damage to property or the creation of a nuisance. The CONTRACTOR shall provide suitable means of disposing of water and mud pumped from the well in a manner to pipe or channel such wastes so as to prevent the creation of nuisances or objectionable flows or deposits of materials.

3.7 Electrical Service: Electrical work shall be in conformance with Division 16. The CONTRACTOR shall coordinate his work with the power company as to securing service to the service pole and any attachments and guying needed; and shall make all deposits and pay all fees for metering and connections, for transfer of billing on completion of construction to the OWNER.

3.8 Flushing: Flush all new pump suction and discharge piping at 100 percent of rated pump capacity. Continue flushing operations until water is clear, but for not less than ten (10) minutes.

3.9 Disinfection of Wells: After completion of the well and installation of permanent pumping equipment, the CONTRACTOR shall disinfect the well in accordance with AWWA C654 "Disinfection of Wells". The water in the casing shall be treated with a chlorine solution so that a chlorine residual of no less than 100 mg/L is in the entire volume of water in the casing. This shall be done by using calcium hypochlorite solution or sodium hypochlorite solution. The solution must reach all parts of the well. A tube shall be suspended through the well-casing vent, so that it reaches the bottom of the well. After the tube reaches the well bottom, the tube shall be withdrawn as the hypochlorite solution is pumped through the tube. After the chlorine has been applied, the well shall be surged at least three times to improve the mixing and induce contact of the chlorinated water with the adjacent aquifer. The chlorine residual of this water shall be verified and recorded. The chlorinated water shall be allowed to rest in the casing for at least 12 hours. After the well has been chlorinated and allowed to rest for at least 12 hours, it shall be pumped to waste. The discharge water shall be tested periodically for chlorine residual. When no detectable chlorine residual is measured, the well shall continue to be pumped to waste for at least 15 min before proceeding with bacteriological sampling. The CONTRACTOR shall obtain a certification, from the Louisiana Department of Health and Hospitals, that the well is clear of bacterial contamination. The CONTRACTOR shall provide a copy of the certification to the ENGINEER. The CONTRACTOR shall assure that water from the production well and associated system piping shall not be furnished for consumer's use until water samples collected and analyzed by the Louisiana Department of Health and Hospitals show the water to be free of coliform bacteria.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Pump Column Pipe:

- A. Measurement: Pump column pipe will be measured per linear foot of the size installed and accepted. This includes pump column pipe, couplings, etc.
- B. Payment: Pump column pipe and line shaft will be paid at the contract unit price per linear foot installed and accepted.
- C. Pay Items: Payment will be made under Pipe Column Pipe, (13400), per linear foot.

4.2 Submersible Pump and Motor:

- A. Measurement: Submersible pump and motor will be measured per the lump sum job installed and accepted. This includes the pump, motor, submersible cable, etc.
- B. Payment: Submersible pump and motor will be paid at the contract unit price per the lump sum job installed and accepted.
- C. Pay Items: Payment will be made under Submersible Pump and Motor, (13400), per lump sum.

- END OF SECTION -

SECTION 13500**WATER SAMPLING AND ANALYSIS**PART 1 - GENERAL

1.1 Scope: This Section covers the collection and analysis of water samples from the water test wells and water production wells to determine compliance with the U.S. Environmental Protection Agency's Primary and Secondary Drinking Water Standards and other parameters specified herein.

1.2 Quality Assurance: All water samples are to be collected and preserved by an experienced laboratory technician and analyzed by an independent testing laboratory certified in drinking water analysis by the U.S. Environmental Protection Agency and the Louisiana Department of Health.

1.3 Submittals: Submittals shall include at least the following:

- A. Name, address and telephone number of the independent testing laboratory which is to perform chemical analysis of the water samples.
- B. Five (5) copies each of laboratory analysis results.
- C. A project specific tabular comparison of the results of the laboratory analysis against the list of contaminants shown in the attached "New Source Chemical Testing – Louisiana Department of Health - Office of Public Health" and the attached "EPA Secondary Drinking Water Standards".

PART 2 - PRODUCTS - NONEPART 3 - EXECUTION

3.1 Water Sample Collection:

A. After the well(s) have been properly developed and has been flowing at least twelve (12) hours, at least three (3) water samples per screened interval shall be collected. These samples shall be collected, preserved and labeled by a representative of the laboratory performing the testing. The personnel shall be trained and knowledgeable on appropriate sampling collection and preservation techniques. Documentation of the chain of custody shall be provided with each sample. All water samples shall be placed in appropriate containers, securely closed to avoid spillage and contamination, and clearly labeled with the following information:

- 1. Owner and address
- 2. Name or number and location of well
- 3. Depth interval represented by the sample

4. Date taken
5. Time taken
6. Capacity of pump and time pumped before sample
7. Name, address, and telephone number of CONTRACTOR

3.2 Water Sample Analysis:

A. The following parameters shall be determined in the field by the laboratory technician immediately upon collection of samples. The results of the field analysis will immediately be made available to the Engineer.

1. True Color	7. Hydrogen Sulfide (H ₂ S)
2. Apparent Color	8. Carbon Dioxide (CO ₂)
3. Odor	9. Free Ammonia
4. pH	10. Total Ammonia
5. Temperature	11. Methane
6. Dissolved Oxygen	

B. Laboratory analyses shall be conducted on all samples for the contaminants listed in the attached “New Source Chemical Testing – Louisiana Department of Health - Office of Public Health” and the attached “EPA Secondary Drinking Water Standards”. The results of these analyses shall be provided to the Engineer and Health Department for review in ensuring compliance with the National Primary Drinking Water Regulations and shall not preclude the necessity of appropriate treatment should the water not comply with these standards.

C. Laboratory analyses shall be conducted on all samples for the contaminants listed in the attached National Secondary Drinking Water Regulations as promulgated by the U.S. Environmental Protection Agency.

D. Laboratory analyses shall be conducted on all samples for the following contaminants/parameters:

1. Alkalinity (Total)	5. Calcium (Ca)
2. Taste	6. Magnesium (Ma)
3. Conductivity	7. Total Organic Carbon
4. Hardness (as CaCo ₃)	8. Total Dissolved Carbon

E. The Owner will collect the sample(s) for Total Coliform analysis. The Contractor shall assist in the collection of samples by providing manpower to energize the well motor, providing bypass pumping/protecting the work from erosion and/or damage from flushing of the well, providing acceptable sampling taps, and any other items required to secure a sample.

3.3 Additional Water Sampling and Analysis:

A. If the test results, with regard to yield or water quality, are questionable, the recommendation may be made to stop operations until a more complete analysis can be made of the available data to determine the feasibility of constructing the water supply production well. Such delays usually involve supplemental chemical analysis of water samples or chemical analysis by other laboratories for verification of water quality. This type of delay at this point of the operation will not be payable under the contract.

B. Should testing of the water quality prove questionable to meet the intent of this ground water supply project, further test pumping may be authorized by the ENGINEER with payment being made by the hour according to a negotiated rate.

C. In the event that the chemical analysis indicates a Primary Drinking Water Contaminant exceeding the maximum contaminant level, the OWNER may elect to plug and abandon the well and/or provide treatment for the contaminant. The ENGINEER may require additional time to evaluate the cost effectiveness of water conditioning or water treatment equipment that may be necessary to meet the intent of the Project. This type of delay at this point of the operation will not be payable under the contract.

3.4 Department of Health Approval:

A. The CONTRACTOR shall assure that water from the permanent production well shall not be furnished for consumer's use until the Louisiana Department of Health has received, reviewed and accepted analyses for the Primary Contaminants as outlined in the Safe Drinking Water Act to ensure compliance with these federal regulations.

B. The CONTRACTOR shall assure that water from the permanent production well and associated system piping shall not be furnished for consumer's use until water samples collected and analyzed by the Louisiana Department of Health show the water to be free of coliform bacteria.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Water Sampling and Analysis and Phase III Contractor's Report

A. Measurement: Water sampling and analysis and Phase II Contractor's Report will be measured per the lump sum job performed and accepted.

B. Payment: Water sampling and analysis and Phase II Contractor's Report will be paid at the contract unit price per the lump sum job performed and accepted.

C. Pay Items: Payment will be made under Water Sampling and Analysis and Phase II Contractor's Report, (13500), per lump sum.

- END OF SECTION -



National Primary Drinking Water Regulations

Contaminant	MCL or TT ¹ (mg/L) ²	Potential health effects from long-term ³ exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) ²
OC Acrylamide	TT ⁴	Nervous system or blood problems; increased risk of cancer	Added to water during sewage/wastewater treatment	zero
OC Alachlor	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops	zero
R Alpha/photon emitters	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	zero
IOC Antimony	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	0.006
IOC Arsenic	0.010	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards; runoff from glass & electronics production wastes	0
IOC Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits	7 MFL
OC Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	0.003
IOC Barium	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	2
OC Benzene	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills	zero
OC Benzo(a)pyrene (PAHs)	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	zero
IOC Beryllium	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	0.004
R Beta photon emitters	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation	zero
DBP Bromate	0.010	Increased risk of cancer	Byproduct of drinking water disinfection	zero
IOC Cadmium	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	0.005
OC Carbofuran	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	0.04
OC Carbon tetrachloride	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	zero
D Chloramines (as Cl ₂)	MRDL=4.0 ¹	Eye/nose irritation; stomach discomfort; anemia	Water additive used to control microbes	MRDLG=4 ¹
OC Chlordane	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide	zero
D Chlorine (as Cl ₂)	MRDL=4.0 ¹	Eye/nose irritation; stomach discomfort	Water additive used to control microbes	MRDLG=4 ¹
D Chlorine dioxide (as ClO ₂)	MRDL=0.8 ¹	Anemia; infants, young children, and fetuses of pregnant women: nervous system effects	Water additive used to control microbes	MRDLG=0.8 ¹
DBP Chlorite	1.0	Anemia; infants, young children, and fetuses of pregnant women: nervous system effects	Byproduct of drinking water disinfection	0.8
OC Chlorobenzene	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories	0.1
IOC Chromium (total)	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits	0.1
IOC Copper	TT ⁵ ; Action Level = 1.3	Short-term exposure: Gastrointestinal distress. Long-term exposure: Liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits	1.3
M <i>Cryptosporidium</i>	TT ⁷	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero

LEGEND

D Disinfectant	IOC Inorganic Chemical	OC Organic Chemical
DBP Disinfection Byproduct	M Microorganism	R Radionuclides

Contaminant		MCL or TT ¹ (mg/L) ²	Potential health effects from long-term ³ exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) ²
IOC	Cyanide (as free cyanide)	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	0.2
OC	2,4-D	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops	0.07
OC	Dalapon	0.2	Minor kidney changes	Runoff from herbicide used on rights of way	0.2
OC	1,2-Dibromo-3-chloropropane (DBCP)	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards	zero
OC	o-Dichlorobenzene	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories	0.6
OC	p-Dichlorobenzene	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories	0.075
OC	1,2-Dichloroethane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC	1,1-Dichloroethylene	0.007	Liver problems	Discharge from industrial chemical factories	0.007
OC	cis-1,2-Dichloroethylene	0.07	Liver problems	Discharge from industrial chemical factories	0.07
OC	trans-1,2-Dichloroethylene	0.1	Liver problems	Discharge from industrial chemical factories	0.1
OC	Dichloromethane	0.005	Liver problems; increased risk of cancer	Discharge from drug and chemical factories	zero
OC	1,2-Dichloropropane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC	Di(2-ethylhexyl) adipate	0.4	Weight loss, liver problems, or possible reproductive difficulties	Discharge from chemical factories	0.4
OC	Di(2-ethylhexyl) phthalate	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories	zero
OC	Dinoseb	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables	0.007
OC	Dioxin (2,3,7,8-TCDD)	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories	zero
OC	Diquat	0.02	Cataracts	Runoff from herbicide use	0.02
OC	Endothall	0.1	Stomach and intestinal problems	Runoff from herbicide use	0.1
OC	Endrin	0.002	Liver problems	Residue of banned insecticide	0.002
OC	Epichlorohydrin	TT ⁴	Increased cancer risk; stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	zero
OC	Ethylbenzene	0.7	Liver or kidney problems	Discharge from petroleum refineries	0.7
OC	Ethylene dibromide	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries	zero
M	Fecal coliform and <i>E. coli</i>	MCL ⁶	Fecal coliforms and <i>E. coli</i> are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes may cause short term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.	Human and animal fecal waste	zero ⁶
IOC	Fluoride	4.0	Bone disease (pain and tenderness of the bones); children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories	4.0
M	<i>Giardia lamblia</i>	TT ⁷	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC	Glyphosate	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use	0.7
DBP	Haloacetic acids (HAA5)	0.060	Increased risk of cancer	Byproduct of drinking water disinfection	n/a ⁹
OC	Heptachlor	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide	zero
OC	Heptachlor epoxide	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor	zero
M	Heterotrophic plate count (HPC)	TT ⁷	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment	n/a

LEGEND

D	Disinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

Contaminant		MCL or TT ¹ (mg/L) ²	Potential health effects from long-term ³ exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) ²
OC	Hexachlorobenzene	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories	zero
OC	Hexachlorocyclopentadiene	0.05	Kidney or stomach problems	Discharge from chemical factories	0.05
IOC	Lead	TT5; Action Level=0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities; Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits	zero
M	<i>Legionella</i>	TT7	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems	zero
OC	Lindane	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens	0.0002
IOC	Mercury (inorganic)	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands	0.002
OC	Methoxychlor	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock	0.04
IOC	Nitrate (measured as Nitrogen)	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	10
IOC	Nitrite (measured as Nitrogen)	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	1
OC	Oxamyl (Vydate)	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes	0.2
OC	Pentachlorophenol	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood-preserving factories	zero
OC	Picloram	0.5	Liver problems	Herbicide runoff	0.5
OC	Polychlorinated biphenyls (PCBs)	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals	zero
R	Radium 226 and Radium 228 (combined)	5 pCi/L	Increased risk of cancer	Erosion of natural deposits	zero
IOC	Selenium	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines	0.05
OC	Simazine	0.004	Problems with blood	Herbicide runoff	0.004
OC	Styrene	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills	0.1
OC	Tetrachloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners	zero
IOC	Thallium	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories	0.0005
OC	Toluene	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories	1
M	Total Coliforms	5.0 percent ⁸	Coliforms are bacteria that indicate that other, potentially harmful bacteria may be present. See fecal coliforms and <i>E. coli</i>	Naturally present in the environment	zero
DBP	Total Trihalomethanes (TTHMs)	0.080	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	n/a ⁹
OC	Toxaphene	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle	zero
OC	2,4,5-TP (Silvex)	0.05	Liver problems	Residue of banned herbicide	0.05
OC	1,2,4-Trichlorobenzene	0.07	Changes in adrenal glands	Discharge from textile finishing factories	0.07
OC	1,1,1-Trichloroethane	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories	0.2
OC	1,1,2-Trichloroethane	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories	0.003
OC	Trichloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories	zero

LEGEND

D	Disinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

Contaminant		MCL or TT ¹ (mg/L) ²	Potential health effects from long-term ³ exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) ²
M	Turbidity	TT ⁷	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites and some bacteria. These organisms can cause short term symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff	n/a
R	Uranium	30µg/L	Increased risk of cancer, kidney toxicity	Erosion of natural deposits	zero
OC	Vinyl chloride	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories	zero
M	Viruses (enteric)	TT ⁷	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC	Xylenes (total)	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories	10

LEGEND					
D	Disinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

NOTES

1 Definitions

- Maximum Contaminant Level Goal (MCLG)—The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
 - Maximum Contaminant Level (MCL)—The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
 - Maximum Residual Disinfectant Level Goal (MRDLG)—The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
 - Maximum Residual Disinfectant Level (MRDL)—The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
 - Treatment Technique (TT)—A required process intended to reduce the level of a contaminant in drinking water.
- 2 Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (ppm).
- 3 Health effects are from long-term exposure unless specified as short-term exposure.
- 4 Each water system must certify annually, in writing, to the state (using third-party or manufacturers certification) that when it uses acrylamide and/or epichlorohydrin to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows: Acrylamide = 0.05 percent dosed at 1 mg/L (or equivalent); Epichlorohydrin = 0.01 percent dosed at 20 mg/L (or equivalent).
- 5 Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10 percent of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.
- 6 A routine sample that is fecal coliform-positive or *E. coli*-positive triggers repeat samples—if any repeat sample is total coliform-positive, the system has an acute MCL violation. A routine sample that is total coliform-positive and fecal coliform-negative or *E. coli*-negative triggers repeat samples—if any repeat sample is fecal coliform-positive or *E. coli*-positive, the system has an acute MCL violation. See also Total Coliforms.
- 7 EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:
- *Cryptosporidium*: 99 percent removal for systems that filter. Unfiltered systems are required to include *Cryptosporidium* in their existing watershed control provisions.
 - *Giardia lamblia*: 99.9 percent removal/inactivation
 - Viruses: 99.99 percent removal/inactivation
 - *Legionella*: No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated according to the treatment techniques in the surface water treatment rule, *Legionella* will also be controlled.
 - Turbidity: For systems that use conventional or direct filtration, at no time can turbidity (cloudiness of water) go higher than 1 nephelometric turbidity unit (NTU), and samples for turbidity must be less than or equal to 0.3 NTU in at least 95 percent of the samples in any month. Systems that use filtration other than conventional or direct filtration must follow state limits, which must include turbidity at no time exceeding 5 NTU.
 - HPC: No more than 500 bacterial colonies per milliliter
 - Long Term 1 Enhanced Surface Water Treatment; Surface water systems or ground water systems under the direct influence of surface water serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).
 - Long Term 2 Enhanced Surface Water Treatment; This rule applies to all surface water systems or ground water systems under the direct influence of surface water. The rule targets additional *Cryptosporidium* treatment requirements for higher risk systems and includes provisions to reduce risks from uncovered finished water storage facilities and to ensure that the systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts. (Monitoring start dates are staggered by system size. The largest systems (serving at least 100,000 people) will begin monitoring in October 2006 and the smallest systems (serving fewer than 10,000 people) will not begin monitoring until October 2008. After completing monitoring and determining their treatment bin, systems generally have three years to comply with any additional treatment requirements.)
 - Filter Backwash Recycling: The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.
- 8 No more than 5.0 percent samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or *E. coli*. If two consecutive TC-positive samples, and one is also positive for *E. coli* or fecal coliforms, system has an acute MCL violation.
- 9 Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:
- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L)
 - Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L)

National Secondary Drinking Water Regulation

National Secondary Drinking Water Regulations are non-enforceable guidelines regarding contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, some states may choose to adopt them as enforceable standards.

Contaminant	Secondary Maximum Contaminant Level
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

For More Information

EPA's Safe Drinking Water Web site:
<http://www.epa.gov/safewater/>

EPA's Safe Drinking Water Hotline:
(800) 426-4791

To order additional posters or other ground water and drinking water publications, please contact the National Service Center for Environmental Publications at :
(800) 490-9198, or
email: nscep@bpa-lmit.com.

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Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

For More Information

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NEW SOURCE CHEMICAL TESTING

LOUISIANA DEPARTMENT OF HEALTH • OFFICE OF PUBLIC HEALTH

The goal of this requirement is to protect the consumer by ensuring the minimum quality standards of all potential new sources are met. To accomplish this goal, required chemical contaminant sampling must be analyzed from each new source by a LDH-certified Laboratory. Additionally, the results must be provided for review and approval to the Louisiana Department of Health (LDH) – Office of Public Health (OPH) – Engineering Services office prior to the new source being utilized to provide water to consumers.

NEW SOURCE TESTING REQUIREMENTS

Any Plans and Specifications which include a new water source will be approved with the understanding that the quality of water from all finished wells or intakes shall comply with the National Primary Drinking Water Regulations promulgated by the U.S. Environmental Protection Agency. National Secondary Drinking Water Regulations should be complied with. **The tables below list the constituents that shall be tested for by a LDH-OPH certified laboratory for Drinking Water Analyses – Chemistry and results shall be submitted to our office for review and approval before the new water source is placed into service.** These testing requirements should be placed into all plans and specifications for new water wells and water intakes. Additional testing may be required based on the results of the initial tests. For a list of certified laboratories, please go to: <http://ldh.la.gov/index.cfm/page/490>

Plans and Specifications shall not preclude the necessity of appropriate treatment should the water not comply with these standards. And should any treatment be necessary, plans and specifications must be revised to include the appropriate treatment, and sent to the LDH-OPH – Engineering Services for review and approval.

TABLE 1. INORGANIC CONTAMINANTS (IOCs), NITRATES/NITRITES, AND CYANIDE

IOC CONTAMINANTS		ANALYTICAL CODE	MCL or AL (mg/L)
1	Antimony	1074	0.006
2	Asbestos	1094	7 MFL (> 10um)
3	Arsenic	1005	0.01 – as of Jan 23, 2006
4	Barium	1010	2
5	Beryllium	1075	0.004
6	Cadmium	1015	0.005
7	Chromium	1020	0.1
8	Lead	1030	AL = 0.015
9	Copper	1022	AL = 1.3
10	Cyanide	1024	0.2
11	Fluoride	1025	4.0
12	Mercury	1035	0.002
13	Nitrate	1040	10 (as Nitrogen)
14	Nitrite	1041	1 (as Nitrogen)
15	Selenium	1045	0.05
16	Thallium	1085	0.002

TABLE 2. SYNTHETIC ORGANIC CONTAMINANTS (SOCs)

SOC CONTAMINANTS		ANALYTICAL CODE	MCL (mg/L)
1	Alachlor	2051	0.002
2	Atrazine	2050	0.003
3	Benzo [a] pyrene (PAHs)	2306	0.0002
4	Carbofuran	2046	0.04
5	Chlordane	2959	0.002
6	Dalapon	2031	0.2
7	2, 4-D (2,4-Dichlorophenoxyacetic acid)	2105	0.07
8	Di [2-ethylhexyl] adipate	2035	0.4
9	Di [2-ethylhexyl] phthalate	2039	0.006
10	Dibromochloropropane [DBCP]	2931	0.0002

SOC CONTAMINANTS		ANALYTICAL CODE	MCL (mg/L)
11	Dinoseb	2041	0.007
12	Dioxin (2, 3, 7, 8-TCDD)	2063	0.00000003
13	Diquat	2032	0.02
14	Endothall	2033	0.1
15	Endrin	2005	0.002
16	Ethylene Dibromide [EDB]	2946	0.00005
17	Glyphosate	2034	0.7
18	Heptachlor	2065	0.0004
19	Heptachlor epoxide	2067	0.0002
20	Hexachlorobenzene	2274	0.001
21	Hexachlorocyclo-pentadiene	2042	0.05
22	Lindane	2010	0.0002
23	Methoxychlor	2015	0.04
24	Oxamyl [Vydate]	2036	0.2
25	Pentachlorophenol	2326	0.001
26	Picloram	2040	0.5
27	Polychlorinated biphenyls [PCBs]	2383	0.0005
28	Simazine	2037	0.004
29	Toxaphene	2020	0.003
30	2,4,5-TP [Silvex]	2110	0.05

TABLE 3. VOLITILE ORGANIC CHEMICALS (VOCs)

CONTAMINANTS		ANALYTICAL CODE	MCL (mg/L)
1	Benzene	2990	0.005
2	Carbon tetrachloride	2982	0.005
3	o-Dichlorobenzene	2968	0.6
4	para-Dichlorobenzene	2969	0.075
5	1,2-Dichloroethane	2980	0.005
6	1,1-Dichloroethylene	2977	0.007
7	cis-1,2-Dichloroethylene	2380	0.07
8	trans-1,2-Dichloroethylene	2979	0.1
9	Dichloromethane	2964	0.005
10	1,2-Dichloropropane	2983	0.005
11	Ethylbenzene	2992	0.7
12	[Mono]chlorobenzene	2989	0.1
13	Styrene	2996	0.1
14	Tetrachloroethylene	2987	0.005
15	Toluene	2991	1
16	1,2,4-Trichlorobenzene	2378	0.07
17	1,1,1-Trichloroethane	2981	0.2
18	1,1,2-Trichloroethane	2985	0.005
19	Trichloroethylene	2984	0.005
20	Vinyl chloride	2976	0.002
21	Xylenes [total]	2955	10

TABLE 4. RADIONUCLIDES

RADIONULCIDE		ANALYTICAL CODE	MCLs
1	Gross Alpha particle	4109	15 pCi/L
2	Combined Radium 226/228	4010	5 pCi/L
3	Uranium [as of 12/08/03]	4006	30 ug/L
4	Beta particle and Photon emitters	4101	4 mrem/yr ¹
5	Gross Beta	4100	4 mrem/yr ¹

¹ Speciation for Strontium and Tritium is required when Gross Beta exceeds 8 pCi/L.

TABLE 5. Disinfection By-Product Formation Potential

For water systems with known Disinfectant/Disinfection By-Products exceedances of Total Trihalomethanes (> 80 ug/L) and Haloacetic Acids (> 60 ug/L).

Disinfection By Product Potential		ANALYTICAL CODE	Levels
1	Total Organic Carbon (TOC)	4109	
2	Dissolved Organic Carbon (DOC)	2919	
2	Color	1905	15 CU (Secondary MCL)
3	Chloroform	2941	
4	Bromoform	2942	
5	Bromodichloromethane	2943	
6	Dibromochloromethane	2944	
7	Trihalomethanes (THM)	2950	0.080 mg/L (MCL)
8	Monochloroacetic acid	2450	
9	Dichloroacetic acid	2451	
10	Trichloroacetic acid	2452	
11	Monobromoacetic acid	2453	
12	Dibromoacetic acid	2454	
13	Haloacetic Acids (HAA5)	2456	0.060 mg/L (MCL)
14	Bromide	1004	

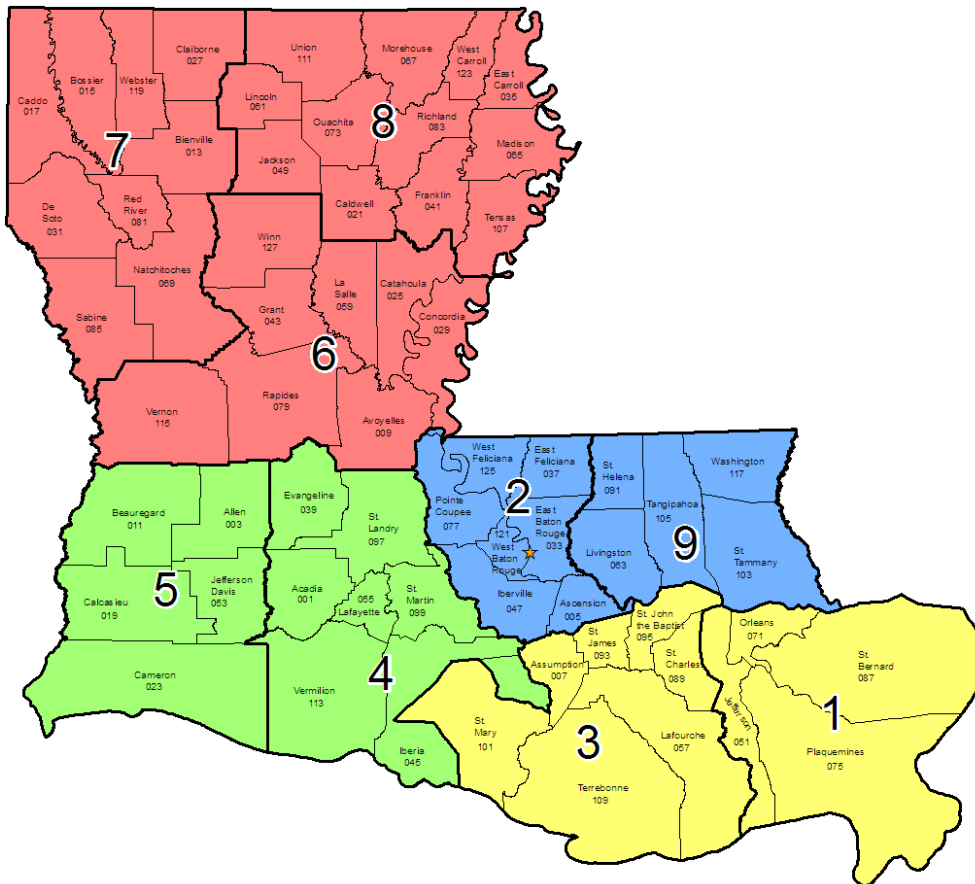
Results must be submitted to the following Offices for review and approval:

ATTN: SEAN NOLAN
LDH - OPH, ENGINEERING SERVICES
P.O. BOX 4489
BATON ROUGE, LA 70821

ATTN: REGIONAL OPH OFFICE
SEE REGIONAL MAP (NEXT PAGE) FOR ADDRESS

★ Central Office	LDH–OPH–Engineering Services PO Box 4489 Baton Rouge, LA 70821–4489 PHYS: 628 N 4 th St, 1 st Floor	(225) 342–7499 (Main line) (225) 342–7303 (Fax) Safe.Water@la.gov (reporting emergencies after business hours)
Amanda Ames, Chief Engineer – Amanda.Ames@LA.GOV		
Caryn Benjamin, Deputy Chief Engineer - Compliance/Enforcement Caryn.Benjamin@la.gov		
Dan MacDonald, Deputy Chief Engineer - Financial (SRF)/Infrastructure Dan.MacDonald@la.gov		
Johan Forsman – Program Manager Johan.Forsman@la.gov		
Esteban Gonzalez – Operator Certification Esteban.Gonzalez@la.gov		

Deputy Chief Engineer of Field Operations District 1 and 2			Vacant
District	Region	District Engineer	District Sanitarian
1	1, 3	Chris Rogers, PE Christopher.Rogers2@la.gov	Melissa Favorth Melissa.favorth@la.gov
2	2, 9	Jennifer Dewitt, PE Jennifer.Dewitt@la.gov	Angela Gomez Angela.Gomez@la.gov
Deputy Chief Engineer of Field Operations District 3 and 4			Jennifer Kihlken, P.E. Jennifer.kihlken@la.gov
3	4, 5	Steven Joubert, PE Steven.joubert@la.gov	Kristen Hungerford Kristen.Hungerford@la.gov
4	6, 7, 8	Barbara Featherston, PE Barbara.Featherston@la.gov	Danny Mortimer Danny.Mortimer@la.gov



Region	Mailing Address	Telephone Numbers
1	Metro Region 1 935 Gravier St, Ste 1420 New Orleans, LA 70160	(504) 599–1564 (504) 599–0200 (Fax)
2	Capitol Region 2 PO Box 4489 Baton Rouge, LA 70821-4489 PHYS: 628 N 4 th St, 1 st Floor	(225) 342-7499 (225) 342–7607 (Fax)
3	Teche Region 3 1434 Tiger Dr Thibodaux, LA 70301	(985) 449-5007x345 (985) 447–0920 (Fax)
4	Acadian Region 4 825 Kaliste Saloom Rd Brandywine # 3 Suite100 Lafayette, LA 70508	(337) 262–5316 (337) 262–5638 (Fax)
5	Southwest Region 5 2827 4 th Ave, Ste 100 Lake Charles, LA 70601	(337) 475–3200 (337) 475–3222 (Fax)
6	Central Region 6 5604–B Coliseum Blvd. Alexandria, LA 71303	(318) 487–5282 x242 (318) 487–5338 (Fax)
7	Northwest Region 7 1035 Creswell Ave, 3 rd Floor Shreveport, LA 71101	(318) 676–7477 (318) 676–7485 (Fax)
8	Northeast Region 8 PO Box 6118 Monroe, LA 71211-6118 PHYS: 1650 Desiard St, 2 nd Floor	(318) 361–7201 (318) 362–3163 (Fax)
9	Southeast Region 9 42354 Deluxe Plaza, Ste 12 Hammond, LA 70403	(985) 543-4958 (985) 5434951 (Fax)

SECTION 13600**WATER WELL ABANDONMENT**PART 1 - GENERAL

1.1 Scope: This Section includes furnishing of all labor, materials, tools and equipment, and perform all operations necessary for abandonment of pilot holes, water test wells and water production wells as indicated on the Drawings and as directed by the ENGINEER.

1.2 Referenced Standard: Work shall conform to the State of Louisiana, Water Well Rules, Regulations and Standards, latest edition.

PART 2 - PRODUCTS

2.1 Water: All water used for well abandonment shall be potable and properly chlorinated to prevent groundwater contamination. See Specification Section 01500 - TEMPORARY FACILITIES.

2.2 Drilling Mud: Should drilling mud be necessary, a commercial bentonite-type shall be used during the drilling operations. The viscosity of the mud shall be sufficient to carry the heaviest drilled material to the surface. No organic type mud shall be allowed.

2.3 Cement Bentonite Slurry: Cement bentonite slurry for use as a plugging material shall consist of a mixture of cement, bentonite and water consisting of not more than eight (8%) percent bentonite by dry weight of the cement and a maximum of ten (10) gallons of water per 95 pound sack of cement.

PART 3 - EXECUTION

3.1 General: Work related to this Section shall conform to the applicable provisions contained in the Referenced Standard.

3.2 Plug and Abandon Pilot Hole:

A. The hole shall be filled by pumping through a tremie pipe with slurry cement grout with a maximum of 8% bentonite from the bottom of the completed hole to natural ground with a tremie pipe and jagger pump. The tremie pipes shall be installed to the bottom of the hole and withdrawn as the operation is completed. During the filling operation, the CONTRACTOR shall overfill the hole, allowing the cement grout to form a cap at the top.

B. CONTRACTOR shall accurately record the volume of cement and bentonite used to plug the hole.

C. After filling operations, the grout shall be allowed to cure for 72 hours and then an earth fill shall be placed over the cap to form a neatly compacted surface.

3.3 Plug and Abandon Test Well:

- A. The casing and screen shall be removed from the test well.
- B. The well shall then be filled by pumping through a tremie pipe with slurry cement grout with a maximum of 8% bentonite from the bottom of the completed hole to natural ground with a tremie pipe and jagger pump. The tremie pipes shall be installed to the bottom of the hole and withdrawn as the operation is completed. During the filling operation, the CONTRACTOR shall overfill the hole, allowing the cement grout to form a cap at the top.
- C. CONTRACTOR shall accurately record the volume of cement and bentonite used to plug the well.
- D. After filling operations, the grout will be allowed to cure for 72 hours and then an earth fill will be placed over the cap to form a neatly compacted surface.

3.4 Plug and Abandon Water Production Well:

- A. CONTRACTOR shall remove all obstructions in the well that would interfere with plugging operations. The existing well casing shall be removed to a point no less than five (5') feet below existing grade.
- B. The screen shall be filled with clean sterilized sand.
- C. The well shall then be filled by pumping through a tremie pipe with slurry cement grout with a maximum of 8% bentonite from the top of the screen to the top of the casing with a tremie pipe and jagger pump. The tremie pipes shall be lowered to the bottom of the casing and withdrawn as the operation is completed. During the filling operation, the CONTRACTOR shall overfill the casing or hole, allowing the cement grout to form a cap at the top.
- D. CONTRACTOR shall accurately record the volume of cement and bentonite used to plug the well.
- E. After filling operations, the grout shall be allowed to cure for 72 hours and then an earth fill shall be placed over the cap to form a neatly compacted surface.
- F. CONTRACTOR shall remove the motor, pump column, pump, discharge head, well head concrete foundation, above ground fittings & valves, associated well site electrical and mechanical appurtenances, etc., as required to return the site to a natural setting.
- G. CONTRACTOR shall cut and cap the existing well discharge main.

3.5 Reporting and Filing: Upon completion of the abandonment CONTRACTOR shall complete the "Water Well Plugging and Abandonment Form (DOTD - GW-2)". The original shall be filed with LDOTD. The CONTRACTOR shall keep the second copy of the triplicated form and the third copy shall be sent to the ENGINEER for delivery to the OWNER.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Abandonment of Pilot Hole:

A. Measurement: The abandonment of a pilot hole, if non-developable, will be measured per linear foot, based on the distance from the bottom of the drilled hole, (or top of previous plug, as the case may be) to natural ground. This includes abandonment in accordance with State of Louisiana Department of Transportation and Development Regulations and the completion of the applicable forms, processing forms with the State and restoration of the test well site.

B. Payment: The abandonment of a pilot hole will be paid at the contract unit price per linear foot installed and accepted.

C. Pay Items: Payment will be made under Abandonment of Pilot Hole, (13600), per linear foot.

4.2 Abandonment of Test Well:

A. Measurement: The abandonment of a test well will be measured per linear foot, based on the distance from the bottom of the drilled hole,(or top of previous plug, as the case may be)to natural ground. This includes abandonment in accordance with State of Louisiana Department of Transportation and Development Regulations and the completion of the applicable forms, processing forms with the State and restoration of the test well site.

B. Payment: The abandonment of a test well will be paid at the contract unit price per linear foot, installed and accepted.

C. Pay Items: Payment will be made under Abandonment of Test Well, (13600), per linear foot.

4.3 Abandonment of Water Production Well:

A. Measurement: The abandonment of a water production well shall be measured per Lump Sum job. This includes abandonment in accordance with State of Louisiana Department of Transportation and Development Regulations and the completion of the applicable forms, processing forms with the State and restoration of the site.

B. Payment: The abandonment of a water production well, measured as provided above, will be paid at the contract Lump Sum price, which price and payment shall constitute full compensation for furnishing all materials, equipment, labor, hauling, traffic control, signs, barricades, safety items, and incidentals necessary to complete this item in accordance with the Drawings and Specifications.

C. Pay Items: Payment will be made under Plug and Abandon Existing Well No. "X", (13600), per Lump Sum Job.

- END OF SECTION -

SECTION 13650

CHLORINATION EQUIPMENT

PART 1 - GENERAL

1.1 Scope: This Section covers the furnishing and installation of a complete duplex chlorination station with chlorinator, initial dual bottle chlorine dose, internal and external piping, internal wiring, prefabricated fiberglass house with vents, heater, lighting, electrical, ~~foundation~~, etc.

1.2 Quality Assurance and Qualifications: All equipment furnished under this Specification shall be new and unused, shall be the standard product of manufacturers having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of five (5) years.

1.3 Submittals: Submittals shall be provided in accordance with Section 01340 - Shop Drawings, Samples And Project Data.

1.4 Start-up Services: A factory representative of each major component manufacturer, who has complete knowledge of proper operation and maintenance, shall be provided for a minimum of one (1) day to instruct representatives of the OWNER and the ENGINEER on proper operation and maintenance. With the permission of the OWNER, this work may be conducted in conjunction with the inspection of the installation and test run.

1.5 Operation & Maintenance Manual: Complete operations and maintenance manuals shall be provided in accordance with Section 01730 - Operation and Maintenance Manual.

1.6 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 Society for Testing and Materials (ASTM) Publications

D1784	Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (PVC) Compounds.

1.7 Warranty: Warranty shall be provided in accordance with Section 01740 - Warranties and Bonds and as follows:

A. Three (3) year manufacturer's warranty on all parts on gas chlorinators and cylinder automatic switch-over unit.

1.8 Selected Equipment/Approved Equal: The chlorination equipment and controls selected for this project are supplied by Municipal & Industrial Chlorination of Baton Rouge, Louisiana (225-490-4636); or approved equal.

PART 2 - PRODUCTS

2.1 General: The chlorination system equipment shall include all equipment required to provide a complete dual cylinder chlorination station. The equipment specified herein is not intended to be a comprehensive list of the required equipment, piping, valves, tubing, etc. Any equipment not specified, and required to complete the chlorinator installation shall be provided by the CONTRACTOR and shall be subject to the approval of the ENGINEER.

2.2 Gas Chlorinator System: The gas chlorinator system shall be a vacuum-operated, bottle mounted, solution feed type and shall automatically switch the chlorine supply from an empty cylinder to the full cylinder. Each chlorinator system shall consist of:

- two (2) vacuum regulators for mounting directly on the chlorine gas cylinder valves with automatic switch-over capability
- one (1) pressure relief vent valve
- one (1) adjustable gas flow meter panel with rate valve
- one (1) ejector/check valve assembly

The gas chlorinator system shall be Regal Model 216 as manufactured by Chlorinators Incorporated or approved equal.

2.3 Vacuum Regulator (Existing):

A. The vacuum regulator shall mount directly onto the 150 pound chlorine cylinder valve by means of a positive yoke type clamp having an integral tightening screw with slide bar handle. All metallic bolts shall mate with metallic threaded nuts or inserts. Each regulator shall have its own diaphragm, safety-shutoff/inlet valve and automatic switch-over detent mechanism, thereby allowing chlorination to continue when one vacuum regulator is removed from service.

~~B. The vacuum regulator shall mount directly onto the ton chlorine cylinder valve utilizing Regal TAY-200 Ton Container Adaptors by means of a positive yoke type clamp having an integral tightening screw with slide bar handle. All metallic bolts shall mate with metallic threaded nuts or inserts. Each regulator shall have its own diaphragm, safety-shutoff/inlet valve and automatic switch-over detent mechanism, thereby allowing chlorination to continue when one vacuum regulator is removed from service.~~

2.4 Pressure Relief Vent Valve: The pressure relief vent valve shall be wall mounted and shall be designed to vent the system and provide a central interconnection point for the vacuum tubing.

2.5 Adjustable Gas Flow Meter Panel with Rate of Flow Valve: The chlorinator system shall include an adjustable gas flowmeter panel with a gas feed range of zero (0) pounds to a maximum of fifty (50) pounds per twenty-four (24) hours.

2.6 Ejector/Check Valve Assembly: The ejector/check valve assembly shall be a wall mounted nozzle injector unit with double seat ball check valve and O-ring seal for chlorine tubing line.

2.7 Vent and Vacuum Tubing: The vent and vacuum tubing shall be 3/8" diameter. Each gas chlorinator shall be supplied with a standard spare parts kit, all required plastic vent tubing, two (2) multi-purpose cylinder wrenches and twelve (12) spare lead gaskets.

2.8 Ton Container Scales (Existing): **NONE REQUIRED THIS PROJECT** ~~Single-ton scales shall be furnished and installed for the chlorine ton containers. Rollers shall be zinc plated and equipped with bronze bushings for ease of tank rotation and to prevent roller seizures. Roller pins shall be zinc plated steel with alemite grease fittings for ease of lubrication. The ton container scale shall be Force Flow Ton Cylinder Hydraulic Scale with 4-20 mA dc signal transmitter and direct reading analog gauge.~~

2.9 150 Pound Cylinder Scale (Existing): A chlorine cylinder scale shall be provided to simultaneous weigh two (2) 150 pound compressed gas cylinders. The unit shall consist of a high-impact, corrosion resistant, molded vinyl ester fiberglass base with two (2) fiberglass weighing platforms. The base shall support a steel column that and two (2) stainless steel safety chains for restraining the gas cylinders. A corrosion resistant scale head shall be provided to read out the net weight, in pounds, remaining in each cylinder. The scale head shall be capable of turning 180 degrees so that the dials can be read from behind. Adjustment knobs shall be provided to cancel out the tare weight of each cylinder. Net contents weight shall be read out on each dial to an accuracy of 1% of full scale. The scale and magnifying pointer shall give readability to within ½ pound. The chlorine cylinder scale shall be Model 4D1502 as manufactured by Force Flow or approved equal.

2.10 Gas Detectors (Existing):

A. The gas detector shall consist of a wall-mounted receiver and two (2) remote sensors. The gas detector shall have a range of 0-10 parts per million (ppm).

B. The receiver shall provide an LED bar graph display. The LED bar graph display shall be color-coded to indicate sensor status, gas concentration and alarm set point. Additional LEDs shall provide for indication of set point alarm, sensor malfunction, power ON and sensor ready. The receiver shall be housed in a NEMA 4X enclosure.

C. The sensor shall be an electrochemical type requiring no chemical addition with a response time of 30 seconds maximum for 80% of full range at 20 degrees C. The sensor shall be wall mounted and housed in a NEMA 4X enclosure.

D. The alarm and malfunction contacts shall be SPDT rated at 10 amps at 240 Vac or 28 Vdc maximum resistive or inductive load. The alarm and malfunction contacts shall be field configurable for manual reset (latching) or automatic reset (non-latching).

E. Communications between the sensor and receiver shall be 3-wire, shielded, 22-gauge cable. The maximum distance between the receiver and sensor shall be 1,000 feet/305 meters.

F. The gas detector shall operate from a 120 Vac, 50/60 Hz, 1-phase power supply. The receiver and sensor electronics shall have provisions for protection against radio frequency/electromagnetic interference.

- G. Weatherproof visual and audible alarms shall be provided.
- H. Provide 2 chlorine sensors at each site.
- I. The gas detector shall be Foxcroft FX 1502 Dual Channel Toxic Gas Leak Detectors with battery back-up or approved equal.

2.11 Safety Shower and Eyewash Station (Existing):

- A. Construction: Corrosion resistant, all stainless steel construction, combination eye wash/shower safety station with stainless steel shower head, stainless steel bowl, stainless steel flag handle and floor flange, 1 IA" IPS Schedule 40 stainless steel pipe and fittings, 1" IPS and 1/2" IPS U.S. made stainless steel stay open ball valves, and polished stainless steel pull rod. Unit shall have (2) polypropylene 'GS Plus' spray heads with integral "flip flop" dust covers, filters and 1.8—GPM flow control orifices, mounted on a stainless steel head assembly. Unit shall include ANSI compliant sign.
- B. Performance: Unit shall meet or exceed ANSI 2358.1 - 2004 and come with a full 2-year warranty.
- C. Fixture: Guardian Equipment G1991. Guardian Equipment 1140 N. North Branch Street, Chicago, IL 60642, 312-447-8100 phone.

2.12 Chlorine Residual Test Kit: Test equipment shall be provided and shall include all necessary apparatus, reagents, step-by-step instructions and a carrying case required to measure free and total chlorine residual. The chlorine test kit shall be Model CN-66, Catalog No. 2231-01 as manufactured by Hach Company of Loveland, Colorado or approved equal.

2.13 Respiratory Protection Equipment (Existing):

- A. Chin-type gas mask: Respiratory protection equipment in the form of a chin-type gas mask designed for respiratory protection against chlorine gas shall be provided with the chlorination system. The gas mask shall have a maximum use condition of 100 times the Permissible Exposure Level or 5,000 parts per million, whichever is greater and shall be supplied with two (2) chlorine canisters and a carrying case. The chin type gas mask shall be Part No. 817065 a manufactured by MSA or approved equal.
- B. Self-Contained Breathing Apparatus (SCBA): Provide a MSA "Air Hawk" self-contained breathing apparatus (SCBA) as manufactured by MSA or approved equal.
- C. Equipment Storage Wall Case: Provide an equipment storage wall case 18-3/4" x 34-3/4" x 13-1/4" interior with molded top shelf, SCBA steel bracket, SCBA graphics and AGV window, Model WC12y10B as manufactured by Encon Safety Products or approved equal.

2.14 Chlorine Leak Test Kit (Existing): The chlorine leak test kit shall include devices and tools to contain leaks in and around the cylinder valve and in the side wall of 150 pound chlorine cylinders. The chlorine leak test kit shall be Chlorine Institute Emergency Kit "A" as manufactured by Indian Springs Manufacturing or approved equal.

2.15 Pressure Gauge: Pressure gauges shall be provided on the chlorination system discharge manifold as shown on the Drawings and shall meet the standards listed herein. The pressure gauge shall be a 2 ½" diameter, liquid filled, stainless steel, safety pattern, bourdon tube gauge and shall be supplied such that all wetted parts are made from stainless steel suitable for corrosive environments. The gauges shall be accurate to 1.5% of full scale and have scale range of zero (0) to two hundred (200) psi. The pressure gauges shall be Type 233.30 as manufactured by Wika or approved equal.

2.16 Chlorination Piping:

A. General: The various chlorination system piping shall be sized as shown on the Drawings and shall meet the standards listed herein.

B. PVC: All rigid plastic pipe shall be Schedule 80 PVC pipe and shall have solvent welded type joints. PVC pipe shall conform to CS 207-60, ASTM D-1784-60T, and shall meet the quality standard of the National Sanitation Foundation and bear its seal of approval of safe for portable water service.

C. Fittings: Fittings for rigid PVC piping shall be Schedule 80 PVC and be compatible with the rigid PVC pipe specified above. All changes of direction and connections shall be made with appropriate bends, tees and coupling and connections shall be made in an approved manner. No heating and/or bending of the pipe to make up alignment shall be permitted.

D. Underground Piping: Underground plastic piping for the chlorinator water supply line and chlorine solution feed line shall be 2" and 1" diameter, respectively, polyethylene service tubing and shall be installed with a non-corrosive metallic wire as specified in Section 15120 - Mechanical Piping, Valves and Appurtenances.

E. Y-Strainer: The chlorine water feed line shall be equipped with a PVC Y-Strainer to eliminate debris from interfering with the proper operation of the chlorination system. The Y-strainer body and seals shall be of all plastic construction with 150 p.s.i. pressure rating. The Y-strainer shall be equipped with a screen constructed on 316 stainless steel with an open area at least twice that of the equivalent pipe size cross-sectional area to minimize pressure drop. The Y-Strainer shall be 1" diameter as manufactured by Hayward Industrial Products, Clemmons, North Carolina, (336) 712-9900 or approved equal.

2.17 Chlorination Valves:

A. The various valves shown on the Drawings shall meet the standards shown herein and shall be as sized on the Drawings.

B. True Union Ball Valves: True union ball valves supplied for chlorination system piping shall be manufactured of PVC Type 1- Grade 1, with EPDM seals, full port design, reversible PTFE seats and double stem seals. True union ball valves shall be rated for 150 p.s.i. as manufactured by Hayward Industrial Products, Clemmons, North Carolina, (336) 712-9900 or approved equal.

C. True Union Ball Check Valves: True union ball check valves supplied for chlorination system piping shall be manufactured of PVC Type 1, Grade 1 with EPDM seals, full port design and PTFE seat. True union ball check valves shall be rated for 150 p.s.i. as manufactured by Hayward Industrial Products, Clemmons, North Carolina, (336) 712-9900 or approved equal.

D. Solenoid valves shall be of the 2-way pilot operated design. Solenoid valves shall have stainless steel bodies and NEMA 4x enclosures. Solenoid voltages shall be 120 VAC. Solenoid valves shall be Red Hot II Series 8210 as manufactured by ASCO, Model 1A579 as manufactured by Dayton or approved equal.

2.18 Chlorine Solution Feed Corporation Stop Nozzle Assembly: Each chlorine solution feed line shall be equipped with an open end pipe diffuser with corporation stop and tapping saddle for dispersion of the chlorine solution into the raw water stream. The corporation stop nozzle assemblies (1") shall be Model J61136 (NPT) manufactured by Pulsafeeder, Model 10741 as manufactured by LMI or approved equal. The tapping saddles shall be Style F202 as manufactured by Ford Meter Box Company, Inc., or approved equal. The pack joint coupling for transitioning the polyethylene service tubing to the corporation stop shall be catalogue No. C84-44 male 1" I.P.S. x pack joint for CTS with stainless steel insert stiffener as manufactured by Ford Meter Box Company, Inc. or approved equal.

2.19 Chlorinator Water Supply Corporation Stop: The chlorinator water supply line shall be equipped with a corporation stop and tapping saddle for chlorine supply water. The corporation stop (2") shall be Type F1001-7 with insert stiffener as manufactured by Ford Meter Box Company, Inc., or approved equal. The tapping saddles shall be Style S70 as manufactured by Ford Meter Box Company, Inc., or approved equal. The pack joint coupling for transitioning the polyethylene service tubing to the corporation stop shall be catalogue No. C84-77 male 2" I.P.S. x pack joint for CTS with stainless steel insert stiffener as manufactured by Ford Meter Box Company, Inc. or approved equal.

2.20 Pack Joint Coupling: A pack joint coupling shall be provided to transition from the polyethylene tubing used for the chlorine water supply line and chlorine solution feed line to the rigid schedule 80 PVC piping used inside the chlorinator building. The pack joint coupling shall be Catalogue No. C14-44 female 1" I.P.S. x pack joint for CTS with stainless steel insert stiffener as manufacturer by Ford Meter Box Company or approved equal.

2.21 P.E. Sleeve: A two inch (2") diameter PVC sleeve shall be provided to route both the polyethylene chlorine water supply line and chlorine solution feed line through the chlorinator building slab. The PVC sleeve shall be made of plastic conduit as specified in Section 16110 - Raceways.

2.22 Spare Parts Kit: Provide a standard spare parts kit, including twelve (12) spare lead gaskets.

2.23 Multi-Purpose Cylinder Wrench: Provide a multi-purpose cylinder wrench.

2.24 Chlorinator Building:

A. The fiberglass building shall be the insulated type and shall have 1/8" interior and exterior walls using styrofoam insulation with a three (3 lb) pound density sandwiched between the panels. The thickness of insulation shall be a minimum of one (1") inch.

B. The nominal building dimensions shall be six (6') feet long x four (4') feet wide x seven (7') feet-four (4) inches high. The building shall be prewired and factory tested.

C. The exterior wall shall have a contact molded finish. The building shall be of a sectional type construction with the finished appearance of a one-piece molded building. The bottom lip or anchor lip shall be turned inward for holding to the concrete cross section or for the purpose of anchoring. Silicone shall be applied around the anchor lip to seal the building to the floor. The building shall have a four (4") inch roof overhang and shall be furnished assembled.

D. All wall and roof sections shall be completely encapsulated within a 1/8" minimum thickness fiberglass laminate, made up of chemical grade polyester laminating resin, applied by the hand lay up method for controlled thickness producing a resultant laminate having glass content approximately 30% by weight.

E. The ceiling shall be a double type with interior and exterior walls with insulation between surfaces.

F. A 2" x 4" inner structure shall be approximately 35" from the floor and run continuously around the building interior. A 3/4" plywood panel shall be installed for hanging electrical equipment at designated location.

G. Insulating material shall be modified polyisocyanurate polyurethane type foam of three (3 lb) pound density applied in continuous sheet foam.

H. All interior and exterior surfaces shall be finished with a ten (10) mil thickness of white pigmented isophthalic polyester gel coat, with ultraviolet inhibitor resistant to weathering and sunlight.

I. The door(s) shall be 36" x 78" x 1 3/8" contact mold finish externally and internally, hollow core fiberglass. The hinge(s) shall be continuous 302 stainless steel. The doors shall be furnished with a locking handle connected to a three (3) point latching mechanism. The latch shall engage the door casing at the top and bottom and the door jamb at midpoint for maximum security against vandalism. All door hardware shall be stainless steel. Each door shall be provided with an 11" x 11" clear glass, gas tight, shatter resistant window.

J. The building shall withstand 125 mph wind load and 40 pounds per square foot snow load.

K. The building shall be supplied with lighting fixtures, exhaust fans, light switches and receptacles as shown on the Drawings. All wiring for those fixtures shall be completed by the building manufacturer.

2.25 Chlorinator Building Foundation: **NONE REQUIRED THIS PROJECT** ~~The chlorinator building concrete foundation shall be constructed of portland cement concrete with a 28 day compressive strength of 3,800 psi and constructed in conformance with Section 03100, 03200, and 03300 and as detailed on the Drawings. A six (6) mil visqueen vapor barrier shall be placed on the compacted subgrade. The subgrade shall be compacted to 100% of standard proctor density. The concrete shall be reinforced with one (1) layer of 6 x 6 x W 2.9 x W 2.9 welded wire fabric and two (2) number four (4) rebars continuous as shown on the Drawings.~~

PART 3 - EXECUTION

3.1 General: All chlorination station components shall be installed in accordance with the manufacturer's recommendations.

3.2 Installation of Chlorinator Water Supply Line:

A. The chlorinator water supply line shall be installed as shown and detailed on the Drawings.

B. The tap shall be made at 45° to line perpendicular (top of pipe tap will not be accepted).

3.3 Installation of Chlorine Solution Feed Lines:

A. The chlorine solution feed lines shall be installed as shown and detailed on the Drawings.

B. The tap shall be made at 45° to line perpendicular (top of pipe tap will not be accepted).

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION –

SECTION 13700**PHOSPHATE FEED SYSTEM**PART 1 - GENERAL

1.1 Scope: This section covers the furnishing and installation of a complete phosphate feed system.

1.2 Quality Assurance and Qualifications: All equipment furnished under this Specification shall be new and unused, shall be the standard project of manufacturers having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of five (5) years.

1.3 Submittals: Submittals shall be provided in accordance with Section 01340 - Shop Drawings, Samples and Project Data.

1.4 Start-up Services: A factory representative of each major component manufacturer, who has complete knowledge of proper operation and maintenance, shall be provided for a minimum of one (1) day to instruct representatives of the OWNER and the ENGINEER on proper operation and maintenance. With the permission of the OWNER, this work may be conducted in conjunction with the inspection of the installation and test run.

1.5 Operation & Maintenance Manual: Complete operations and maintenance manuals shall be provided in accordance with Section 01730 - Operation and Maintenance Manual.

1.6 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 Society for Testing and Materials (ASTM) Publications

D1784	Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (PVC) Compounds.

1.7 Manufacturer's Field Service: The phosphate manufacturer shall make necessary tests and adjustments for startup, and assist with equipment startup. The phosphate manufacturer shall test operation of the chemical feed system. At time of startup of water treatment operations the phosphate manufacturer shall calibrate and adjust the chemical feed rates in the presence of the ENGINEER.

1.8 Warranty: Warranty shall be provided in accordance with Section 01740 - Warranties and Bonds.

1.9 Additional Services:

- A. The phosphate manufacturer shall test the effectiveness of his product by conducting filtration tests, iron, manganese and chlorine residual tests to determine optimum feed rate.
- B. The phosphate manufacturer shall provide four (4) hours of training to the OWNER or the OWNER'S representative for the conducting of the above described parameters.
- C. Based on the results of the above described analysis, the phosphate manufacturer shall make recommendations to the ENGINEER and the OWNER as to suggested chemical feed rates, solution strengths, etc.
- D. The four (4) hour training period shall not begin until all trouble shooting and startup of the plant is complete.

1.10 Delivery, Storage & Handling:

- A. Deliver all pumps, piping, feeders, equipment, etc. with clearly marked labels indicating intended use.
- B. Maintain feed piping with cap seal on ends to prevent entry of foreign material until ready for installation and startup.
- C. Store chemicals in manner which will prevent damage to project facilities and environment. Do not open chemical containers until ready to initiate chemical feed. Instruct site workers of hazard of each chemical, post warning signs, post first aid procedures as recommended by supplier of each chemical.

PART 2 - PRODUCTS

2.1 Phosphate: The phosphate shall be a commercially produced blend of polyphosphate and orthophosphate to act as a sequestering agent for iron and manganese and act as a corrosion inhibitor. The phosphate shall be NSF approved for potable water use. The phosphate shall be TMB 432 as manufactured by Thornton Musso and Bellemin Water Treatment Consultant of Zachary, Louisiana, (225) 654-4955 or approved equal.

2.2 Phosphate Tank:

- A. The tanks specified in this section shall be as manufactured by Pro Tank of Olive Branch, Mississippi (866) 776-8265; or approved equal.
- B. Tanks shall be constructed by a firm that has at least ten years prior experience in construction of similar crosslink polyethylene tanks in similar applications. The tank shall be of High Density Crossedlinked Polyethylene (HDXLPE). Tanks shall be manufactured by a firm with a nationally accepted quality standard (i.e. ISO 9001 or equal). Submit to ENGINEER list of previous five similar use site installations in the past 36 months or provide a list of three or more customers using tanks for the same chemical applications

and similar weather conditions for at least ten years. Submit supporting information of UL tank manufacturing capabilities and ISO 9001 certification.

C. The tanks shall be molded from high density crosslinked polyethylene. The resin used shall be Marlex CL-200 YJN as manufactured by Phillips Petroleum Company, Plastics Division or Paxon 7004 as manufactured by Paxon, Inc. or of resins of equal physical and chemical properties. The tanks shall be constructed by the rotational molding process.

D. The plastic shall not contain any fillers. All plastic shall contain a minimum of 0.25 percent U.V. stabilizer and maximum of 0.60 percent. Pigments may be added as desired by the OWNER or as designated by the manufacturer, not to exceed 0.5 percent of dry blended or 2 percent if melt compound of the total weight of the tank.

E. The tanks shall be capable of storing the above specified chemicals at temperatures up to 130 degrees F.

F. The tank shall be vertical, cylindrical, flat bottom, dome top, and seamless in construction.

G. The tank diameter shall be measured externally. Tolerance on the outside diameter including out of roundness shall be plus or minus two percent. Measurement shall be taken in a horizontal position. The knuckle radius at bottom to wall shall be a minimum of one inch.

H. All edges shall be trimmed to have smooth edges.

I. All tank materials shall be NSF 61 certified.

J. Dimensions and Accessories:

1. Tank diameter: 23"
2. Tank height: 43"
3. Tank capacity: 65 Gallons
4. Specific gravity: 1.5
5. Lid/Manway: 8"
6. Drain Fitting: 1 ¼"
7. Tank color: Natural (Off-White)
8. Number of tanks: Two (2)

2.3 Metering Pumps:

A. The metering pumps for the phosphate feed system shall be of the positive displacement diaphragm type. Each pump shall include anti-siphon seating springs and poppets integral with unit, and an external, independent anti-siphon device and vacuum relief device furnished with each pump by pump manufacturer. Each pump shall be fitted with wetted parts which are compatible with particular chemical being fed.

B. Each pump shall permanently bear a label identifying:

1. Manufacturer.
2. Model number.
3. Serial number.
4. Electrical data.
5. Name of specific chemical that unit is dedicated for under this project; this may be separate, permanent label affixed for this project.

C. The metering pumps shall be designed to have a max. pump range of 0.42 GPH at 140 psi.

D. Each metering pump shall be adjustable over a 250:1 range. Each metering pump shall deliver the specified flow rate within 2 percent of true flow. The metering pumps shall be provided with an injection check back pressure valve with ½" NPT male threads. The metering pump shall be provided with 16 feet of ½" polyethylene tubing and a foot valve with an integral one piece strainer to the pump section.

E. The metering pumps shall be Liquid Metronics Model A171352 SI or approved equal.

2.4 Piping and Valves:

A. All rigid piping and fittings to be Schedule 80 PVC with solvent weld joints of the sizes indicated on the Drawings.

B. All flexible piping to be PE 3408 SDR 11 I.P.S. of the size indicated on the Drawings.

C. Pump suction tubing to be translucent polyethylene tubing of the sizes indicated on the Drawings.

D. All PVC ball valves shall be true union by Spears, Sylmar, California (818) 364-1611, or approved equal.

E. All PVC check valves shall be true union by Spears, Sylmar, California (818) 364-1611 or approved equal.

F. All pressure relief valves shall have threaded ends and be as manufactured by Plastomatic Valves, Totowa, New Jersey (201) 256-3000)

G. All piping and valves shall be compatible with the type of chemical used in each system.

H. Strainers shall have stainless steel type 316 bodies with 1" threaded ends. Strainers shall be as manufactured by Yarway Series 931 as locally available from Moody Price, Monroe, Louisiana (318) 323-4400.

2.5 Solenoid Valves Solenoid valves shall be of the 2 way pilot operated design. Solenoid valves shall have stainless steel bodies and NEMA 4X solenoid enclosures. Solenoid voltages shall be as shown on the Drawings. Solenoid Valves shall be Red Hot II Series 8210 as manufactured by ASCO locally available through Moody Price, Monroe, Louisiana (318) 323-4400.

2.6 Initial Chemical Supply and Spare Parts:

- A. Provide two (2) thirty (30) gallon drums of phosphate.
- B. For each individual model of metering pump provide a standard preventative maintenance kit including all replacement parts susceptible to wear.

PART 3 - EXECUTION

3.1 Manufacturer's Recommendations: The installation of all chemical feed equipment shall be in strict accordance with the manufacturer's recommendations.

3.2 Interface with Adjacent Systems:

- A. Control chemical feed systems to activate simultaneously with raw water flow from wells into aerator via control interface with auxiliary contacts in the control panel.
- B. Equip each metering pump with local manual override switch control.

3.3 Compatibility:

- A. All systems shall be compatible for use with potable water application, and shall not impart objectionable taste or odor to finished water.
- B. All chemicals shall be approved for use in potable water application.

3.4 Field Measurements:

- A. Field verify all dimensions affecting installation, with special attention to piping runs.
- B. Field verify piping run routes to avoid conflicts with other piping and systems.
- C. Do not route chemical feed piping over the top of electrical equipment and motors.
- D. Minimize presence of piping over water treatment and other equipment.
- E. Determine anchoring and support locations and locate to avoid conflicts or interference with other piping and equipment.
- F. Provide necessary clearances to allow access for installation and maintenance of chemical feed system piping and other process piping and equipment.

3.5 Installation of Chemical Feed Piping: Do not create pockets or air traps. Anchor and support at maximum six (6) feet o.c. to fully support piping system without sags.

3.6 Startup:

A. Prior to initial chemical feed, for each system, pump at least 20 gallons of clean water through each piping system to cleanse.

B. Under supervision of chemical feed equipment manufacturer's representative, verify that all feeders are calibrated and adjusted to meet adequate pumpage conditions based on results of chemical tests specified in Paragraph 3.4.A.

C. At time of water treatment process startup, mix chemicals to recommended solution strengths and adjust feeders to deliver water treatment chemical under supervision of the equipment manufacturer and CONTRACTOR'S lab technician.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 13800**HORIZONTAL SUBMERSIBLE BOOSTER PUMP ASSEMBLIES**PART 1 - GENERAL

1.1 Scope: This Section covers the requirements for the horizontal submersible booster pumps. The pumps and motors shall be of the in-line submersible multistage turbine type as specified herein.

1.2 Quality Assurance and Qualifications: All equipment furnished under this Specification shall be new and unused, shall be the standard product of manufacturers having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of five (5) years.

1.3 Certification: The pumps and motors shall be certified to ANSI/NSF STD. 61. Written certification shall be provided to the engineer if requested. The supplier of this assembly shall submit at least 5 names or locations where it has furnished applications of this equipment as described by the above. This assembly shall be manufactured as specified in these specifications or approved equal.

1.4 Submittals:

A. Submittals shall include at least the following and shall be provided in accordance with Section 01340 - Shop Drawings, Samples And Project Data.

1. Shop and erection drawings showing all important details of construction and dimensions.
2. Descriptive literature, bulletins, and/or catalogs of the equipment.
3. Data on the characteristics and performance of each pump. Data shall include guaranteed performance curves, based on actual shop tests, which show that they meet the specified requirements for head, capacity, efficiency, NPSHR, brake horsepower and input KW. Curves shall be submitted on 8-½" by 11" sheets, at as large a scale as is practical. Curves shall be plotted from no flow at shut off head to pump capacity at minimum specified TDH. Catalog sheets showing a family of curves will not be acceptable.
4. List of the manufacturer's recommended spare parts to be supplied, with the manufacturer's current price for each item. Include gaskets, seals, etc. on the list. List bearings by the bearing manufacturer's numbers only.
5. Complete motor data including certified motor curves.
6. The CONTRACTOR shall submit a certificate from the equipment manufacturer stating that the installation of the equipment is satisfactory, that the equipment is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication and care of each unit.

1.5 Start-up Services: A factory representative of each major component manufacturer, who has complete knowledge of proper operation and maintenance, shall be provided for a minimum of one (1) day to instruct representatives of the OWNER and the ENGINEER on proper operation and maintenance. With the permission of the OWNER, this work may be conducted in conjunction with the inspection of the installation and test run.

1.6 Operation & Maintenance Manual: Complete operations and maintenance manuals shall be provided in accordance with Section 01730 - Operation And Maintenance Manual.

1.7 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 Society for Testing and Materials (ASTM) Publications.

A 48	Specification for Gray Iron Castings
A 53	Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
A 126	Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
B 584	Specification for Aluminum-Coated Steel Woven Wire Fence Fabric

B. American Water Works Association (AWWA) Standards

C 200	Steel Water Pipe - 6 inch (150 mm) and Larger
C 206	Field Welding of Steel Water Pipe
C 207	Steel Pipe Flanges for Waterworks Service-Sizes 4 Inch Through 144 Inch (100 mm Through 3600 mm)
C 208	Dimensions for Fabricated Steel Water Pipe Fittings

PART 2 - PRODUCTS

2.1 General: The CONTRACTOR shall furnish and install horizontal duplex pump assemblies with associated motors, valves, piping, electrical, etc. The pumps and motors shall be non-overloading at any point on the curve. The pump and motor assemblies shall be Franklin Electric FPS Series or approved equal. The balance of the assembly, including shrouds, isolation valves, etc. shall be as provided by Tube Pumps Systems, LLC of West Monroe, Louisiana (1-800-654-7482) or approved equal. The pumps shall have the following characteristics:

	Capacity (GPM)	Head (PSI)	Motor Hp	Min. Eff.	Voltage	Phase
Main Pump Station	400	72	25	75%	480	3
Booster Station 2	90	85	7.5	75%	240	3
Booster Station 3	50	80	5	75%	240	3
Booster Station 4	50	80	5	75%	240	3

2.2 Shroud: A shroud shall be provided for encasement and support of the submersible pump and motor. The shroud shall be constructed of 304 stainless steel. The shroud shall be sized to allow a minimum flow velocity of .5 ft/sec. past motor.

2.3 Pump Bowl Assembly:

A. ANSI/NSF STD. 61 CLASSIFIED. Pump bowls, suction and discharge cases shall be of (close grained cast iron ASTM A48, class 30, 316SS ASTM A743-CF8M, or Lead and Zinc Free Bronze, ASTM B584) Free of blow holes, sand holes or other imperfections. Tensile strength shall be a minimum of 30,000 PSI. The bowl assembly shall be of flanged construction utilizing stainless steel bolts; or if threaded, must be left hand threads. Right hand threads will not be permitted. All mating surfaces shall be precision machined and fitted and no gaskets will be allowed. Rabbeted fits shall be utilized throughout the bowl assembly for accurate fit and alignment. Each bowl casting shall be factory tested at hydrostatic test pressure of 150 PSI before assembly to assure integrity of each bowl and certification of test shall be provided if requested.

B. Impellers shall be precision cast of (Lead and Zinc Free Bronze, ASTM B584 or 316SS ASTM A743-CF8M) machined and dynamically balanced for maximum efficiency and vibration-free operation. Enclosed type impellers, with sufficient skirt material thickness to enable repair and restoration of proper running clearance by the shaft with a split taper collet of stainless steel or lead and zinc free bronze.

C. The shaft shall be of sufficient diameter to transmit the pump horsepower with a liberal safety factor and rigidly support the impellers between the bowl and case bearings. The shaft material shall be 416SS or 17-4 PH, polished and precision straightened, with a minimum diameter of 1".

D. The motor coupling shall be a large stainless steel coupling, accurately machined for perfect alignment, balance and power transmission. The coupling shall be fastened to the end of the pump shaft by means of a recessed allen screw to prevent loss of the coupling during handling and assembly or disassembly. The coupling shall be keyed to the pump shaft and either splined or keyed as required to the motor shaft. The coupling shall be capable of transmitting the total torque of the unit, regardless of the direction of rotation.

E. Intermediate bowls, motor adapter and discharge case shall have viton rubber bearings to support and guide the shaft and lend resistance to sand abrasion wear on shaft bearing surface. The motor adapter and discharge cases may have bronze bearings, provided the bearings are lead and zinc free. The discharge case shall include a top bearing plug to seal the bearing and restrict vertical or horizontal up thrust on the shaft during start-up, imposed hydraulically or by positive suction pressures. A minimum of 30 PSI should be present at all times on the discharge of the pump. Systems with little or no pressure at start-up should simulate a head condition of 30 PSI by closing the system discharge valve on the pump until the pressure is greater than 30 PSI on the pump.

F. The suction screen shall be of stainless steel material with a net open area of at least four times the area of the impeller eye.

G. The pump shall have been classified to ANSI/NSF STD. 61 and carry a label clearly and positively showing compliance when installed in a minimum of 22 gallons of water.

2.4 Motor:

A. The motor shall be of the submersible type designed for continuous under-water operation. The motor shall be of the squirrel cage induction type, suitable for (across the line) starting and conforming to the latest National Manufacturers Association (NEMA) specifications for submersible motors. Motors shall be certified to ANSI/NSF STD. 61.

B. The motor thrust bearing shall be of the Kingsbury design, sized to carry the weight of all rotating parts plus the hydraulic thrust of the pump. The thrust bearing shall have sufficient capacity to permit the pump to operate momentarily with the discharge valve closed.

C. The motor shaft shall be stainless steel, splined or keyed as required and fitted with a rotary face type seal to prevent entry of foreign material into the motor.

D. Motor leads shall be of sufficient length to reach disconnect switch, or electrical junction enclosure at the pump discharge. The motor shall have provision for proper grounding.

E. Minimum flow velocity around motor shall be .5 ft/sec. Shroud should be sized to accommodate this flow. Adequate cooling shall be achieved with this flow rate.

2.5 Support Stand: The shroud assembly shall include a stainless steel adjustable stand for support and leveling of the shroud. The support stand shall be made entirely of 304 stainless steel. The feet of the stand shall be equipped with rubber encasements for protection of the tank floor. The rubber encasements shall be certified to ANSI/NSF STD. 61.

2.6 Butterfly Valve: A butterfly valve shall be provided at the suction side of each pump for isolation of the shroud. The butterfly valve shall be a full-lug valve designed and manufactured for use with ANSI 125 or 150 Class Flanges. The valve body shall be PVC material certified to ANSI/NSF STD 61. Stainless steel cap screws shall be used to attach valve to the shroud.

2.7 Butterfly Valve Handle: The valve shall be equipped with a stainless steel handle that exits the top of the tank for valve operation. The butterfly valve handle shall be constructed of 304 stainless steel. The butterfly valve handle shall be equipped with a 416 stainless steel adapter for precise fitment to the butterfly valve stem.

2.8 Submersible Cable: The cable shall be comprised of three (3) separate conductors plus ground in a single jacketed cable assembly. Each conductor shall be insulated by synthetic rubber or plastic insulation suitable for continuous immersion in water. The cable shall be protected with a stainless steel nozzle where it passes the tank flanges to prevent damage from contact.

2.9 Tube Assembly: The tube assembly including shroud, adjustable support stand, adaptor flanges, pump discharge column and flanges shall be constructed of Type 304 stainless steel.

2.10 Electrical Connection: The electrical connection shall be a stainless steel nipple with NPT threads. The wire size shall be determined by horsepower rating of motor as specified by motor manufacturer.

2.11 Tank Connection: The storage tank shall be equipped with tank shell nozzles (receiving flanges) for connection to the flange on the pump shroud. The shell nozzle flanges shall be 2" larger than the nominal size of the pump shroud and extend at least 6" from the tank wall. Center elevations of the shell nozzles from the tank floor shall be as shown on the Drawings. Shell nozzle flanges shall be two-holed at twelve o'clock. Shell nozzle flanges shall be installed in parallel form with a minimum measurement of 54" center to center of shroud.

2.12 Pressure Gauge: A liquid filled stainless steel pressure gauge shall be provided on the discharge of the pumps as shown on the Drawings. Gauges shall be 2½" diameter with accuracy of 1.5% of full scale, stainless steel, copper alloy bourdon tube, glycerin filled, and brass movement. Gauges shall be WIKA Type 233.30. Discharge gauge shall be 0 to 150 p.s.i. Gauges shall be installed with needle valves and pressure snubbers with ¼" NPT connection.

2.13 Name Plates: Stainless steel name plates giving the name of the manufacturer of the pump and motor (type, model number, acceptance date), the rated capacity, head and speed and number of stages shall be firmly affixed into the pump control panel. Minimum size of name plate shall be 3" x 5" x 0.125" thick. Lettering shall be a minimum of .25" high normal block style. Lettering shall be accurately aligned and engraved.

PART 3 - EXECUTION

3.1 Installation:

- A. Equipment, materials, installation, workmanship, fabrication, assembly, erection, examination, inspection and testing shall be in accordance with manufacturer's recommendations and standard construction procedures. Install piping straight and true to bear evenly on supports. Installation shall include furnishing the required oil and grease, if any, for initial operation.
- B. Keep the interior and ends of new piping and existing piping thoroughly cleaned of water and foreign matter. Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping and fittings so that water and foreign matter will not enter the pipes or fittings. Inspect piping before placing into position.
- C. The CONTRACTOR shall check all motors for correct clearance and alignment and for correct lubrication in accordance with manufacturer's instructions. The CONTRACTOR shall check direction of rotation of all motors and reverse connections if necessary.
- D. The CONTRACTOR shall submit a certificate from the equipment manufacturer stating that the installation of the equipment is satisfactory, that the equipment is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication and care of each unit.
- E. All installation of pumping equipment shall be performed by or under the direct supervision of an experienced pump installer/mechanic.

3.2 Pipe and Fittings:

- A. Inspect, test, and approve piping before installing. Provide fittings for changes in direction of piping and for all connections. Make changes in piping sizes through tapered reducing pipe fittings, do not use bushings.
- B. Jointing compound for pipe threads shall be polytetrafluoroethylene (PTFE) pipe thread tape or PTFE powder and oil; apply only on male threads. Provide exposed ferrous pipe threads with one coat of zinc chromate primer applied to a minimum dry film thickness of one mil.
- C. Provide supports as shown on Drawings.
- D. Field welding of steel pipe is not anticipated, but in the event that field welding is necessary, it shall be performed in conformance with AWWA C206 - "Field Welding of Steel Water Pipe".

3.3 Inspections:

- A. The ENGINEER shall have the right to inspect, test or witness tests of all materials or equipment to be furnished under these Specifications, prior to their shipment from the point of manufacture. The ENGINEER shall be notified in writing prior to initial shipment, in ample time so that arrangements can be made for inspection by the ENGINEER.
- B. Field pump tests shall not be conducted until such time that the entire installation is complete and ready for testing.
- C. The CONTRACTOR shall furnish the ENGINEER with his detailed plan and procedure for conducting the required field pumps tests. The tests shall not be conducted until the ENGINEER has reviewed the procedure.

3.4 Field Pump Tests: The pumps, motors and controls shall be given operational tests to substantiate and record the operation of the equipment at the design heads, capacities, speeds and horsepowers as herein specified. The pump shall be tested at start-up and voltage, current and other significant parameters recorded. Hydrostatically test each piping system at 200 psig for a period of two (2) hours. Perform tests on pumps, drivers, and equipment, including visual equipment checks to ensure compliance with approved shop drawings; pump start-run to ensure proper operation and to detect leakage of piping, valves and fittings; sequence of operation check; verification that required pump accessories have been provided; test of specified indicating lights; and additional inspection is correct, complete, and ready for operation. If the pump performance does not meet the Specifications, corrective measures shall be taken or pumps shall be removed and replaced with pumps which satisfy the conditions specified. A 24-hour operating period of the pumps will be required before acceptance. During this 24-hour operating period, the CONTRACTOR shall supply all power necessary.

3.5 Flushing: Flush all new pump suction and discharge piping at 100 percent of rated pump capacity. Continue flushing operations until water is clear, but for not less than ten (10) minutes.

3.6 Instructing Operating Personnel: Upon completion of the work and at a time designated by the ENGINEER, provide for a period of not less than four (4) hours, the services of experienced technicians regularly employed by the manufacturer of the pumps and the drivers to instruct the OWNER'S operating personnel in the proper operation and maintenance of the equipment.

3.7 Electrical Services:

- A. Electrical work shall be in conformance with Division 16000.
- B. The CONTRACTOR shall coordinate his work with personnel to insure continued operation of the existing water system. He shall connect new equipment, making all connections and adjustments as required for a complete installation.
- C. The CONTRACTOR shall coordinate his work with power company.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 13900**GROUND STORAGE TANKS**PART 1 - GENERAL

1.1 Scope: This Section covers all work associated with the installation of epoxy coated bolted steel tanks as detailed on the Drawings and specified herein.

1.2 Applicable Publications: The publication listed below form a part of this Specification to the extent referenced: The publications may be referred to in the text by basic designation only.

A. America Water Works Association, Inc.

D103 Factory Coated Bolted Steel Tanks for Water Storage

B. American Society for Testing and Materials:

A36 Specification for Structural Steel

A153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

A307 Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile

A570 Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality

1.3 Warranty: The tank manufacturer shall warrant the tank against any defects in workmanship and materials for a period of one (1) year from the date of acceptance by the OWNER. In the event any such defect should appear, it should be reported in writing to the CONTRACTOR during the warranty period.

1.4 Design Requirements:

A. Size: The reservoir at the Duplex Pump Station site shall have a minimum nominal storage capacity of 44,000 gallons. It shall have a nominal inside diameter of 21'-6" and nominal tank height of 16'. The tanks at the Booster Pump Station sites shall have a minimum nominal storage capacity of 14,000 gallons. The tanks shall have a nominal inside diameter of 12'-4" and nominal tank height of 16'.

B. Approved Manufacturer: The tank(s) specified in this section shall be TecTank CS (formerly Columbian TecTank) as manufactured by CST Industries, Parsons, KS. and locally represented by Southeastern Tank, Lebanon, TN. These specifications and Drawings have been prepared using technical data and dimensions for the TecTank CS. The tank manufacturer shall be quality certified, having an active API-Q1 Certification and ISO-9001 Registration. The tank manufacturer must have experience in the manufacturing of bolted steel tanks and have in the last two (2) years manufactured at least five (5) tanks of similar size and use.

C. Alternate Equipment: CONTRACTOR shall assume overall undivided responsibility for the functioning of the alternate equipment. The cost of any changes incidental to installation of the alternate equipment such as electrical wiring, relocation of piping, engineering design or supervision, as-built drawings, etc., shall be borne by the CONTRACTOR with no additional expense to the OWNER.

D. Loads:

1. Specific Gravity: 1
2. Wind Force: 120 m.p.h.
3. Roof Live Load: 20 p.s.f.
4. Earthquake: Seismic Zone Per AWWA D103

1.5 Quality Assurance and Qualifications: All equipment furnished under this Specification shall be new and unused, shall be the standard product of manufacturers having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of five (5) years.

1.6 Submittals:

A. Submittals shall include at least the following and shall be provided in accordance with Section 01340 - Shop Drawings, Samples and Project Data.

1. Shop and erection drawings showing all important details of construction and dimensions.
2. Descriptive literature, bulletins, and/or catalogs of all accessories indicated on the Drawings and specified herein.

PART 2 - PRODUCTS

2.1 Tank Structure: The materials, design, fabrication, and erection of the powder-coated-epoxy bolted steel tank shall conform to AWWA D103 and API 12B.

A. Materials:

1. Steel sheets shall conform to, or be at least equal to, hot-rolled quality per ASTM A570 Grade 33 with a minimum yield strength of 33,000 p.s.i. Minimum thickness shall be 12 gauge (0.0972" minimum).
2. Steel plates shall conform to, or at least be equal to, the requirements of ASTM A36 with a minimum yield strength of 36,000 p.s.i.
3. Rolled structural shapes shall conform to ASTM A36.

B. Bolts:

1. Bolts used in tank joints shall be ½ inch diameter and shall meet the minimum requirements of API 12B, Appendix A. All bolt heads shall be square, plastic encapsulated hot dip galvanized to ASTM A153.
2. Other bolts shall conform as a minimum to the latest revision of ASTM A307.

2.2 Tank Foundation: The materials, design, fabrication, and construction of the tank foundation shall conform to AWWA D103. The tank foundations shall be a "*Type 5. Steel-bottom tanks supported on granular berms with steel retainer rings*", in accordance with AWWA D 103.

- A. Stone base shall be "No. 7 Stone" conforming to ASTM D 488, eight inch (8") thick.
- B. Grade band shall be eight inches (8") high by 1/8" thick and galvanized steel with galvanized bolts.
- C. Vapor barrier shall be 15 mils and have a water vapor transmission rate of less than 0.006 gr/ft²/hr as tested under ASTM E96 guidelines and conform to ASTM E1745 Class A (Plastics). Vapor barrier shall be W.R. Meadows Premolded Membrane with Plasmatic Core, or approved equal.
- D. Geotextile fabric shall be US Fabrics "US 205NW" geotextile fabric or approved equal.

2.3 Valves: Refer to Specification Section 15120 - Mechanical Piping, Valves and Appurtenances.

2.4 Gaskets: All bolted connections shall incorporate an EPDM white, prefabricated, by nylon reinforced gasket minimum width 1-3/4" or a FDA approved equal. Field caulking will be allowed when joining a discontinuous gasket section and at certain joint connections. Neoprene backed steel washers shall be provided at all bolts in contact with the stored liquid.

2.5 Epoxy Coating:

A. All metal plates, supports, members, and miscellaneous parts, except bolts, certain accessories and appurtenances shall be factory coated in accordance with the provisions of these specifications. All interior coatings shall be NSF 61 Certified. Field coating, except for touch-up will not be permitted.

1. Interior: Thermally cured epoxy Trico-Bond EP by CST Industries or prior approved equal.
2. Exterior: Enhanced Trico-Bond EP by CST Industries or prior approved equal.

2.6 Accessories: Accessory equipment shall be provided for each tank in accordance with Section 5 of AWWA D103 and as included herein or as shown on the drawings:

- A. One (1) 24-inch by 46 inch rectangular shell manhole with suitable reinforcing located approximately 1' - 6" above the tank floor.
- B. One (1) 24-inch standard roof hatch with hasp and curb located near the tank ladder. The tank roof hatch shall have a curbed, upward opening 24" square. The curb shall extend at least four (4") inches above the tank. The hatch cover lip shall be hinged and provisions made for locking. The hatch cover lip should extend for a distance of two (2") inches down on the outside of the curb.
- C. One (1) 20-inch diameter standard roof center manhole.
- D. One (1) suitable screened and vented finial located at the roof apex. Vent shall be bolted to the cover plate of the center manhole on the roof. Vent will be tank manufacturer's standard type mushroom vent with aluminum bird screen (24 Mesh). The free area of the vent shall be sized fifty (50%) percent in excess of the required capacity to pass air so that the maximum possible rate of the water, either entering or leaving the tank does not develop excessive pressure. The overflow pipe shall not be considered a tank vent. The vent shall be designed to ensure fail-safe operation in the event that screen frosts over and the bottom of the screen shall be sufficiently elevated for snow consideration in the area.
- E. A ladder on the inside and the outside of the tank shall be equipped with OSHA approved safety climbing devices complete with belts and sleeves, SAF-T-CLIMB or approved equal.
- F. Access from the outside shell ladder to roof hatches and vents per AWWA D103 and OSHA requirements.
- G. Two (2) 12-inch diameter steel pipe outlet connections for pump discharge.(44,000 Gallon Tank only)

- H. One (1) 10-inch diameter steel pipe tank fill inlet connection. (44,000 Gallon Tank only)
- I. One (1) 6-inch diameter steel pipe drain connection. (44,000 Gallon Tank only)
- J. One (1) 6-inch diameter overflow connection and weir box. The overflow shall empty over a 3'-0" by 5'-0" splash block as indicated on the Drawings. (44,000 Gallon Tank only)
- K. Two (2) 8-inch diameter steel pipe outlet connections for pump discharge. (14,000 Gallon Tanks only)
- L. One (1) 2-inch diameter steel pipe tank fill inlet connection. (14,000 Gallon Tanks only)
- M. One (1) 2-inch diameter steel pipe drain connection. (14,000 Gallon Tanks only)
- N. One (1) 2-inch diameter overflow connection and weir box. The overflow shall empty over a 3'-0" by 5'-0" splash block as indicated on the Drawings. (14,000 Gallon Tanks only)
- O. One (1) 3-inch female NPT connection at roof.
- P. One (1) Target Style Level Indicator: The gauge board shall be 1" x 8" aluminum, painted with black marks at 12" on center. The target shall be of 12" diameter, aluminum construction and painted red. Target pulleys, cables, idlers, etc. shall be of stainless steel construction.
- Q. Two (2) 10-foot copper ground rods.
- R. One (1) 1/2" NPT plain stainless steel smooth nozzle sample tap on 1" NPT shell nozzle for DHH sampling purposes.

2.7 Overflow Piping Flap Valve: Refer to Specification Section 15120 - Mechanical Piping, Valves and Appurtenances.

2.8 Flexible Couplings: Refer to Specification Section 15120 - Mechanical Piping, Valves and Appurtenances.

PART 3 - EXECUTION

3.1 Shipping: All plates, supports, members, and miscellaneous parts shall be packaged for shipment in such a manner to prevent abrasion or scratching of the finished coating.

3.2 Epoxy Coating Application:

A. Surface Preparation:

1. Tank parts shall be thoroughly washed and rinsed to remove grease, oil and foreign matter.
2. Parts are then immediately oven dried
3. Parts shall be grit-blasted to SSPC-SP10-63T (near white blasted cleaning) to 2-3 mils profile
4. All parts must be coated within 15 minutes after blasting, and no further processing other than coating shall be done.

B. Interior Coating (Includes underneath side of steel bottom) (7.0 mils min. DFT)

1. First Coat: Electrostatic application of NSF approved Trico-Bond EP powder coat epoxy, 4.0 mils average DFT.
2. Second Coat: Electrostatic application of NSF approved Trico-Bond EP powder coat epoxy, 3.0 mils average DFT.

C. Exterior Coating (4.0 mils minimum DFT):

1. First Coat: Electrostatic application of NSF approved Trico-Bond EP powder coat epoxy, 2.5 mils average DFT.
2. Second Coat: Performance Urethane, 1.5 mils average DFT

D. Curing:

1. Baking ovens shall be used after each coat.
2. Initial curing shall take place after powder is applied. A combination of IR boosters and convection ovens will be used to heat parts to approximately 300° F to gel the powder (partial cross-linking).
3. Final curing shall take place after topcoat is applied. A combination of IR boosters and convection ovens will be used to heat parts to approximately 350° F for 5-6 minutes to finish curing powder and topcoat.

E. Inspection:

1. MEK rub test to verify proper curing of coating.
2. Wet sponge test to check for holidays.

3. Mil thickness test for uniform epoxy coverage.

F. Preparation for Transport:

1. All plates, supports, members, and miscellaneous parts shall be packaged for shipment in such a manner to prevent abrasion or scratching of the finished coating.
2. Material to be marked or tagged with part number for ease of field assembly.
3. Tank materials to be placed in racks or on pallets to facilitate transportation to jobsite.
4. Touch-up paint with instructions for application by erection personnel.

3.3 Erection: Field erection of tank shall be in strict accordance with the manufacturer's recommendations. The foundation shall be compacted on a prepared subgrade compacted to 100% standard proctor density. The gravel base shall be covered with the vapor barrier. Foundation shall be level with differential not exceeding $\pm 1/8"$ in any 30 foot circumference. The levelness on the circumference shall not vary by more than $\pm 1/4"$ from an established plane. Particular care shall be exercised in handling and bolting of the tank plates, supports, and members to avoid abrasion or scratching of the coating. Touch-up coating shall be done in accordance with manufacturer's recommendations where and as directed.

3.3 Testing:

- A. Following completion of erection and cleaning of the tank, the tank shall be tested for liquid-tightness by filling the tank to its overflow elevation.
- B. Any leaks disclosed by this test shall be corrected by the CONTRACTOR in accordance with the manufacturer's recommendations.

3.4 Disinfection: The ground storage tank shall be disinfected in accordance with AWWA Standard Disinfection of Water-Storage Facilities (C652-11) and LAC 51:XII.225.T.

3.5 Health Department Approval: The CONTRACTOR will be responsible for the successful disinfection of the reservoir. The CONTRACTOR shall assure water from the ground storage tank system piping shall not be furnished for consumer's use until water samples collected and analyzed by the local Health Department show the water to be free of coliform bacteria.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 13950**ALUMINUM FORCED DRAFT AERATOR**PART 1 - GENERAL

1.1 Scope: This Section covers the furnishing and installation of a new Aluminum Forced Draft Aerator. All equipment shall be furnished by a single manufacturer and shall include aerator housing, media, blower, and all other appurtenances required or shown on the drawings. The Aerator shall be installed as indicated on the Drawings and specified herein.

1.2 Product Delivery, Storage and Handling:

- A. Comply with the pertinent provisions of the delivery schedule.
- B. Equipment, materials and fabricated parts shall be delivered to the site and stored off the ground and protected from weather and damage. Control and electrical devices shall be stored indoors.
- C. Fabricated assemblies shall be in largest sections permitted by carrier regulations.
- D. Prevent damage to equipment during handling and transportation.

1.3 Submittals: Copies of all materials required to establish compliance with these specifications shall be submitted for review. Submittals shall include at least the following:

- A. Certified general arrangement drawings showing all important details and materials of constructions dimensions, loads on supporting structures, and anchorage locations.
- B. Descriptive literature, bulletins, and catalogs of the equipment.
- C. Complete data on blower.

1.4 Requirements for Low Lead in Water Distribution Systems: The CONTRACTOR shall comply with all applicable provisions of La. R.S. 40:1285.8 regarding Low Lead in Water Distribution Systems.

1.5 Purpose: The purpose of the aerator is to reduce levels of hydrogen sulfide (H₂S) that exist in the water produced by the existing wells. The hydrogen sulfide concentration is reported to be 3.25 ppm.

PART 2 - PRODUCTS

2.1 General: The Aerator shall be General Filter™ Products - Model AWF21I Aluminum Forced Draft Aerator as manufactured by WesTech Engineering, LLC, or approved equal. The aerator shall have a flow capacity of 600 gpm. The aerator shall be capable of dissolving iron and reducing levels of dissolved gases such as carbon dioxide, hydrogen sulfide, etc. from raw water.

2.2 Aerator Chamber:

- A. The aerator shall consist essentially of a closed chamber for affecting a countercurrent flow of water and air. The aerator cover shall be fixed, and one side shall be hinged and bolted for access to the PVC slats and stainless steel grids.
- B. The aerator internal shell chamber shall be 60" wide x 60" long x 120" high and have an effective internal cross sectional area of 25 square feet. The unit shall be of welded construction and fabricated from aluminum alloy 3000 series plate suitably reinforced with Type 6061 aluminum alloy structural members.
- C. The aerator shall be welded inside and outside with fillet welds equal in size to the thickness of the plates. Appropriate water-retaining welds shall be checked at the factory with dye penetrant before shipment to ensure they are watertight.
- D. Four structural support legs shall be welded to the base of the aerator chamber. The support legs shall be fabricated of the same materials of construction as the aerator chamber. The support legs shall be equipped with mounting holes for anchorage to tank, platform, base, etc., by others.
- E. The aerator shall have an 8" flanged top side influent connection and an 10" plain end effluent connection. Piping and pipe supports to and from the aeration connections is furnished by others.

2.3 Aerator Internals:

- A. A complete primary distribution system of non-corrosive water distributors and air collectors shall be provided for uniform distribution of the inlet water over the horizontal cross section of the aerator chamber and for uniform collection of exhaust air. The distributor box shall be constructed of aluminum with an inlet water velocity breaker box to absorb excess inlet flow energy prior to uniform cascade distribution, aluminum air exhaust stacks engineered and positioned for uniform air distribution through the secondary aeration chamber and water distribution target nozzles. Aluminum shall be alloy 3000 series, same as shell construction.
- B. The distributor box shall be equipped with polypropylene inlet water distribution nozzles having an approximate 6" center to center spacing. The nozzles shall be equipped with a bell mouthed entrance to minimize operating head. Each nozzle shall be equipped with an integral target distributor located below the nozzle which, in conjunction with the other target nozzles, shall uniformly disperse and distribute all the inlet flow over the entire cross section of the aerator chamber. Use of a pipe inlet header with orifices or spray nozzles, commonly referred to as spray aerators, is not permitted because of inadequate inlet water distribution and excessive head loss required.
- C. The secondary aeration zone shall consist of loose plastic fill polypropylene media, 60 inches deep supported by an aluminum grid.

2.4 Forced Draft Blower Assembly:

- A. Provide a motor blower with an air flow capacity of 1,875 scfm and sufficient static pressure, driven by a 1/2 hp, 460 volt, 3 phase, 60 Hz motor. The motor shall be provided with a weatherproof hood. Provide protective #24 mesh stainless steel screen on aluminum blower inlet hood and an aluminum transition for connecting blower to aerator. Dampers installed in blower discharge creating a false head are not acceptable.
- B. The blower shall be of the non-overloading centrifugal type. The blower housing shall be constructed of heavy steel properly reinforced. The blower wheel shall be of welded construction and shall be dynamically balanced. Bearings shall be anti-friction, self-aligning, grease packed, pillow block type with grease and dirt seal. The blower rating shall be based upon the AMCA standards, and the blower shall bear the AMCA seal.
- C. Supporting platform for the aerator and blower and the necessary materials for securing aerator against wind loads shall be provided by purchaser.
- D. The Motor Controller supplier shall provide a delay timer to be used to keep the blower running for at least 10 minutes after the pump stops. This is to prevent water from running back into the blower during shutdown and to dry the unit out to prevent icing of the outlet screens.
- E. The Contractor shall provide a 30A-3P NEMA-4 stainless steel N.F. Disc Sw on the aerator platform for the aerator motor. He shall also provide a duplex GFI receptacle in a cast box with a W.P. while-in-use cover on the aerator platform.

2.5 Air Exhaust Hood/Moisture Separators: An aluminum air exhaust hood with stainless steel screen and baffle type moisture separators shall be provided for mounting on the aerator cover. The hood shall be constructed of aluminum properly braced with aluminum angles to withstand wind loads. The air outlet shall be screened with #24 stainless steel mesh. Provide moisture separator baffles designed to produce multiple changes of direction in the exhaust air stream at the base of the hood. Moisture separator baffles are to be constructed of 20 gauge aluminum and are to be spaced on 1 1/2 inch centers.

2.6 Top Inspection Port: Provide one factory installed inspection port approximately 18 inch diameter in the aerator cover for inspection of the distributor box and the top trays which are visible through the air stacks.

2.7 Bottom Inspection Port: Provide one factory installed inspection port 13 inches x 15 inches in the side shell below the media for inspection of the lower collection area and to view the internals from below.

2.8 Finish: Surfaces in contact with concrete or other dissimilar metal shall be coated with a coal tar, mastic coating or base pad.

PART 3 - EXECUTION

3.1 General: The equipment shall be installed properly to provide a complete working system. Installation shall follow the supplier's recommendations.

3.2 Inspection, Start-Up, and Operator Training:

A. The Supplier shall furnish a qualified factory-trained field technician for equipment check, start up and instruction of operating personnel on proper operation and maintenance of the equipment, with a maximum of one eight hour day at the jobsite in one trip.

B. Installation inspection, start-up and operator instruction shall be coordinated with the Installing Contractor. All equipment must be in operating condition and ready for Supplier's Field Technician when called to the project location.

3.3 Warranty: A warranty shall be provided covering all materials and workmanship for twelve months beginning on the date of Substantial Completion of the project.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.
CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

DIVISION 15 - MECHANICAL

Section 15120 - MECHANICAL PIPING, VALVES AND
APPURTENANCES

SECTION 15120**MECHANICAL PIPING, VALVES AND APPURTENANCES**PART 1 - GENERAL

1.1 Scope: This Section covers the furnishing and installation of water mains and related water works including the well discharge lines, aerator fill line, ground storage tank fill and drain lines, elevated tank fill line, pump station pipe, fittings and valves, above ground and below ground pipe and fittings, etc. for the Duplex Pump Station site and site piping at each of the three (3) Booster Station sites, as indicated on the Drawings and specified herein.

1.2 Product Delivery, Storage and Handling:

A. Inspection of Material at Delivery Point:

1. When delivered to the site, and prior to unloading, the CONTRACTOR shall inspect all pipe, valves, valve boxes and accessories for loss, damage or lack of specified identification and markings.

2. Any defective or improper material shall be immediately marked and shall not be unloaded. Defective or improper material shall not be considered for payment as "material stored on or at the site".

B. Handling: In shipping, storing and installing pipe, valves and accessories shall be kept in a sound, undamaged condition. They shall, at all time, be handled with care and shall not be dropped, dumped or bumped against any other object. Any material(s) damaged shall be so marked and immediately removed from the job site.

C. Storing:

1. Pipe shall be stored off the ground on skids or pallets. Pipe shall be stacked with spigot ends projecting from the stack in opposite directions for alternate rows.

2. Valves, valve boxes, couplings, fittings, etc. shall be kept clean and dry.

D. Defective Materials: All materials found at any time during the progress of the work to have cracks, flaws, or other defects will be rejected and so marked and the CONTRACTOR shall promptly remove such defective material from the work site.

1.3 Applicable Publications: The publications listed below form a part of this specification to the extent referenced. The publications may be referred to in the text by basic designation only.

A. American Water Works Association:

C104	Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water
C105	Polyethylene Encasement for Gray and Ductile Cast Iron Piping for Water and Other Liquids
C110	Gray-Iron and Ductile Fittings, 3 in. through 48 in. for Water and Other Liquids
C111	Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
C115	Flanged Ductile-Iron Pipe with Ductile-Iron On Gray-Iron Threaded Flanges
C150	Thickness Design of Ductile Iron Pipe
C151	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
C153	Ductile - Iron Compact Fittings, 3 Inch through 12 Inch (75mm through 300mm) for Water and Other Liquids
C502	Dry Barrel Fire Hydrants
C509	Resilient Seated Gate Valves for Water Supply Service
C550	Protective Epoxy Interior Coatings for Valves and Appurtenances
C600	Installation of Gray and Ductile Cast Iron Water Mains and Appurtenances
C900	Polyvinyl Chloride (PVC) Pressure Pipe, 4 Inch Through 12 Inch, for Water
C901	Polyethylene (PE) Pressure Pipe and Tubing, ½ Inch Through 3 Inch, for Water Service
C906	Polyethylene (PE) Pressure Pipe and Fittings, 4 Inch through 63 Inch, for Water Distribution

B. American Society for Testing and Materials:

A 536	Specification for Ductile Iron Castings
D1784	Rigid Poly (Vinyl Chloride)(PVC) Compounds and Chlorinated Poly (Vinyl Chloride)(PVC) Compounds
D2240	Test Method for Rubber Property - Durometer Hardness
D2241	Poly (Vinyl Chloride)(PVC) Plastic Pipe (SDR-PR)
D2737	Specification for Polyethylene (PE) Plastic Tubing
D3035	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
D3139	Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

1.4 Submittals: Submittals shall be provided in accordance with Section 01340 -Shop Drawings, Samples And Project Data.

1.5 Quality Assurance: All pipe and fittings shall be furnished by manufacturers who are fully experienced, reputable, and qualified in the manufacture of the material to be furnished.

1.6 Requirements for Low Lead in Water Distribution Systems: The CONTRACTOR shall comply with all applicable provisions of La. R.S. 40:1285.8 regarding Low Lead in Water Distribution Systems.

PART 2 - PRODUCTS

2.1 Plastic Water Pipe and Fittings:

A. Plastic Water Pipe (Push-On Joints): Plastic pipe shall be polyvinyl chloride (PVC) conforming to ASTM D1784, ASTM D2241 AWWA C900 and/or AWWA C905 as applicable, latest revisions, with integral bell push-on gasketed joint conforming to ASTM D3139. The requirements for the specific type of plastic pipe to be used under this project shall be as given below unless otherwise noted on the Drawings.

2" through 3" – ASTM D2241 – DR 21 (IPS)
 4" through 12" – AWWA C-900 – DR 18 (DIPS)
 14" through 48" – AWWA C-905 – DR 18 (DIPS)

The pipe shall have an integral bell, rubber gasket joint and shall be capable of direct tapping. The PVC pipe shall be approved by the National Sanitation Foundation for potable water pipe and said stamp be inclusive on the pipe furnished along with the nominal size O.D., pressure class, dimensional ratio, and the manufacturer's name or trademark which shall be Certainteed Corporation, H&W Industries, Inc., Extrusion Technologies, Inc., or equal.

B. Plastic Water Pipe (Push-On Restrained Joints): Plastic pipe shall be polyvinyl chloride (PVC) conforming to ASTM D1784, ASTM D2241 AWWA C900 and/or AWWA C905 as applicable, latest revisions, with integral bell push-on gasketed joint conforming to ASTM D3139. The requirements for the specific type of plastic pipe to be used under this project shall be as given below unless otherwise noted on the Drawings.

4" through 12" – AWWA C-900 – DR 18 (DIPS)

The pipe shall have an integral bell, restrained rubber gasket joint and shall be capable of direct tapping. The PVC pipe shall be approved by the National Sanitation Foundation for potable water pipe and said stamp be inclusive on the pipe furnished along with the nominal size O.D., pressure class, dimensional ratio, and the manufacturer's name or trademark which shall be Eagle Loc 900 as manufactured by J.M. Eagle, Certa-Lok C900 RJIB as manufactured by North American Specialty Products, or equal.

C. Fittings for PVC Pipe: Fittings that are three (3) inches in diameter or larger shall be mechanical joint S.S.B., unless otherwise shown on the Drawings, and shall be made of ductile cast iron with a pressure rating of 350 psi, and cement lined and asphalt coated. All fittings shall meet or exceed ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11 specifications. All DIMJ fittings shall be of domestic manufacture. (Made in USA). All follower glands shall be mechanical joint restraint devices as specified under "Mechanical Joint Restraint Devices" of these Specifications. Fittings two (2) inches and smaller, unless otherwise shown on the Drawings, shall be PVC (DR 21) gasketed fittings manufactured by the Harrington Corporation of Lynchburg, Virginia or approved equal.

D. Bolts and Nuts for Mechanical Joint Fittings: Bolts and nuts for mechanical joints shall be Cor-Ten T Bolts, as manufactured by NSS Industries of Plymouth, Michigan (1-800-221-5125) or approved equal.

2.2 Ductile Cast Iron Pipe and Fittings (Underground):

A. Ductile Cast Iron Pipe: Ductile cast iron (D.I.) pipe used underground shall be designed in accordance with ANSI/AWWA C151/A21.51 and ANSI/AWWA C111/A21.11 specifications and have push-on joints unless otherwise shown on the Drawings. Mill certificates shall be furnished upon request of the ENGINEER. The requirements for the specific type of ductile iron pipe to be used under this project shall be as given below unless otherwise noted on the Drawings.

4" through 12" - Pressure Class 350
14" through 20" - Pressure Class 250

B. Coating and Lining: The pipe shall be cement lined and seal coated on the inside according to AWWA C104 with an NSF61 approved seal coat and seal coated on the outside with a one (1) mil thick asphaltic coating in accordance with AWWA C151. Underground ductile iron pipe and fittings shall be wrapped in polyethylene wrap as specified herein.

C. Fittings: Ductile iron fittings used underground shall be mechanical joint unless otherwise shown on the Drawings in accordance with ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11 specifications. Fittings shall have a pressure rating of 350 psi. All DIMJ fittings shall be of domestic manufacture. (Made in USA). All follower glands shall be mechanical joint restraint devices as specified under "Mechanical Joint Restraint Devices" of these Specifications. The fittings shall be cement lined and seal coated on the inside according to AWWA C104 with an NSF approved seal coat, and seal coated on the outside with one (1) mil thick asphaltic coating in accordance with AWWA C151.

D. Bolts and Nuts for Mechanical Joint Fittings: Bolts and nuts for mechanical joints shall be Cor-Ten T Bolts, as manufactured by NSS Industries of Plymouth, Michigan (1-800-221-5125) or approved equal.

2.3 Ductile Cast Iron Pipe and Fittings (Aboveground):

A. Ductile Cast Iron Pipe: Ductile cast iron (D.I.) pipe used aboveground shall be designed in accordance with ANSI/AWWA C115/A21.15 and ANSI/AWWA C110/A21.10 specifications and have flanged joints unless otherwise shown on the Drawings. Mill certificates shall be furnished upon request of the ENGINEER. The requirements for the specific type of ductile iron pipe to be used under this project shall be as given below unless otherwise noted on the Drawings.

3" thru 12" - Ductile Iron - Pressure Class 250

B. Coating and Lining: The pipe shall be cement lined and seal coated on the inside according to AWWA C104 with an N.S.F. approved seal coat. The pipe fabricator shall apply a shop coat to the exterior in accordance with Specification Section 09910 - Painting.

C. Fittings: Ductile iron fittings used aboveground shall be flanged joint unless otherwise shown on the Drawings in accordance with ANSI/AWWA C110/A21.10 specifications. Fittings shall have a pressure rating of 250 psi. The fittings shall be cement lined and seal coated on the inside according to AWWA C104 with an N.S.F. approved seal coat. The fitting manufacturer shall apply a shop coat in accordance with Specification Section 09900 – Painting of Miscellaneous Items.

2.4 Gate Valves (Aboveground): Gate valves shall be resilient seated wedge type and shall be iron body, non-rising stem with "O" ring stem seals, open left with handwheel and with flanged ends. All gate valves shall comply with the latest revision of the AWWA Gate Valve Standard C-509 for resilient seated wedge type gate valves with N.S.F. approved fusion bonded epoxy coating conforming to AWWA C-550. Gate valves shall be rated for 250 psi working pressure and shall be hydrostatically tested to 500 psi for structural integrity. The gate valves shall be covered by a manufacturer's published 10 year warranty. All gate valves shall be UL listed and FM approved. Gate valves shall be as manufactured by American Flow Control, Clow, Mueller, M&H, or approved equal.

2.5 Gate Valves and Valve Boxes (Underground):

A. Gate valves shall be resilient seated wedge type and shall be iron body, non-rising stem with "O" ring stem seals, open left with two inch (2") square operating nut and with mechanical joint ends. All gate valves shall comply with the latest revision of the AWWA Gate Valve Standard C-509 or C-515 for resilient seated wedge type gate valves with N.S.F. approved fusion bonded epoxy coating conforming to AWWA C-550. Gate valves shall be rated for 250 psi working pressure and shall be hydrostatically tested to 500 psi for structural integrity. The gate valves shall be covered by a manufacturer's published 10 year warranty. All gate valves shall be UL listed and FM approved. Gate valves shall be as manufactured by American Flow Control, Clow, or Mueller, no exceptions allowed.

B. Valve boxes shall be three (3) piece adjustable, five and one-quarter (5¼") inch shaft diameter, high grade screw-type cast iron valve boxes as manufactured by the Tyler Corporation of Tyler, Texas, Series 6850 or approved equal. The cast iron valve box shall have a base large enough to fit completely over the valve bonnet and shall have the word "Water" embossed on the top side of its cover.

C. Iron bodied gate valves shall be wrapped with an 8 mil thickness polyethylene wrap.

D. All valves/valve boxes shall be equipped with a valve box alignment device, Sigma "Box-Lok Valve Box Alignment Device" or approved equal.

2.6 Butterfly Valves: Butterfly valves shall be of tight-closing, rubber-seat type. No metal-to-metal seating surfaces shall be permitted. Valves shall be bubble-tight at rated pressures with flow in either direction. Valve discs shall rotate 90° from the full open position to the tight shut position. Valve bodies shall be constructed of cast iron ASTM A-126 Class B. Flange drilling shall be in accordance with ANSI B16.1 Standard for cast iron flanges. Valve discs shall be constructed of alloy cast iron ASTM A-436 Type I (Ni-Resist), cast iron, or ductile iron. Shafts of all valves shall be turned, ground and polished. Valve shafts shall be constructed of 18-8 Type 304 or Type 316 stainless steel. Valve seats shall be of a synthetic compound. Valves shall have seats that are simultaneously molded in, vulcanized and bonded to the valve body. Valves shall meet the full requirements of AWWA Standard C504 for Class 150B. Butterfly valves shall be as manufactured by the Henry Pratt Company of Aurora, Illinois, or approved equal. Valves at the aerator shall be provided with chain wheel actuators. Isolation valves at the pump stations in the ground storage tank shall be provided with an operating nut.

2.7 Check Valves:

A. Lever & Weight: The check valve shall be a Lever and Weight, rubber seated swing check valve. The valve shall permit flow in one direction only and close tightly, without slamming, when its discharge pressure exceeds its inlet pressure. The swing check valve shall be installed on the discharge side of a pump with the flow direction horizontal and shall function to prevent reverse flow back thru the pump when the pump is not running. The valve shall be made to operate without slam. The hinge shaft shall be located completely above the waterway. The valve shall be tight seating when closed, and when open provide full flow area through the valve equal to pipeline diameter. The seating shall be by a resilient field replaceable ring on the valve disc contacting a bronze seat ring in the valve body. A lever and weight shall be provided to initiate valve closure. The valve body shall be of Cast Iron (ASTM A126-B) and with a Cast Iron Disc of similar material. The hinge shaft shall be of 18-8 stainless steel with the disc arm and counterweight arm keyed there on. The body seat shall be all Bronze. The counterweight arm may be of the manufacturer's standard construction. The hinge shaft packing gland shall be of the adjustable packing gland design employing a compression type packing. Simple O-ring shaft seals will not be accepted. The valve shall be full-ported at a disc travel of no more than 25 degrees and close tightly when the inlet pressure decreases below the outlet pressure. AN external adjustable, bronze air-cushion chamber, side mounted directly on the valve body and connected to the valve shaft, shall provide non-slam operation. The check valve shall be equipped with a NEMA 4X, "normally open", limit switch. The valve shall be Fig. 250-DS Lever and Weight (Class 125 flange), as manufactured by GA Industries; APCO Series 6000C – Cushioned swing check valve as manufactured by Dezurik, Inc.; or approved equal.

B. Globe Style: Check valves shall be globe style spring assist or silent globe style for warranty.

2.8 Discharge Meter (w/ 4-20 mA Output): The well and pump discharges shall be equipped with a Rosemount 8750WA magnetic flowmeter or equal, complete with 150 lb. flanged carbon steel connections, polyurethane liner, #316 stainless steel electrodes, integral mounted aluminum NEMA 4X housing with local display and 4-20 mA output, and grounding rings.

2.9 Air/Vacuum Valve: The Air/Vacuum valve shall employ the kinetic discharge principle to automatically exhaust large quantities of air during the filling of the pump column and to allow air to re-enter when the well pump kicks off. The inlet shall be nominal size of the valve and the outlet shall be the same size as the inlet. The float shall be the only moving part, be capable of withstanding a test pressure of 1,000 psig and shall seal against a renewable resilient seat. The body and covers shall be constructed of cast iron conforming to ASTM A126, Class 150. The float shall be made of stainless steel. No plastic parts shall be permitted in the valve. The Air/Vacuum valve shall be installed with a two (2") inch brass shut off valve and threaded brass nipples on the intake side of the valve. The brass gate valve shall be 200 psi WOG. The discharge orifice shall be fitted with an adjustable double-acting throttling device to regulate the flow of air escaping through the orifice. Schedule 40 brass pipe shall be installed on the discharge of the air/vacuum valve as shown on the drawings. The Air/Vacuum Valve shall be G.A. Figure 930T, as manufactured by GA Industries or approved equal.

2.10 Rubber Expansion Joints: Rubber expansion joints of the size and shape shown on the Drawings shall be installed. All rubber expansion joints shall be provided with ductile iron split retaining rings. All rubber expansion joints on a pump discharge shall be provided with control rods. All rubber expansion joints shall be provided with natural rubber tube covers. Rubber expansion joints shall be as manufactured by Mercer Rubber Co., Inc., Hamilton Square, N.J. (1-800-443-5764) or approved equal.

2.11 Polyethylene - PE Service Tubing: Water service tubing shall be PE 3408, SDR 9 conforming to ASTM D2737 and approved by the National Sanitation Foundation for potable water use and meet AWWA C901 specifications. The PE tubing shall be rated for use with water at 73.4°F at a maximum working pressure of 200 psi. The PE water service tubing shall be Driscopipe 5100 - Ultra Line manufactured by Phillips Driscopipe, Inc. or "Plexco Bluestripe" as manufactured by Chevron Chemical Company.

2.12 Galvanized Iron Pipe and Fittings: Galvanized iron pipe shall be standard weight schedule 40 pipe in accordance with ASTM A-53 and galvanized coating in accordance with ASTM A-153. Galvanized iron fittings shall be 150 lb. standard weight malleable iron fittings with dimensions in accordance with ANSI B16.3, threads in accordance with ANSI B2.1, material conforming to ASTM A-47 Grade 32510, and galvanized coating in accordance with ASTM A-153.

2.13 Brass Pipe and Fittings: Brass pipe shall be standard weight schedule 40 pipe in accordance with ASTM B-43 "Standard Specification for Seamless Red Brass Pipe, Standard Sizes". Brass fittings shall be 150 lb. standard weight malleable iron fittings with dimensions in accordance with ANSI B16.3, threads in accordance with ANSI B2.1, material conforming to ASTM B-62, "Standard Specification for Composition Bronze or Ounce Metal Castings".

2.14 Stainless Steel Pipe and Fittings: Stainless steel pipe shall be standard weight schedule 40 pipe in accordance with ASTM A-269, "Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service". Stainless steel fittings shall be in accordance with ASTM B-462 Standard Specification for Forged or Rolled UNS", 150 lb. standard weight malleable iron fittings with dimensions in accordance with ANSI B16.3 and threads in accordance with ANSI B2.1.

2.15 Copper Pipe: Copper pipe shall be Government Type "K", soft copper water tubing of standard weight and thickness. Copper shall be Mueller, Ancon, or approved equal. Fittings for copper pipe shall be cast brass or wrought copper fittings. Solder and fluxes shall not contain more than .02% lead. CONTRACTOR shall use 95-5 solder on all piping above slab. No fittings or joints are allowed beneath the slab. Copper lines penetrating concrete slabs shall be installed within a vinyl flexible tube. Vinyl flexible tube shall be "Protect-O-Sleeve" as manufactured by Robert H. Harris Co., or approved equal.

2.16 Solenoid Valves: Solenoid valves shall be of the 2 way pilot operated design. Solenoid valves shall have stainless steel bodies and NEMA 4X enclosures. Solenoid voltages shall be 120 VAC. Solenoid valves shall be Red Hot II Series 8210 as manufactured by ASCO, locally available through Moody Price, Monroe, Louisiana, (318)323-4400.

2.17 Bronze Ball Valves: Bronze ball valves shall be full port ball valves with PTFE seats, pressure rated at 600 psi, with NPT female connections, two piece bronze body with lever handle. Bronze ball valves shall be Watts Regulator Model FBV or approved equal.

2.18 Stainless Steel Ball Valves: Stainless steel ball valves shall be full port ball valves with PTFE seats, pressure rated at 1000 psi, with NPT female connections, two piece investment cast body with stainless steel lever handle. Stainless steel ball valves shall be Watts Regulator Model S-FBV-1 or approved equal.

2.19 Mechanical Joint Restraint Devices: Mechanical joint restraint devices shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Flexibility of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80. Restraining devices shall be of ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWWA A21.11 and ANSI/AWWA C153/A21.53 of latest revision. Twist-off nuts shall be used to insure proper actuating of the restraining devices. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG or approved equal.

2.20 Foster Adapter: Foster adapters shall be installed where shown on the Drawings to connect mechanical joints to mechanical joints. Foster Adapters shall be as manufactured by Infact Corporation of Fairview, Tennessee (1-888-773-9130).

2.21 Cutting-In Sleeve: Cutting-in sleeves for connection to existing water mains shall be Power Seal 3520, with mechanical joint connections.

2.22 Compression Couplings: All compression couplings shall have a ductile iron body and be equipped with mechanical joint ends in accordance with ANSI/AWWA C110/A21.10 and ANSI/AWWA C11/A21.11. In cases where line sizes are such that ductile iron couplings are not available, epoxy coated steel compression coupling shall be used. The steel compression coupling shall be Rockwell or approved equal.

2.23 Caps and Plugs:

A. Where existing lines are to be abandoned, the ends shall be cut and fitted with an appropriately sized cap or plug. The cap or plug material may be PVC. The capped end shall be backfilled with compacted native material in such a manner as to ensure the integrity of the cap.

B. Where lines are to remain in service, the ends shall be cut and fitted with a ductile iron mechanical joint coupling with a ductile iron plug or with a ductile iron mechanical joint cap. This assembly shall be blocked with concrete thrust blocking.

2.24 Polyethylene Wrap: Polyethylene wrap shall conform to AWWA C105 specifications. Film shall be Class "C" - Black, with a minimum nominal thickness of .008 inches (8 mils). Tape for securing the film shall be thermoplastic material with a pressure sensitive adhesive face capable of bonding to metal, bituminous coating and polyethylene. Tape shall have a minimum thickness of 8 mils, and a minimum width of one inch. The polyethylene film envelope shall be free as is commercially possible of gels, streaks, pinholes, particles of foreign matter, and undispersed raw materials. There shall be no other visible defect such as holes, tears, blisters, or thinning out at folds. Manufacturers shall furnish a certification of conformance of the

material to the requirement of AWWA C105 or ANSI A21.5. The polywrap shall be as manufactured by Dupont or approved equal. The tape shall be Scotch Wrap No. 50 or approved equal.

2.25 Back Pressure Valve: At each of the three (3) Booster Station Sites, the fill valve on the ground storage reservoir fill lines shall be a 115 volt solenoid controlled back pressure sustaining valve. The back pressure and solenoid shut-off valve shall modulate to maintain an upstream pressure above a preset minimum when activated by a solenoid control. The valve shall energize to open. The solenoid shall also close the valve tight. The valve shall be closed when the solenoid is de-energized. A direct factory representative shall be made available for start-up service, inspection and necessary adjustments. The valve shall be a Cla-Val Co. Model No. 58-01 Combination Back Pressure & Solenoid Shut-off Valve with X105L Limits Switch Assembly as manufactured by Cla-Val Co., Newport Beach, CA.

2.26 Probes, Probe Holder and Relay Panel: At each of the four(4) Booster Station Sites, provide a complete system of five (5) probes (Warrick No. 3W1 brass electrode), five (5) suspension wires (Warrick No. 3Z1A), five (5) adapter kits (Warrick No. 3Z1B) and one (1) brass probe holder for 3" NPT connection (Warrick No. 3E7B) and relay panel. The relay panel shall be a NEMA 3R enclosure with two (2) Warrick Controls Series 1G 1D0 relays. One relay shall control the solenoid fill valve at the ground storage tank. The other relay shall provide a low water cutoff signal to the booster pump control panel. The probes shall perform the following functions:

1. First Probe: Reservoir Satisfied - Back Pressure Valve Closed;
2. Second Probe: Water Required - Back Pressure Valve Open;
3. Third Probe: Restore Low Water Cutoff for Pump;
4. Fourth Probe: Low Water Cutoff for Pump; and,
5. Fifth Probe: Ground Electrode for Return Signal.

2.27 Flap Valve: Flap valve for tank overflow line shall have an iron body, Class 30 cast iron bronze seat and disc rings, and bronze hinge pin. The valve shall have an ANSI Class 125 flanged end. The valve shall be manufactured by Troy Valve, Model A-2540-6, Troy, Pennsylvania (717) 297-4442.

2.28 Pre-lube Assembly: The well shall be equipped with a water pre-lubrication system, complete with 1" main line tap, corporation stop, 1" P.E. service tubing, concrete valve box, 3/4" galvanized steel pipe, 3/4" bronze globe valve, etc.

- A. The main line tap shall be made using a brass tapping saddle and 1" x 1" corporation stop with pack joint or approved equal for connection to 1" P.E. service tubing.
- B. The 3/4" pipe provided from the concrete valve box to the well head assembly for the pre-lube line shall be 3/4" Schedule 40 hot-dipped galvanized, seamless steel pipe conforming to ASTM A120.
- C. The 1" polyethylene service tubing shall be as PE 3408 SDR 9.

D. Solenoid valves shall be of the 2 way pilot operated design. Solenoid valves shall have stainless steel bodies and NEMA 4X enclosures. Solenoid voltages shall be 120 VAC.

2.29 Heat Tape, Insulation and Weatherproof Jacketing:

A. Heat tape shall be as manufactured by Easy Heat, Inc., New Carlisle, Indiana (219-654-3144) or approved equal.

B. Insulation shall be a plain unjacketed molded, heavy density, one piece insulation made from inorganic glass fibers bonded with a thermosetting resin. The insulation shall be a minimum of one (1) inch thick for all pipe and sizes.

C. Insulation shall be weatherproofed with aluminum jacketing manufactured from 1100 aluminum alloy with 3/16" corrugations and .010" thickness. All jacketing shall have an integrally bonded moisture barrier over the entire surface in contact with the insulation.

D. Aluminum fastening devices for the jacketing shall be manufactured by the same company as the jacketing.

E. Elbow insulation covers shall be manufactured from 1100 aluminum alloy with .024" thickness and fastened with aluminum bands.

2.30 Smooth Nozzle Sample Tap: Smooth nozzle sample tap shall be ½" diameter Type 316 stainless steel plain outlet.

2.31 Name Plates: Stainless steel name plates giving the name of the manufacturer of the pump and motor (type, model number, acceptance date), the rated pump capacity, head and speed, number of stages, and the following words shall be firmly affixed into the pump foundation:

**"Depth to Top of Pump = _____ Feet",
 "Depth to Top of Screen = _____ Feet",
 "Length of Screen = _____ Feet",
 "Diameter of Screen = _____ Inches"**

The minimum size of name plate shall be 3" x 5" x 0.125" thick. Lettering shall be a minimum of .25" high normal block style. Lettering shall be accurately aligned and engraved.

2.32 Non-Corrosive Metallic Wire: Non-corrosive metallic wire shall be copper wire, Type TW, A.W.G. #12 gauge stranded.

2.33 Wire Splice Kits: Wire splices shall be Direct Bury Splice Kit, Part No. 054007-09964 as manufactured by 3M Electrical Products Division of Austin, Texas 78769-2963.

2.34 Pressure Gauge Assembly: Liquid filled stainless steel pressure gauges shall be provided where shown on the Drawings. Gauges shall be 2½" diameter with accuracy of 1.5% of full scale, stainless steel, copper alloy bourdon tube, glycerin filled, and brass movement. Gauges shall be WIKA Type 113.14. Gauges shall be installed with needle valves and pressure snubbers with ¼" NPT connection. Pressure snubbers shall have a brass body with Nickel or stainless steel piston and shall be Ray Pressure Snubber Model No. 010B as manufactured by Operating

and Maintenance Specialties of Charlotte, N.C. 28220 (704-523-4031) or approved equal. Gauges shall be provided with the following ranges:

Location	Range
Well Discharges	0 - 50psi
Main Pump Station Discharge	0 - 150 psi
Booster Station 2 Discharge	0 - 200 psi
Booster Station 3 Discharge	0 - 200 psi
Booster Station 4 Discharge	0 - 200 psi
Chlorine Suction	0 – 100 psi
Chlorine Discharge	0 – 200 psi
Phosphate Suction	0 – 100 psi
Phosphate Discharge	0 – 200 psi

2.35 Backfill Material for Valves and Valve Boxes: Material for backfill of valves and valve boxes shall be fine aggregate or sandy material known locally as “flume sand”.

2.36 Concrete For Thrust Blocking: Concrete required for thrust blocking shall be Class A with a 28-day compressive strength of 3,000 psi and in conformance with Section 03300 - Cast-In-Place Concrete.

2.37 Concrete For Valve Box Pads: Concrete required for the valve box pads shall be Class A with a 28-day compressive strength of 3,000 psi and in conformance with Section 03300 - Cast-In-Place Concrete.

2.38 Pipe Supports: Refer to Section 05500 - Miscellaneous Metals.

2.39 Coatings: Refer to Section 09900 - Painting for coating requirements.

2.40 Well Head Foundation: Refer to Section 03300 - Cast-in-place Concrete.

2.41 Electrical Controls: Refer to Division 16 - Electrical.

PART 3 - EXECUTION

3.1 General: All pipe, valves, appurtenances and accessories shall be installed as indicated on the Drawings. Any deviations must be approved by the ENGINEER before installation.

3.2 Inspection of Pipe Before Installation: All pipe, fittings and related items shall be carefully inspected in the field before lowering in the trench. Cracked, broken, warped, out of round or otherwise defective pipe, fittings, or other related items, as determined by the CONTRACTOR or the ENGINEER, shall be pulled and not installed. Such rejected pipe shall be clearly tagged in such manner as not to deface or damage it, and the pipe shall then be removed from the job site by the CONTRACTOR at his own expense.

3.3 Installation of Water Pipe and Fittings:

A. All pipe and fittings shall be installed in strict accordance with the manufacturer's recommendations.

3.4 Field Hydrostatic and Leakage Tests:

A. The hydrostatic testing of all lines shall conform to the requirements of AWWA C-600, and/or AWWA C605, as applicable, except as modified as follows:

1. Maximum allowable leakage shall not exceed ten (10) gallons per inch of pipe diameter per mile of pipe per 24 hours.
2. The test shall be applied to the whole or individual valved off sections of the mains after the trench is backfilled.
3. Furnish gauges, water meter, water and all other material, tools, labor, equipment and other necessary assistance of conducting the tests. The ENGINEER will be notified at least 48 hours in advance of the hydrostatic test. The ENGINEER will be present at any or all tests.
4. The test pressure shall be 150 psi and shall be maintained for a minimum of four (4) hours. The test pressure will be based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge.

B. Should the amount of leakage exceed that specified, locate and repair the defective joints until the leakage is within the specified limits.

3.5 Disinfection Test, Sampling Tap, and Temporary Line Flushing Assembly (Chlorination):

A. General:

1. The disinfection of water mains and appurtenances shall conform to the requirements of AWWA C-651 – Disinfecting Water Mains, “Slug Method of Chlorination (Section 4.5)” except as modified herein.
2. The Contractor shall assist in the collection of samples required for State Department of Health and Hospitals approval of the completed system by providing acceptable sampling taps and temporary line flushing assemblies, as required, and suitable for satisfactory chlorination and flushing of the new line.
3. Upon receipt of notice of an acceptable bacteriological test from the State Department of Health and Hospitals, the chlorine sampling taps and any temporary line flushing assemblies shall be removed.
4. Temporary line flushing assemblies shall be adequately sized to allow flushing of the main at a velocity of no less than 3.0 feet per second.
5. The CONTRACTOR is responsible for the successful disinfection of all water mains. Water shall not be furnished for consumer's use until water samples collected and analyzed by the local Health Department show the water to be free of coliform bacteria.

B. Disinfection Procedures: Disinfection shall be accomplished in conformance with the following:

1. Preliminary Flushing: The main shall be flushed, prior to chlorination, as thoroughly as possible with the water pressure and outlets available. Flushing shall be done after the pressure test has been made. It must be understood that flushing removes only lighter solids and cannot be relied upon to remove heavy material allowed to get into the main during laying. If no hydrant is installed at the end of the main, a tap should be provided large enough to develop a velocity in the main of at least 3.0 fps.
2. Form of Applied Chlorine: Any of the following methods of procedure (arranged in order of preference) shall be followed, subject to the approval of the ENGINEER:
 - a. Liquid chlorine gas-water mixture
 - b. Direct chlorine feed
 - c. Calcium or sodium hypochlorite and water mixture
3. Liquid Chlorine: A chlorine mixture shall be applied by means of a solution-feed chlorinating device in combination with a booster pump for injecting the chlorine-gas water mixture into the main to be disinfected. Chlorinating devices for feeding solutions of the chlorine gas or the gas itself must provide means for preventing the backflow of water into the chlorine cylinder. Liquid chlorine shall be used only by personnel familiar with the proper use of the equipment and the emergency preparedness required with the use of the gas.
4. Chlorine-Bearing Compounds in Water: On approval of the ENGINEER, a mixture of water and a chlorine-bearing compound of known chlorine content may be substituted for liquid chlorine.
5. Compounds to be Used: The chlorine-bearing compounds that may be used are: 1) calcium hypochlorite granules, 2) sodium hypochlorite solutions, and 3) calcium hypochlorite tablets.
6. Preparation of Mixtures: The chlorine water solution is prepared by dissolving or mixing the tablets, granules or solution with water in the proportion required for the desired concentration. The following table gives the amount of chlorine required for each 100 feet of pipe of various sizes for a 100 ppm chlorine dosage.

Pipe Size (Inches)	Volume of 100' Length (Gal)	Chlorine (lb)	1% Chlorine Water Solution (Gal)
4	65.3	0.054	0.66
6	146.5	0.122	1.46
8	261.0	0.216	2.30
10	408.0	0.340	4.08
12	588.7	0.480	5.76

7. Point of Application: The preferred point of application of the chlorinating agent is at the beginning of the pipeline extension or any valved section of it and through a corporation stop inserted in the top of the newly laid pipe. The water injector for delivering the chlorine-bearing water into the pipe should be supplied from a tap on the pressure side of the gate valve controlling the flow into the pipeline extension. In a new system, application of chlorine may be made advantageously at the pump station, the elevated tank, the standpipe, or the reservoir. When property cleaned first, these units are thus chlorinated adequately.

8. Rate of Application: Water from the existing distribution system or other source of supply shall be controlled so as to flow slowly into the newly laid pipeline during the application of chlorine. The rate of chlorine mixture flow shall be in such proportion to the rate of water entering the pipe that the chlorine dose applied to the water entering the newly laid pipe shall produce at least 100 ppm.

9. Preventing Reverse Flow: Valves shall be manipulated so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water. Check valves may be used if desired. Insure that a positive flow is developed in the direction of the new line before chlorinating. Insure that chlorine solution is not allowed to backfeed into the existing system thereby potentially creating a health and safety hazard for system users.

10. Retention Period: Treated water shall be retained in the pipe long enough to destroy a non-spore-forming bacteria. This period should be at least three (3) hours and preferably longer as may be directed.

11. Chlorinating Valves and Hydrants: In the process of chlorinating new laid pipe, all valves or other appurtenances shall be operated when the pipe line is filled with the chlorinating agent.

12. Residual Required: After the chlorine treated water has been retained for the required time, the chlorine residual at pipe extremities and at other representative points shall be at least 50 ppm.

13. Repetition of Procedure: Should the initial treatment fail to result in the conditions specified above, the original chlorination procedure shall be repeated until a 50 ppm residual is obtained.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

NEBO WATER SYSTEM, INC.

CONSOLIDATION WITH THE
MANIFEST-RHINEHART WATER SYSTEM, INC.
CONTRACT NO. 4
MANIFEST-RHINEHART WATER WELL SITE IMPROVEMENTS &
BOOSTER STATIONS 2, 3, AND 4 IMPROVEMENTS

DIVISION 16 - ELECTRICAL

- Section 16000 - ELECTRICAL - GENERAL PROVISIONS
- Section 16110 - RACEWAYS
- Section 16120 - WIRES AND CABLES
- Section 16402 - WIRING DEVICES, PANELBOARDS, AND TRANSFORMERS
- Section 16450 - GROUNDING SYSTEM
- Section 16500 - VARIABLE FREQUENCY DRIVES
- Section 16600 - WATERWORKS CONTROL SYSTEMS
- Section 16800 - STANDBY DIESEL POWER SYSTEMS

SECTION 16000**ELECTRICAL - GENERAL PROVISIONS**PART 1 - GENERAL1.1 Scope:

A. Furnish all labor, materials, equipment and incidentals required to make ready for use a complete electrical system at the water production well site as hereinafter specified and shown on the Drawings.

B. The work shall include as applicable, but not limited to furnishing, installing, and connecting the following items:

1. Conduit and wiring for the secondary service including riser, disconnect switch grounding, etc. to be by the CONTRACTOR. Meter to be furnished by CLECO but installed by the CONTRACTOR.
2. Conduit, wire, control equipment and field connections as required for all motors and process equipment furnished under other Divisions of these Specifications.
3. Raceways and fittings.
4. Wires and cables.
5. Miscellaneous equipment and materials.
6. Grounding system.
7. Pilot devices, various types.
8. Service switches, various types.

C. It is the intent of these Specifications that the electrical system shall be suitable in every way for the service required. All material and all work which may be reasonably implied as being incidental to the work of this Section shall be furnished under the contract bid price.

1.2 Electrical Service: The CONTRACTOR shall coordinate his work with Central Louisiana Electric Company as to securing service to the service pole and any attachments and guying needed; and shall make all deposits and apply all fees for metering and connections, for transfer of billing on completion of construction to the Owner.

1.3 Submittals:

- A. As specified in the General Conditions and Section 01340 - Shop Drawings, Samples and Project Data, shop drawings shall be submitted for all materials, equipment, apparatus, and other items as specified and as specifically required under this Section.
- B. For shop drawing submittals, the manufacturers' names, product designations, catalog numbers, and catalog cuts shall be submitted for all material.
- C. Prior to submittal, all shop drawings shall be checked by the CONTRACTOR for accuracy and coordination with the respective associated electrical devices, and equipment and contract requirements. Shop drawings shall bear the date checked and shall be accompanied by a statement that the shop drawings have been examined for conformity to Specifications and Drawings. This statement shall also list all discrepancies with the Specifications and Drawings. If discrepancies are not noted on the submittals, it shall be the CONTRACTOR'S responsibility to correct any errors and/or omissions. Shop drawings not so checked and denoted shall be returned.
- D. The ENGINEER'S check shall be only for conformance with the design concept of the project and compliance with the Specifications and Drawings. The responsibility or the necessity of furnishing materials and workmanship required by the Specifications and Drawings and coordination with all associated crafts, devices, and equipment which may not be indicated on the shop drawings is included the work of this Section.
- E. All dimensions shall be confirmed, coordinated, and correlated at each job site with all trades.
- F. Material shall not be ordered or shop work started until the ENGINEER'S review of shop drawings has been given.

1.4 Codes, Inspection and Fees:

- A. All material and installation shall be in accordance with the latest edition of the National Electrical Code, National Fire Prevention Code, and the codes and ordinances of Rapides Parish.
- B. Pay all fees required for permits and inspections.

1.5 Tests and Settings:

- A. Test all systems furnished, and repair or replace all defective work. Make all necessary adjustments to the systems and instruct the OWNER'S personnel in the proper operation of the systems.
- B. Make all circuit breaker and protective relay settings.

C. For grounding systems, secondary systems beginning at the load side of service transformers through power and lighting panels, motor control centers, switchboards, 3-phase motors, and all pump motors, the following minimum tests and checks shall be made prior to the energizing of electrical equipment. Tests shall be by person(s) who are experienced in performing the required tests and whose qualifications meet the approval of the ENGINEER, and certified test report(s) shall be submitted stating that the equipment meets and operates in accordance with the manufacturer's and job specifications, and that equipment and installation conforms to all applicable Standards and Specifications including but not limited to the following:

1. Testing of protective relays and circuit breakers for calibration and proper operations.
2. Over-potential, high-potential, insulation resistance, and shield continuity tests for cables.
3. Mechanical inspection of air interrupter switches and circuit breakers to assure proper operation.
4. Testing to assure proper function of surge suppression equipment.

1.6 Sleeves and Forms for Openings: Provide and place all sleeves for conduits penetrating floors, walls, partitions, etc. Locate all necessary slots for electrical work and form before concrete is poured.

1.7 Cutting and Patching: The CONTRACTOR shall do cutting for installation of electrical facilities with approval of the ENGINEER as to cutting of any structural members. Patching shall be done by the various crafts whose work is involved. Any painting required shall be in accordance with Section 09900 - Painting.

1.8 Interpretation of Drawings:

- A. The drawings are not intended to show exact locations of conduit runs.
- B. Each three-phase circuit shall be run in a separate conduit unless otherwise shown on the Drawings.
- C. Unless otherwise approved by the ENGINEER, conduit shown exposed shall be installed exposed; conduit shown concealed shall be installed concealed.
- D. Where circuits are shown as "home-runs", all necessary fittings and boxes shall be provided for a complete raceway installation.
- E. Any work installed contrary to or without approval by the ENGINEER shall be subject to change as directed by the ENGINEER at no additional cost to the OWNER.

F. The locations of equipment, fixtures, outlets, and similar devices shown on the Drawings are approximately only. Exact locations shall be as approved by the ENGINEER during construction. Obtain, in the field, all information relevant to the placing of electrical work, and, in case of any interference with other work, proceed as directed by the ENGINEER, and furnish all labor and materials necessary to complete the work in an approved manner.

G. Circuit layouts are not intended to show the number of fittings, or other installation details. Furnish all labor and materials necessary to install and place in satisfactory operation all power, lighting, and other electrical systems shown. Additional circuits shall be installed wherever needed to conform to the specific requirements of the equipment.

H. All connections to equipment shall be made as required, and in accordance with the approved shop and setting drawings.

1.9 Size of Equipment:

A. Investigate each space in the structure through which equipment must pass to reach its final location. If necessary, the manufacturer shall be required to ship his material in sections sized to permit passing through such restricted areas in the structure.

B. The equipment shall be kept upright at all times. When equipment has to be tilted for ease of passage through restricted areas during transportation, the manufacturer shall be required to brace the equipment suitably, to insure that the tilting does not impair the functional integrity of the equipment.

1.10 Record Drawings: As the work progresses, legibly record all field changes on a set of project contract drawings. These drawings shall be given to the ENGINEER at the completion of the project.

1.11 Component Interconnections:

A. Components of equipment furnished under this Specification will not be furnished as integrated systems.

B. Analyze all systems components and their shop drawings; identify all terminals and prepare drawings or wiring tables necessary for component interconnection. Furnish two copies of initial interconnection. Furnish two copies of initial interconnection wiring diagrams and tables to the ENGINEER for review. Provide final interconnection wiring diagrams and tables as required for record drawings.

C. Furnish and install all component interconnections.

1.12 Materials:

A. The materials used in all systems shall be new, unused and as specified herein. All materials where not specified shall be of the very best of their respective kinds. Samples of materials or manufacturer's specifications shall be submitted for review as requested by the ENGINEER.

B. Materials used shall be listed by Underwriters Laboratories, Inc. Equipment shall be labeled by Underwriters Laboratories, Inc.

C. Electrical equipment shall at all times during construction be adequately protected against mechanical injury or damage by water. Electrical equipment shall not be stored out-of-doors. Electrical equipment shall be stored in dry permanent shelters. If any apparatus has been damaged, as determined by the ENGINEER, such damage shall be repaired at no additional cost to the OWNER. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through such special tests as approved by the ENGINEER or shall be replaced as directed by the ENGINEER at no additional cost to the OWNER.

1.13 Equipment Identification:

A. All equipment, such as disconnect switches, separately mounted motor starters, control stations, etc., shall be identified by the name of the process equipment or other facility component it serves. Motor control centers, control panels, panelboards, switchboards, switchgear, and other devices shall have nameplates where identified by letter or number on the Drawings.

B. The identified method shall be laminated plastic nameplates. Nameplates shall be not less than 1/16-inch x ¾-inch x 2½-inch with 3/16-inch high black letters on a white background.

C. Nameplates shall be screw mounted to NEMA 1 enclosures. Nameplates on the exterior of all other types of enclosures shall be cemented using epoxy or other approved adhesive. Where the equipment size does not have space for mounting a nameplate the nameplate shall be cemented to the adjacent mounting surface. Cemented nameplates shall not be drilled.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 16110**RACEWAYS**PART 1 - GENERAL

1.1 Scope: Furnish and install complete raceway systems as shown on the Drawings and as specified herein.

1.2 Applications:

- A. Except where otherwise shown on the Drawings, or hereinafter specified, all wiring shall be in conduit. Schedule 40 PVC conduit may be used below grade but all conduit above grade shall be rigid steel.
- B. All conduit of a given type shall be the product of one manufacturer.
- C. Unless otherwise hereinafter specified or shown on the Drawings, all boxes shall be metal.
- D. Exposed switch, outlet and control station boxes and fittings shall be cast or malleable iron.
- E. Concealed switch, outlet and control station boxes shall be pressed steel.
- F. Terminal boxes, junction boxes, pull boxes, etc., used in areas designated as NEMA 1 shall be galvanized sheet steel.
- G. Type 316 stainless steel NEMA 4x boxes shall be used in exterior or corrosive areas.
- H. Combination expansion-deflection fittings shall be used where conduits cross structure expansion joints. Refer to Drawings for expansion joint locations.
- I. Conduit wall seals shall be used where conduits penetrate walls.
- J. Where conduits pass through openings in walls or floor slabs, the openings shall be sealed against the passage of flame and smoke and gas.
- K. Conduit ends exposed to the weather shall be sealed with conduit sealing bushings.

PART 2 - PRODUCTS

2.1 Materials:

A. Rigid Metal Conduit:

1. Rigid metal conduit shall be for use under the provisions of N.E.C. Article 346.
2. Rigid steel conduit shall be hot-dipped galvanized after threading and be as manufactured by the Allied Tube and Conduit Corp., Wheatland Tube Co., Triangle PWC Inc., or equal.

B. Plastic Conduit

1. Plastic conduit shall be schedule 40 PVC, per NEMA TC 2, for use under the provisions of NEC Article 347.
2. Fitting for plastic conduit shall be per NEMA TC 3.

C. Liquidtight, Flexible Metal Conduit, Couplings and Fittings:

1. Liquidtight, flexible metal conduit shall be for use under the provisions of N.E.C. Article 351A.
2. Liquidtight, flexible metal conduit shall be Sealtite, Type UA, manufactured by the Anaconda Metal Hose Division, Anaconda American Brass Co., American Flexible Conduit Co., Inc., Universal Metal Hose Co., or equal.
3. Fittings used with flexible conduit shall be of the screw-in type as manufactured by the Thomas and Betts Co., Crouse-Hinds Co., or equal.

D. Boxes and Fittings:

1. Pressed steel switch and outlet boxes shall be hot-dipped galvanized as manufactured by the Raco Manufacturing Co., Adalet Co., O. Z. Manufacturing Co., or equal.
2. Terminal boxes, junction boxes, pull boxes, etc. for NEMA I locations shall be sheet steel unless otherwise specified herein or shown on the Drawings. Boxes shall be galvanized and have continuously welded seams. Welds shall be ground smooth and galvanized. Box bodies shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal. Covers shall be gasketed and fastened with stainless steel screws. Boxes shall be as manufactured by Hoffman Engineering Co. or equal. Conduit connections shall be by conduit hubs only.

3. Cast or malleable iron device boxes shall be Type FD. Cast or malleable iron boxes and fittings shall have cadmium-zinc finish, threaded conduit connections, cast covers, and stainless steel screws as manufactured by the Crouse-Hinds Co. or equal.
 4. Terminal boxes, junction boxes, pull boxes, etc. for NEMA 4 areas unless otherwise specified herein or shown on the Drawings shall be 316 stainless steel. Boxes shall be constructed in accordance with Hoffman Engineering Company Bulletin A-4 or equal.
 5. Steel elbows and couplings shall be hot-dipped galvanized.
 6. Conduit hubs shall be as manufactured by Myers Electric Products, Inc., Raco Div., Appleton Electric Co., or equal.
 7. Combination expansion-deflection fittings shall be Type XD as manufactured by the Crouse-Hinds Co., or equal.
 8. Conduit sealing bushings shall be OZ/Gedney Type CSB or equal.
 9. Cable fittings shall be Crouse-Hinds Type EYS or equal.
- D. Conduit Mounting Equipment: Hangers, rods, backplates, beam clamps, etc., shall be hot-dipped galvanized iron or steel. They shall be as manufactured by the Appleton Electric Co., Thomas and Betts Co., Unistrut Corp., or equal.
- E. Wall and Floor Slab Opening Seals: Wall and floor slab openings shall be sealed with "FLAME-SAFE" as manufactured by Thomas and Betts Co. or equal.

PART 3 - EXECUTION

3.1 Installation:

- A. No conduit smaller than ½-inch electrical trade size shall be used, nor shall any have more than three 90 degree bends in any one run between ends or pull boxes. Pull boxes shall be provided as required or directed by the ENGINEER.
- B. No wire shall be pulled until the conduit system is complete in all details and has been shown to be free of obstructions by pulling an appropriately sized mandrel through the completed conduits; in the case of concealed work, until all rough plastering or masonry has been completed; in the case of exposed work, until the conduit system has been completed in every detail.
- C. The ends of all conduits shall be tightly plugged to exclude dust and moisture until the time to install the wires.
- D. Conduit supports shall be spaced at intervals of eight (8) feet or less, as required to obtain rigid construction.

- E. Single conduits shall be supported by means of one-hole pipe clamps in combination with one-screw back plates, to raise conduits from the surface. Multiple runs of conduits shall be supported on trapeze type hangers with steel horizontal members and threaded hanger rods. The rods shall be not less than -inch diameter.
- F. Conduit hangers shall be attached to structural steel by means of beam or channel clamps. Where attached to concrete surfaces, embedded concrete inserts of the continuous slot type shall be used.
- G. All conduits on exposed work shall be run at right angles to and parallel with the surrounding wall and shall conform to the form of the ceiling. No diagonal runs will be allowed. Bends in parallel conduit runs shall be concentric. All conduit shall be run straight and true.
- H. Conduit terminating in pressed steel boxes shall have double locknuts and insulated bushings.
- I. Conduit terminating in gasketed enclosures shall be terminated with conduit hubs.
- J. Conduits shall be installed using threaded fittings. Threadless fittings may be used in isolated instances and only when approved in writing by the ENGINEER.
- K. Liquidtight flexible metal conduit shall be used for all motor terminations and other equipment where vibration is present except hazardous locations.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 16120**WIRES AND CABLES**PART 1 - GENERAL

1.1 Scope: Furnish, install and test all wire, cable and appurtenances as shown on the Drawings and as hereinafter specified.

1.2 Submittals:

- A. Samples of proposed wire shall be submitted for approval. Each sample shall have the size, type of insulation and voltage printed on the jacket.
- B. Approved samples will be sent to the project location for comparison by the Resident Engineer with the wire actually installed.
- C. Installed but unapproved wire shall be removed and replaced at no additional cost to the OWNER.

1.3 Applications (600 Volt or Less)

- A. Wire for lighting, receptacles, and other circuits No. 10 and smaller shall be NEC type THHN/THWN, stranded.
- B. Wire for circuits No. 8 and larger shall be NEC type THW, or THWN, stranded.
- C. Wire for control circuits shall be NEC type THHN/THWN No. 14, stranded.
- D. Ground wire installed in raceways shall be NEC type THW, green. Ground wires shall be bare where shown on the Drawings.

1.4 Minimum Sizes: Except for control, signal, and instrumentation circuits, wire smaller than No. 12 AWG shall not be used.

PART 2 - PRODUCTS

2.1 Materials:

- A. Wires and cables shall be of annealed, 98 percent conductivity, soft drawn copper.
- B. All conductors shall be stranded.

2.2 600-Volt or Less Wire and Cable:

A. Types THHN/THWN, THW and USE wire shall be as manufactured by the Collyer Insulated Wire Co., Pirelli Cable Corp., or equal.

B. Multi-conductor control cable shall be stranded, 600 V., cross-linked polyethylene insulated, neoprene jacketed, Firewall III as manufactured by the Cerro Wire and Cable Co., or equal.

2.3 600-Volt Wire Splices: Splice insulators shall be PST Cold Shrink as Manufactured by the Minnesota Mining and Mfg. Co. or equal.

2.4 Wire and Cable Markers:

A. Wire and cable markers shall be "Omni-Grip" as manufactured by the W.H. Brady Co. or equal.

B. Wire and cables with diameters exceeding the capacity of the "Omni-Grip" shall be marked with pre-printed, self-adhesive vinyl tapes as manufactured by the W.H. Brady Co. or equal.

2.5 Fire-Proofing Tape: Fire-proofing tape shall be Scotch No. 77 with Scotch No. 27 binding or equal.

PART 3 - EXECUTION

3.1 Installation:

A. All conductors shall be carefully handled to avoid kinks or damage to conductors and insulation.

B. All wires, cables and each conductor of multi-conductor cables (except lighting and receptacle wiring) shall be uniquely identified at each end with wire and cable markers.

C. Lubrications shall be used to facilitate wire pulling. Lubricants shall be U.L. approved for use with the insulation specified.

D. Opening in slabs and walls through which wires and cables pass shall be sealed.

E. Where cables pass through walls or floor slabs, the remaining openings shall be sealed against the passage of flame, smoke, and gas.

3.2 Tests: All 600-volt wire insulation shall be tested with a megohm meter after installation. Tests shall be made at not less than 500 volts. Submit a written test report of the results to the ENGINEER.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 16402

WIRING DEVICES, PANELBOARDS, AND TRANSFORMERS

PART 1 - GENERAL

1.1 Scope: This Section covers switches, receptacles, disconnect switches, panelboards, Surge Protective Device (SPD) and transformers.

1.2 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.):

W-C-375B	Circuit Breaker, Molded Case, Branch Circuit and Service
W-S-896E(1)	Switch, Toggle (Toggle and Lock), Flush Mounted

B. National Fire Protection Association (NFPA) Publication:

7-1990	National Electrical Code (NEC)

C. Underwriter's Laboratories, Inc. (UL) Publications:

(All UL Publications shall be current editions published and available in print on the date of advertisement of this contract.)

50.....	Cabinets and Boxes
67.....	Panelboards
198E	Class R Fuses

D. National Electrical Manufacturers Association (NEMA) Publications:

KS1 - 1975	Enclosed Switches
(Rev. 1981)	
ST20 - 1986.....	Dry Type Transformers for General Applications
WD1 - 1979.....	General Purpose Wiring Devices

1.3 General Requirements: Section 16000 - Electrical General Provisions, applies to this section with additions and modifications specified herein. In each of the standards referred to herein, consider the advisory provisions to be mandatory, as though the word "shall" had been substituted for "should" wherever it appears. Interpret reference in these standards to the "authority having jurisdiction", or words of similar meaning, to mean the ENGINEER.

1.4 Submittals: Submit data, shop drawings, etc. in accordance with Section 01340 - Shop Drawings, Samples, and Project Data for panelboards, Surge Protective Device (SPD), disconnect switches, and transformers.

PART 2 - PRODUCTS

2.1 Materials and Equipment, General: All materials, equipment, and devices shall, as a minimum, meet the requirements of UL where UL standards are established for those items, and the requirements of NFPA 70. All items shall be new unless specified or indicated otherwise.

2.2 Device Plates: Provide UL listed, one-piece device plates for outlets and fittings to suit the devices installed. Plates on fittings shall be of cast metal or non-metallic having round or beveled edges. Screws shall be machine type with countersunk heads in a color to match the finish of the plate. The use of sectional type device plates will not be permitted. Plates installed in wet locations shall be gasketed.

2.3 Switches:

A. Toggle Switches: Fed Spec. W-S-896, totally enclosed with bodies of thermosetting plastic and a mounting strap. Handles shall be ivory. Wiring terminals shall be of the screw type, side wired. Switches shall be rated quiet-type ac only, 120/277 volts, with the current rating and number of poles indicated.

B. Disconnect Switches: NEMA KS1. Switches serving as motor-disconnect means shall be horsepower rated. Provide heavy duty type switches. Fused switches shall utilize Class R fuseholders and fuses, unless indicated otherwise.

2.4 Receptacles: NEMA WD1, heavy-duty, grounding type. Ratings and configurations shall be as indicated. Bodies shall be of ivory thermosetting plastic supported on a metal mounting strap. Wiring terminals shall be of the screw type, side wired. Connect grounding pole to the mounting strap.

Weatherproof Receptacles: Provide in a cast metal box or non-metallic with a gasketed, weatherproof, non-metallic cover with a spring-hinged flap, rated for "wet" locations", while in use.

2.5 Panelboards: UL 67 and UL 50. Panelboards shall be circuit breaker equipped. Design shall be such that any individual breaker can be removed without disturbing adjacent units or without loosening or removing supplemental insulation supplied as a means of obtaining clearances as required by UL. Where "space only" is indicated, make provisions for the future installation of a breaker sized as indicated. All panelboard locks included in the project shall be keyed alike. Directories shall be type to indicate load served by each circuit and mounted in a holder behind transparent protective covering.

A. Panelboard Buses: Support bus bars on bases independent of the circuit breakers. Main buses and back pans shall be designed so that breakers may be changed without machining, drilling, or tapping. Provide an isolated neutral bus in each panel for connection of circuit neutral conductors. Provide a separate ground bus marked with a green stripe along its front and bonded to steel cabinet for connecting grounding conductors.

B. Circuit Breakers: Fed. Spec. W-C-375 ambient-compensated thermal magnetic type with interrupting capacity of 10,000 amperes symmetrical minimum. Breaker terminals shall be UL listed as suitable for the type of conductor provided. Plug-in circuit breakers are not acceptable.

Multipole Breakers: Provide common-trip type with a single operating handle. Breaker design shall be such that an overload in one pole automatically causes all poles to open. Maintain phase sequence throughout each panel so that any three adjacent breaker poles are connected to Phases A, B and C, respectively.

2.6 Surge Protective Device (SPD): SPD unit shall be mounted adjacent to panel and connected to a circuit breaker in the panel with leads as short as possible. SPD unit shall be rated at 80,000 AMPS per mode, 160,000 AMPS per phase, of surge protection with maximum response time of 0.5 nanoseconds. UL 1449 suppression rating shall be 1200 volts L-N, 1200 volts L-G, 1000 volts N-G, and 2000 volts L-L and tested to withstand 8,000 IEEE/ANSI C62.41, Category 3 (10,000 AMP peak) impulses without failure or performance degradation. SPD shall be equal to ASCO Model 510 Series, 277/480 volt.

2.7 Fuses: Provide a complete set of fuses for each fusible switch. Time-current characteristics curves of fuses serving motors or connected in series with circuit breakers or other circuit protective devices shall be coordinated for proper operation; submit coordination data for approval. Fuses shall have a voltage rating not less than the circuit voltage.

Cartridges Fuses, Current-limiting Type (Class R): UL 198E, Class RK-1 time-delay type. Associated fuseholders shall be Class R only.

PART 3 - EXECUTION

3.1 Installation:

A. General Requirements: Electrical installations shall conform to the requirements of NFPA 70 and to the requirements specified herein.

B. Mounting Heights: Mount panelboards, circuit breakers, and disconnecting switches so the height of the operating handle at its highest position will not exceed 78 inches from grade. Mount lighting switches 48 inches above grade and receptacles 36 inches above grade unless otherwise indicated. Measure mounting heights of wiring devices and outlets to the center of device or outlet.

C. Covers and Device Plates: Plates shall be installed with an alignment tolerance of 1/16 inch. The use of sectional type device plates will not be permitted. Plates installed in wet locations shall be gasketed.

3.2 Field Tests: The CONTRACTOR shall provide all test equipment and personnel and submit written copies of all test results.

Devices Subject to Manual Operation: Each device subject to manual operation shall be operated at least five (5) times, demonstrating satisfactory operation each time.

uPART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 16450**GROUNDING SYSTEM**PART 1 - GENERAL

1.1 Scope: Furnish all labor, materials, equipment and incidentals required and install a complete grounding system at the water production well sites in strict accordance with Article 250 of the National Electrical Code and as hereinafter specified and shown on the Drawings.

PART 2 - PRODUCTS2.1 Materials:

- A. Conduit shall be as specified under Section 16110.
- B. Wire shall be as specified under Section 16120.
- C. Ground rods: Ground rods shall be ¾" x 10' copper. Ground rods shall be Copperweld or be clad steel approved equal product.

PART 3 - EXECUTION3.1 Installation:

- A. Grounding electrode conductors shall be run in rigid steel conduits. The protecting conduits shall be bonded to the grounding electrode conductors at both ends.
- B. Grounding conductors shall be run with all feeders and branch circuits.
- C. Liquid tight flexible metal conduit in sizes 1½ inches and larger shall have bonding jumpers. Bonding jumpers shall be external, run parallel (not spiraled) and fastened with plastic tie wraps.
- D. Grounding electrodes shall be driven as required.
- E. All equipment enclosures, motor and transformer frames, conduits systems, cable armor, exposed structural steel and similar items shall be grounded.
- F. Exposed connections shall be made by means of approved grounding clamps. Exposed connections between different metals shall be sealed with No-Oxide Paint Grade A or Equal. All buried connections shall be made by welding process equal to Cadweld.

G. All underground conductors shall be laid slack and where exposed to mechanical injury, shall be protected by pipes or other substantial guards. If guards are iron pipe or other magnetic material conductors shall be electrically connected to both ends of the guard. Connections shall be made as hereinbefore specified.

H. Care shall be taken to insure good ground continuity, in particular between the conduit system and equipment frames and enclosures. Where necessary, jumper wires shall be installed.

3.2 Tests: Test the ground resistance of the system. All test equipment shall be provided under this Section and approved by the ENGINEER. Dry season resistance of the system shall not exceed five ohms. If such resistance cannot be obtained with the system as shown, provide additional grounding as directed by the ENGINEER, without additional payment.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 16500**VARIABLE FREQUENCY DRIVES**PART 1 – GENERAL

1.1 General: This specification defines the minimum requirements for Variable Frequency Drives (VFD) and accessories for speed control of either constant or variable torque loads.

1.2 Scope: VFD's shall be provided for the following motors:

- Well 3
- Well 4
- MWRA Well Site Boosters (Two VFDs required)
- Booster Station 2 (Two VFDs required)
- Booster Station 3 (Two VFDs required)
- Booster Station 4 (Two VFDs required)

1.2 References:

- A. UL 508C
- B. CE
- C. NEC
- D. Canadian Underwrites Laboratory (C_{UL})
- E. ISO 9001
- F. IEEE519-1992

1.3 Submittals:

A. Submit manufacturer's performance data including dimensional drawings, power circuit diagrams, installation and maintenance manuals, warranty description, VFD's FLA rating, certification agency file numbers, catalog information and catalog cut-sheets for all major components.

B. All drawings shall be in an 8.5" X 11" reproducible format, and incorporate the manufacturer's title block on the drawing.

C. This specification lists the minimum VFD performance requirements for this project. Each supplier shall list any exceptions to the specification. If no departures from the specification are identified, the supplier shall be bound by the specification.

D. Five (5) copies of all submittals shall be provided.

1.4 Quality Assurance:

- A. The manufacturer shall be both ISO-9001 and ISO-14001 certified.
- B. All products shall be CE marked; UL labeled, and meet the requirements of UL-508C and maintain ULc.
- C. To ensure quality and minimize infant-mortality failures on the jobsite, each VFD shall be completely tested by the manufacturer. The VFD shall operate a dynamometer at full load and speed under elevated temperature conditions.
- D. All optional features shall be functionally tested at the factory for proper operation.
- E. Factory test documentation shall be available upon request.

1.5 Warranty: A 6-year on-site warranty shall be provided such that the Owner is not responsible for any warranty costs including travel, labor, parts, or other costs for a full 6 years from the date of manufacture of the Drive. The cost of the warranty shall be included in the bid.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers: Danfoss VLT® AQUA Series VFDs

- A. Well 3 (25 hp)
- B. Well 4 (25 hp)
- C. MWRA Well Site Boosters (Two 25 hp VFDs required)
- D. Booster Station 2 (Two 7.5 hp VFDs required)
- E. Booster Station 3 (Two 5 hp VFDs required)
- F. Booster Station 4 (Two 5 hp VFDs required)

2.2 General:

- A. Furnish complete VFD as specified herein or in the equipment schedule for loads designated to be variable speed. VFD's shall be user-selectable for either constant or variable torque loads.
- B. The VFD shall convert incoming fixed frequency three-phase AC power into a variable frequency and voltage for controlling the speed of three-phase AC induction motors. The VFD shall be a six-pulse input design, and the input voltage rectifier shall employ a full wave diode bridge; VFD's utilizing controlled SCR rectifiers shall not be acceptable. The output waveform shall closely approximate a sine wave. The VFD shall be of a PWM output design utilizing current IGBT inverter technology and voltage vector control of the output PWM waveform.

- C. The VFD shall include a full-wave diode bridge rectifier and maintain a displacement power factor of near unity regardless of speed and load.
- D. The manufacturer of the VFD shall demonstrate a continuous period of manufacturing and development of VFD's for a minimum of 30 years. VFD's that are brand-labeled are not acceptable.
- E. The VFD shall produce an output waveform capable of handling maximum motor cable distances of up to 1,000 ft. (unshielded) without tripping or derating.
- F. The VFD shall utilize VVC^{PLUS}, an output voltage-vector switching algorithm, or equivalent, in both variable and constant torque modes. VVC^{PLUS} provides rated RMS fundamental voltage from the VFD. This allows the motor to operate at a lower temperature rise, extending its thermal life. VFD's that cannot produce rated RMS fundamental output voltage or require the input voltage to be increased above motor nameplate value to achieve rated RMS fundamental output voltage are not acceptable. VFD's that utilize Sine-Coded PWM or Look-up tables shall not be acceptable.
- G. The VFD selected must be able to source the motor's full load nameplate amperage (fundamental RMS) on a continuous basis, and be capable of running the motor at its nameplate RPM, voltage, current, and slip without having to utilize the service factor of the motor.
- H. The VFD shall offer a programmable motor parameter that allows the total number of poles of a motor to be programmed to optimize motor performance.
- I. VFD shall automatically boost power factor at lower speeds.
- J. The VFD will be capable of running either variable or constant torque loads. In variable torque applications, the VFD shall provide a CT-start feature and be able to provide full torque at any speed up to the base speed of the motor. In either CT or VT mode, the VFD shall be able to provide its full rated output current continuously and 110% of rated current for 60 seconds.
- K. An Automatic Energy Optimization (AEO) selection feature shall be provided in the VFD to minimize energy consumption in variable torque applications. This feature shall optimize motor magnetization voltage and shall dynamically adjust output voltage in response to load, independent of speed. Output voltage adjustment based on frequency alone is not acceptable for single motor VT configurations.
- L. For multi-motor variable torque configurations, user-selectable load profile curves including VT-High, VT-Medium, and VT-Low shall be provided to ensure easy commissioning and improved energy efficiency. VFD's requiring the operator to assign load torque data-points to create a V/Hz profile, are not acceptable.

- M. An initial ramp function shall be available to provide a user-selectable ramp, up to 60 seconds, for applications requiring a faster or slower ramp than the normal ramp.
- N. A Dual Ramp Down feature shall include a Check Valve Ramp Down and a final Ramp feature. The Check Valve Ramp Down shall be programmable to gently seat a check valve and reduce the potential of damage from excess pressure while shutting-down the system. Both time and end speed shall be programmable. On the Final Ramp, the VFD shall be programmable to quickly stop the motor after seating of a check valve or for a more rapid stopping than the normal ramp down setting.
- O. VFD shall offer up to 4 separate PID controllers. One controller shall operate the drive in closed loop, while the other 3 provide control signals to other equipment. VFD's with PI controllers only are not acceptable.
- P. An Autotuning PI controller output feature shall provide automated PI controller settings. Once the user accepts the settings, the VFD will save the settings to memory.
- Q. An empty pipe fill mode shall be available to fill an empty pipe in a short period of time, and then revert to the PID controller for stable operation. Pipe fill mode shall have a programmable time to reduce water hammer in the system or fill the pipe at a unit per time rate.
- R. VFD shall offer a motor spinning test that will run the motor at 5 Hz until the OK button is pressed. This feature will allow the user to determine if the motor is running in the correct direction.
- S. An embedded cascade pump controller shall be included to provide lead pump alternation and provide control for up to 3 total pumps. The VFD Pump and 2 other pumps can be controlled either by a starter or softstarter.
- T. Switching of the input power to the VFD shall be possible without interlocks or damage to the VFD at a minimum interval of 2 minutes.
- U. Switching of power on the output side between the VFD and the motor shall be possible with no limitation or damage to the VFD and shall require no additional interlocks.
- V. An Automatic Motor Adaptation (AMA) function shall measure motor stator resistance and reactance to optimize performance and efficiency. It shall not be necessary to spin the motor shaft or de-couple the motor from the load to accomplish this optimization. Additionally, the parameters for motor resistance and motor reactance shall be user-programmable.
- W. The VFD shall have temperature controlled cooling fans for quiet operation, minimized internal losses, and greatly increased fan life.

X. The VFDs for Well 3, Well 4, MRWS Boosters, as well as the VFDs for Booster Station 2, 3 and 4 shall be provided with an enclosure that is rated NEMA 4X/IP 66. A VFD that is mounted in a separate enclosure is not acceptable. The enclosure shall be suitable for installations that require protection against windblown dust, rain and splashing water. All cast aluminum ports shall be powder coated with a durable epoxy that is capable of withstanding harsh environments.

2.3 Harmonics:

A. The VFD shall provide internal DC link reactors to minimize power line harmonics and to provide near unity power factor. DC Link reactor shall be installed so that power fluctuations to the DC Capacitors shall be reduced to increase Capacitor life. VFD's without a DC link reactor.

2.4 Protective Features:

A. VFD shall have input surge protection utilizing MOV's, spark gaps, and Zener diodes to withstand surges of 2.3 times line voltage for 1.3 msec.

B. VFD shall include circuitry to detect phase imbalance and phase loss on the input side of the VFD.

C. VFD shall auto-derate the output voltage and frequency to the motor if an input phase is lost. This result will maintain operation without decreasing the life expectancy of the VFD. The use of this feature shall be user selectable and export a warning during the event.

D. Automatic "No-Flow Detection" shall be available to detect a no-flow situation in pump systems where all valves can be closed. This shall be functional in closed loop control or when controlled by an external signal.

E. Dry-pump detection shall be available to detect if the pump has run dry. A timer shall be included to prevent nuisance tripping.

F. End-of-Pump curve detection shall stop motor when the pump is operating outside of its programmed pump curve.

G. VFD shall provide a flow compensation program to reduce energy by adjusting the Setpoint to match changes in flow (friction loss). Flow compensation shall also operate in Cascade control mode.

H. VFD shall include current sensors on all three-output phases to detect and report phase loss to the motor. The VFD will identify which of the output phases is low or lost.

- I. VFD shall auto-derate the output voltage and frequency to the motor in the presence of sustained ambient temperatures higher than the normal operating range, so as not to trip on an inverter temperature fault. The use of this feature shall be user-selectable and a warning will be exported during the event. Function shall reduce switching frequency before reducing motor speed.
- J. VFD shall auto-derate the output frequency by limiting the output current before allowing the VFD to trip on overload. The speed of the load can be reduced, but not stopped.
- K. VFD enclosures shall be made of metal to minimize RFI and provide immunity.
- L. All circuit boards shall be conformally coated to meet requirements of Class 3C3.

2.5 Interface Features:

- A. VFD shall provide an alphanumeric backlit display keypad (LCP) which may be remotely mounted using a standard 9-pin cable. VFD may be operated with keypad disconnected or removed entirely. Keypad may be disconnected during normal operation without the need to stop the motor or disconnect power to the VFD.
- B. VFD Keypad shall feature an INFO key that, when pressed, shall display the contents of the programming manual for the parameter that is currently in the display. The contents shall explain the feature and how the settings can be made.
- C. VFD shall display all faults in plain text; VFD's which can display only fault codes are not acceptable.
- D. The keypad shall feature a 6-line graphical display and be capable of digitally displaying up to five separate operational parameters or status values simultaneously (including process values with the appropriate engineering unit) in addition to Hand/Off/Auto, Local/Remote, and operating status.
- E. Two lines of the display shall allow "free text programming" so that a site description or the actual name of the equipment being controlled by the VFD can be entered into the display.
- F. Keypad shall provide an integral H-O-A (Hand-Off-Auto) and Local-Remote selection capability, and manual control of speed locally without the need for adding selector switches, potentiometers, or other devices.
- G. All VFD's shall be of the same series, and shall utilize a common control card and LCP (keypad/display unit) throughout the rating range. The control cards and keypads shall be interchangeable through the entire range of drives used on the project.

- H. VFD keypad shall be capable of storing drive parameter values in non-volatile RAM uploaded to it from the VFD, and shall be capable of downloading stored values to the VFD to facilitate programming of multiple drives in similar applications, or as a means of backing up the programmed parameters.
- I. VFD Display shall have the ability to display 5 different parameters pertaining to the VFD or the load including: current, speed, DC bus voltage, output voltage, input signal in mA, or other values from a list of 92 different parameters.
- J. VFD display shall indicate which digital inputs are active and the status of each relay.
- K. It shall be possible to toggle between three status read-out screens by pressing the Status key. Different operating variables, with different formatting, can be shown in each status screen.
- L. VFD display shall indicate the value of any voltage or current signal, including the engineering units of measurement, connected to the analog input terminals.
- M. VFD display shall indicate the value of the current at the analog output terminals.
- N. A red FAULT light, a yellow WARNING light and a green POWER-ON light shall be provided. These indications shall be visible both on the keypad and on the VFD when the keypad is removed.
- O. Two-level password protection shall be provided to prevent unauthorized changes to the programming of the VFD. The parameters can be locked via a digital input and/or the unit can be programmed not to allow an unauthorized user to change the parameter settings.
- P. A quick setup menu with factory preset typical parameters shall be provided on the VFD to facilitate commissioning. Use of macros shall not be required.
- Q. A digital elapsed time meter and kilowatt hour meter shall be provided in the display.
- R. VFD shall offer as standard an internal clock. The internal clock can be used for: Timed Actions, Energy Meter, Trend Analysis, date/time stamps on alarms, Logged data, Preventive maintenance, or other uses. It shall be possible to program the clock for Daylight Saving Time / summertime, weekly working days or non-working days including 20 exceptions (holidays, etc.). It shall be possible to program a Warning in case the clock has not been reset after a power loss.

- S. VFD shall provide full galvanic isolation with suitable potential separation from the power sources (control, signal, and power circuitry within the drive) to ensure compliance with PELV requirements and to protect PLC's and other connected equipment from power surges and spikes.
- T. All inputs and outputs shall be optically isolated. Isolation boards between the VFD and external control devices shall not be required.
- U. There shall be six fully programmable digital inputs for interfacing with the systems external control and safety interlock circuitry. Two of these inputs shall be programmable as inputs or outputs.
- V. The VFD shall have two analog signal inputs. Inputs shall be programmable for either 0 -10V or 0/4-20 mA.
- W. One programmable analog output shall be provided for indication of the drive status. This output shall be programmable for output speed, voltage, frequency, motor current and output power. The analog output signal shall be 0/4-20 mA.
- X. The VFD shall provide two user programmable relays with 75 selectable functions. Two form 'C' 230VAC/2A rated dry contact relay outputs shall be provided.
- Y. Floating point control interface shall be provided to increase/decrease frequency in response to external switch closures.
- Z. The VFD shall accept a N.C. motor temperature over-temperature switch input, as well as possess the capability to accept a motor thermistor input.
- AA. The VFD shall store in memory the last 10 faults with time stamp and recorded data.
- BB. Run permissive circuit shall be provided to accept a "system ready" signal to ensure that the VFD does not start until isolation valves, seal water pumps or other types of auxiliary equipment are in the proper state for VFD operation. The run permissive circuit shall also be capable of sending an output signal as a start command to actuate external equipment before allowing the VFD to start.
- CC. The VFD shall be equipped with a standard RS-485 serial communications port and front-of-drive accessible USB port. Danfoss FC or ModBus RTU communications shall be integrally mounted.

DD. A Windows® compatible software program to display all monitoring, fault, alarm, and status signals shall be available. This software program shall allow parameter changes, storage of all VFD operating and setup parameters, and remote operation of the VFD.

2.6 Adjustments:

A. The VFD shall have an adjustable output switching frequency.

B. Four complete programming parameter setups shall be provided, which can be locally selected through the keypad or remotely selected via digital input(s), allowing the VFD to be programmed for up to four alternate control scenarios without requiring parameter changes.

C. In each programming set up, independent acceleration and deceleration ramps shall be provided. Acceleration and deceleration time shall be adjustable over the range from 0 to 3,600 seconds to base speed.

D. The VFD shall have four programmable “Bypass frequencies” with adjustable bandwidths to prevent the driven equipment from running at a mechanically resonant frequency.

E. VFD shall include an automatic acceleration and deceleration ramp-time function to prevent nuisance tripping and simplify start-up.

F. In each programming setup, independent current limit settings, programmable between 50% and 110% of the drives output current rating, shall be provided.

G. PID parameter settings shall be adjustable while the VFD is operating, to aid in tuning the control loop at start up. The VFD will also be capable of simultaneously displaying set-point reference and feedback values with appropriate engineering units, as well as output frequency, output current, and run status while programming the PID function.

H. The VFD will include a “loss of follower” function to detect the loss of process feedback or reference signals with a live-zero value and a user-selectable choice of responses (go to set speed, min speed, max speed, stop, stop, and trip).

I. A Sleep Mode function shall be provided to reduce wear and heating of the pump and other equipment in periods where system demand is minimal. This function will operate in both open and closed loop modes:

1. In closed loop process control, when the output speed drops to a user-programmed minimum value (“sleep frequency”) for a specified time (“sleep mode timer”), the drive will enter a sleep mode and either go into standby or boost mode before entering standby. The drive shall

automatically restart the motor once the output of the PID processor exceeds a programmable value “wake up frequency”.

- a. Boost mode shall prevent short-cycling of the motor by temporarily adjusting the set-point by a user-programmable percentage. Upon reaching this value, the unit will go into standby.

- 2. In open loop, the drive shall be capable of entering sleep mode if the input reference drops below a user-programmable value. When the input reference increases above a user-programmable reference, the drive will automatically start.

K. An integral motor alternation function shall be provided to enable the output of the drive to alternate between two motors. The alternation interval shall be user-programmable in hours. This function shall operate external relays as required to control the motor alternation sequence. A dwell time shall be integral to the function and can prevent damage to the motor contactors.

L. The VFD will include a user-selectable Reset function, which enables the selection of between zero and twenty restart attempts after any self-clearing fault condition (under-voltage, over-voltage, current limit, inverter overload, and motor overload), or the selection of an infinite number of restart attempts. The time between restart attempts shall be adjustable from 0 through 600 seconds.

M. An automatic “on-delay” function may be selected from 0 to 120 seconds.

N. The VFD will include a user-selectable Auto-Restart function that enables the VFD to power up in a running condition after a power loss, to prevent the need to manually reset and restart the VFD.

O. VFD shall catch a rotating motor operating either in forward or reverse at up to full speed.

2.8 Service Conditions:

A. The ambient operating temperature of the VFD shall be -10°C to 50°C (14 to 122°F), with a 24-hour average not to exceed 45°C. Storage temperatures shall be -13° F (-25° C) to 149/158° F (65/70° C).

- B. 0 to 95% relative humidity, non-condensing.
- C. Elevation to 3,300 feet (1000 meters) without derating.
- D. VFD's for Well 3, Well 4 and MRWS Boosters shall be rated for line voltage of 380 to 480VAC, with +10% to -10% variations. Line frequency variation of $\pm 2\%$ shall be acceptable.
- E. VFD's for Booster Stations 2, 3 and 4 shall be rated for line voltage of 240 VAC, single phase input – 3 phase output, with +10% to -10% variations. Line frequency variation of $\pm 2\%$ shall be acceptable.
- F. No side clearance shall be required for cooling of the units.

PART 3 - EXECUTION

3.1 Examination:

- A. Contractor to verify that job site conditions for installation meet factory recommended and code-required conditions for VFD installation prior to start-up, including clearance spacing, temperature, contamination, dust, and moisture of the environment. Separate conduit installation of the motor wiring, power wiring, and control wiring, and installation per the manufacturer's recommendations shall be verified.
- B. The VFD is to be covered and protected from installation dust and contamination until the environment is cleaned and ready for operation. The VFD shall not be operated while the unit is covered.

3.2 Start-Up: A factory-authorized service technician shall perform start-up on each drive. "Start up" shall not include installation or termination of either power or control wiring. Start-up costs provided with the bid shall include time and travel for the estimated number of visits required, but shall not be less than at least one half-day with travel. Upon completion, a start up service report shall be provided.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment: This work will not be measured for payment. The cost of this work shall be included in other items to which it is subsidiary.

- END OF SECTION -

SECTION 16600**WATERWORKS CONTROL SYSTEMS**

PART 1. GENERAL

1.01. WORK INCLUDED:

- A. This section covers work necessary for the design, documentation, assembly, test, installation, field testing, startup, training, and final documentation for Control System and SCADA upgrades for the Manifest Rhinehart Water Well Site and Booster Station Sites 2, 3 and 4. New Telemetry and Control panels will be provided as follows:
 - 1. Manifest Rhinehart Water Well Site – A new Remote Telemetry Unit (RTU) shall be provided. The RTU will monitor the following:
 - a. Status and control of Water Well 3 and Water Well 4 VFD's in response to the local Ground Storage Tank (GST) Level
 - b. Status and control of the two (2) Booster Pump VFD's in response to water level in the elevated tank (system pressure).
 - c. Discharge Flow from Water Well 3 and Water Well 4.
 - d. The RTU will communicate with interface to iControl Web-Hosted SCADA via Cellular Broadband, and communicate to the Remote Well Control Panel via a Radio I/O communications link for monitoring and control.
 - 2. Booster Station Sites - New Remote Telemetry Units (RTU's) shall be provided at Booster Station 2, Booster Station 3 and Booster Station 4. The RTU's will monitor the following:
 - a. Status and control of the level of the Ground Storage Tanks. The GST's shall be filled from system distribution with a Solenoid Fill Valve.
 - b. Status and control of the Booster Pump VFD's. The Booster Pumps will be controlled to maintain a desired System Discharge Pressure.
 - c. The RTU will communicate with and interface to iControl Web-Hosted SCADA via Cellular Broadband.
 - 3. Web-hosted SCADA System. A new web-hosted SCADA System application shall be provided to monitor and control water system distribution assets. The *Web-hosted* SCADA application shall be configured with graphic screens to monitor all site data and provide access to system control parameters via any web-enabled device (PC's Laptop, Tablet, Smartphone) via a secure VPN / Internet connection. The *Web-hosted* SCADA application shall also provide, trending and reports for all critical system variables (Levels Pressures, Flows, Water Quality), and system alarm annunciation / notification as specified in the Functional Requirements section below.
- B. All Supervisory Controls, process equipment and services shall be provided by a single System Supplier to ensure a single source of responsibility for the system. The System Supplier shall act as a subcontractor to the CONTRACTOR.

1.02. GENERAL

- A. Major components of this system shall include the specified software, materials, equipment, and installation required to implement a complete and operational process control system along with any associated panel or field mounted instrumentation.
- B. In order to achieve standardization for appearance, operation, maintenance, spare parts and manufacturer's service, to the greatest extent possible, like items of equipment provided hereunder shall be the end products of one (1) manufacturer.
- C. Requirements for the electrical work associated with the installation of the process control system and associated instrumentation equipment are as specified in Division 16 ELECTRICAL.

1.03. RESPONSIBILITY FOR COMPLETE SYSTEM

- A. The Contractor shall be responsible for and shall provide for the design, supply, delivery, installation, certification, calibration and adjustment, software configuration, testing and startup, owner training, warranty and routine future field services, of a complete coordinated system which shall perform the specified functions.
- B. The Owner and the Engineer will review system technical information as submitted by the Contractor for software; operating system, database, control strategies and the graphical user interface, i.e. report and log formats, graphics, trends, alarming, etc. for complete compliance with these specifications.
- C. The Contractor shall provide the Owner with all services and hardware to ensure that proper communications are established between all in-plant locations which are to be monitored and controlled. This work shall include, but not be limited to:
 - 1. Remove and disposal of existing Telemetry / Control Panels as specified.
 - 2. Installation of New Telemetry / Control Panels as specified below.
 - 3. Coordination with Systems Integrator to ensure proper installation, cutover, and commissioning of new telemetry and control equipment.
 - 4. Coordination with Engineer, Owner and Systems Integrator to ensure provision of water to the distribution system during installation, cutover and startup.

1.04. SUBMITTALS

- A. Hardware Submittals:
 - 1. Before any components are fabricated, and/or integrated into assemblies or shipped to the job site, furnish to the Engineer for their review six (6) copies of submittal documents. Submittals shall include full details, shop drawings, catalog cuts and such other descriptive matter and documentation as may be required to fully describe the equipment and to demonstrate its conformity to these specifications. Specifically, the Contractor shall submit the following materials:
 - 2. Block diagram and operational description of the system showing all major components and their interconnections and interrelationships. Label each diagram and specify all external power and communications interfaces. All diagrams shall be in an 11 by 17 format. Required documentation sets shall be furnished in bound hardcopy and final documentation shall also be provided in electronic format on USB Media.

3. Drawings of equipment to be supplied shall include, as a minimum: overall dimension details for each panel, console, etc., including internal and external arrangements and door mounted operator devices with nameplate designations. Wiring diagrams of equipment including field device connections shall be included and specific installation/wiring requirements identified.
4. Operational Description shall include the principal functions/capabilities of the PLC's as provided and configured /programmed. Included shall be a description of future system communications.
5. Provide a detailed Bill of Materials along with descriptive literature identifying component name, manufacturer, model number, and quantity supplied.

B. Software Submittals:

1. Provide complete user manuals for all supplier configured software and firmware. For ancillary software such as operating systems, spreadsheets, etc. being supplied under this contract, only a listing of the manuals which will be included with the Operations and Maintenance documentation is required.
2. Sample communication and control database programs for project in hardcopy form. As a minimum, hardcopy form shall be fully documented, including code, comments, addressing data and cross-references, etc. Every line or section of code shall be accompanied by a comment describing its function.
3. Provide initial graphic display and report format layouts as described later in this specification. List and briefly describe all operator interface functions provided at the PC, including: alarm annunciation and acknowledgment, status displays, control capabilities, report generation, event logging, charting and trending, etc.

C. Test Outlines and Procedures Submittals

1. Test descriptions shall be in sufficient detail to fully describe the specific tests to be conducted to demonstrate conformance with this specification.

D. Spares and Expendable Recommendations

1. The Control System Supplier shall provide a list of recommended spares and expendable items. The list shall be exclusive of any spares furnished under this Contract. A total purchase cost for the recommended list shall be provided in addition to the unit cost for each item.

1.05. ON SITE SUPERVISION

- A. The Contractor shall provide experienced personnel to supervise, perform, and coordinate the installation, adjustment, testing, and startup of the SCADA system. The personnel shall be present on-site as required to affect a complete and operating system.

1.06. TESTING AND STARTUP

- A. All elements of the Process Control system shall be tested to demonstrate that the total system satisfies all the requirements of this Specification. The Contractor shall provide all special testing materials and equipment. The Contractor shall coordinate and schedule all his testing and startup work with the Owner. As a minimum, the testing shall include both a factory test and a field test. Testing requirements are as follows:
- B. Factory Tests
 - 1. Control Panels, PLC's and all other associated hardware shall be tested at the factory, prior to shipment, to demonstrate that each component is operational and meets the requirements of these specifications. Test results shall be certified, with written documentation provided to the Owner upon test completion. The Owner or Engineer will not witness factory testing.
- C. Field Tests
 - 1. All system components shall be checked to verify that they have been installed properly and that all terminations have been made correctly. Witnessed field tests shall be performed on the complete system. Each function shall be demonstrated to the satisfaction of the Owner and Engineer on a paragraph-by-paragraph basis.
- D. Each test shall be witnessed and signed off by the Contractor and the Engineer upon satisfactory completion. The Contractor shall notify the Owner at least one (1) week prior to the commencement date of the field tests.

1.07. TRAINING

- A. The training program shall educate operators, maintenance, engineering, and management personnel with the required levels of system familiarity to provide a common working knowledge concerning all significant aspects of the system being supplied. The training program shall consist of Two 2-hour sessions. Class Room and Field sessions shall be provided. At least two weeks prior to the requested start of the program, the proposed dates of training shall be submitted to the Owner and the Engineer for approval.
- B. The supplier shall provide all instructional course material, equipment and manuals to conduct the training program. Owner shall provide facilities for the training.

1.08. OPERATION AND MAINTENANCE MANUALS

- A. The Contractor shall provide (6) complete sets of hard-covered ring bound loose-leaf O&M manuals. In addition to "as-built" system drawings, the manuals shall include internal wiring diagrams and operating and maintenance literature for all components provided under this section.
- B. The submitted literature shall be in sufficient detail to facilitate the operation, removal, installation, programming and configuration, adjustment, calibration, testing and maintenance of each component and/or instrument.

- C. Operation and Maintenance manuals shall include copies of all PLC programs written to accomplish the monitoring and control functions specified. Programs shall be updated after startup is complete, with the program(s) provided to the Owner on USB Media. Two (2) copies to be provided.
 - 1. The contents of the O&M manuals shall be generally organized as follows:
 - a. System Hardware/Installation
 - b. Drawings and Bill of Material
 - c. System Software
 - d. Operation – Description of Operation including hardware, software, and HMI screen functions.
 - e. Maintenance and Troubleshooting

PART 2. SYSTEM DESCRIPTION

2.01. GENERAL

- A. The functions and features specified herewith are the minimum acceptable requirements for the Process Control System. The provided system shall equal or exceed each requirement.
- B. In some cases, the specifications may allow the accomplishing of certain functions by means of more than one hardware/firmware/software approach. Any approach that is proposed shall equal or exceed all functional, operational, convenience and maintenance aspects of the one described.
- C. Major equipment, component and software items are specified; however, the Contractor shall provide all appurtenant items necessary to achieve the required operation as hereinafter specified.

2.02. FUNCTIONAL REQUIREMENTS

- A. General Overview
 - 1. The project consists of four (4) sites providing water and pressure for the system.
 - a. The Manifest Rhinehart Well site consists of 2 Wells filling a Ground Storage Tank (GST). Chlorine Feed and Phosphate Feed solenoid activation for each well is based on positive operation of the Well Pumps by VFD operation and flow switch indication. Two Service Pumps take suction from the GST and pump to system distribution utilizing VFD's to provide soft start and soft stop. System Flow will be monitored via flow meters on Well 3 and Well 4. Water pumped via the distribution system shall fill Ground Storage Tanks located at Booster Station 2, 3 and 4.
 - b. Booster Stations 2, 3 and 4 sites shall consist of a GST (filled through system distribution) and Duplex Booster pumps. An Electrically-actuated fill valve will open & close to fill the GST based on level setpoints. Two Booster Pumps shall draw suction from the GST and pump to distribution, maintaining a desired System Pressure.
 - 2. All Sites will Communicate with each other as needed and to iControl SCADA via Cellular Modem.

3. All GSTs will have low level cutout and restore setpoints, and floats, to prevent Booster Pump damage in event of low level conditions.

B. Manifest Rhinehart Well Site RTU.

1. Unit shall be housed in a NEMA 3R wall-mounted enclosure located as indicated on the Plan Drawings. The enclosure shall be sized to house all components described herein.
2. Incoming Service and Power Distribution.
 - a. Incoming service shall be 120 VAC, 1-phase, 2 wire.
 - b. Provide incoming power surge protection of 40,000 amps per phase.
3. A DC power supply, battery charger, and battery will be furnished to power the control system components.
4. A remote Telemetry Unit (RTU) shall be integrated into the control panel. The RTU shall be equipped on-board I/O and or Ethernet expansion I/O as required to interface with the VFDs and local instrumentation.
 - a. The RTU shall be a Primex MicroVPAC Controller with 4" Color Touchscreen. The Controller will be equipped with on-board and/or Ethernet expansion I/O as required for the application.
 - b. The RTU will communicate with the CTU via Cellular modem. The Modem will interface with the RTU via Ethernet (CAT5) cable.
 - c. The RTU will communicate with the VFD's using Modbus RS-485.
 - d. Ground Storage Tank (GST) Level monitoring and control functions:
 - i. The GST level shall be monitored via a primary level Transducer and backup float switches. The Low-Level Cut Out Restore floats shall be mounted at elevations outside of normal transducer levels. The Booster Pump Cutout / Restore float functions are active only in the event of a transducer failure.
 - Low Level Cut Out Float – (activation of this float switch will generate a low level alarm, cut out booster pumps and start the Lead Well.
 - Low Level Restore Float – (removes Booster Pump low level lockout) and (Stops the Well).
 - The Control system, will continue to operate in float backup float control until the level transducer operation is restored and control is reset to Primary via the PLC HMI.
 - e. Well Control Scheme:
 - i. Manual Control: Setting the HOA Switch to Hand will start the Wells.
 - ii. Automatic Control: Setting the HOA switch to the Auto position will allow the RTU Controller to start and stop the Wells based on GST level control setpoints. In this mode, the RTU Controller will start and stop the local and remote wells (Well No 3 & 4 respectively) in a lead-lag fashion. Pumps will alternate each pumping cycle. The Wells may also be started manually via the RTU Controller HMI soft HOA switch. Additionally, the Wells can be manually started from SCADA in similar fashion (Well VFD and soft HOA's must be in the Auto position).
 - iii. All pump status shall be monitored and displayed locally and on SCADA.
 - f. Service Pump Control Scheme:

- i. The Service Pumps will be controlled based on System Pressure Control Setpoints.
 - ii. The RTU shall monitor the GST Level. Low Level Pressure Cutout / Restore setpoints shall be provided to inhibit Service Pump operation if level falls below the cutout setpoint, and resume operation when the level rises above the restore setpoint. An alarm will be generated at the RTU/CTU and SCADA. Service Pump Control scheme shall be provided as follows:
 - Manual Control from VFD: Operator selects Manual mode on the VFD and manually sets the desired speed.
 - Manual Control from the RTU Controller: VFD's must be set to Automatic control. The VFD;s can then be controlled manually via a Soft HOA on the RTU Controller HMI screen. Operator selects the Hand position on the HOA. The Controller will send a start command to the VFD. The VFD will ramp to a preset speed setting programmed into the drive.
 - Manual Control from SCADA: The VFD's and RTU Controller Soft HOA's must be set to Automatic. The Soft HOA switch for the Service VFD is set to Hand. A start command is passed to the VFD via the RTU Controller to start the VFD. The VFD will ramp to its preset speed setting.
 - iii. Automatic Control scheme:
 - All HOA Selectors need to be set to Automatic. The RTU will start and stop the Service Pump VFD's based on lead /lag System Pressure control setpoints. The Controller will vary VFD speed to maintain a desired System Pressure setting. VFD speed will be controlled by the RTU Controller in a proportional ramp / dead-band control to maintain a desired system pressure.
 - If the lead pump cannot maintain desired pressure at 100% speed, the lag service pump will be started and VFD speeds adjusted in tandem to satisfy system demand. The VFD's will be controlled in reverse fashion in response to rising system pressure. Service pumps will be alternated each pump cycle via forced alternation.
 - iv. Service Pump Status will be monitored by the RTU Controller and SCADA.
 - g. Chlorine Feed: Each Well will have a dedicated Chlorine Feed Solenoid. The RTU will send a command to the appropriate Chlorine Feed unit to feed Chlorine any time a well pump is running and filling the GST.
 - h. Phosphate Feed: Each Well will have a dedicated Phosphate Feed Solenoid. The RTU will send a command to the appropriate Phosphate Feed unit to feed Phosphate any time a well pump is running and filling the GST.
 - i. Well Discharge flow will be measured by a magnetic flow meter. The Flow signal will be input to the RTU Controller (4-20mA).
5. The Electrical Contractor shall terminate power, pump leads and all field instrumentation as required to customer terminals in the Control Panel / RTU. Contractor shall provide all necessary wire conduit, set all panels and instrumentation in place and provide all terminations.

C. Booster Stations RTU Panel

1. Units shall be housed in a NEMA 3R wall-mounted enclosure, located as indicated on the Plan Drawings by the Contractor. The enclosure shall be sized to house all components described herein.
2. Incoming Service and Power Distribution.
 - a. Incoming service shall be 120 VAC, 1-phase, 3 wire.
 - b. Provide incoming power surge protection of 40,000 amps per phase.
3. DC power supply, battery charger, and battery to power the control system components.
4. A Remote Telemetry Unit (RTU) shall be integrated into the control panel. The RTU shall be equipped on-board I/O and or Ethernet expansion I/O as required to interface with the VFDs and local instrumentation.
 - a. The RTU shall be a Primex MicroVPAC Controller with 4" Color Touchscreen. The Controller will be equipped with on-board and/or Ethernet expansion I/O as required for the application.
 - b. The RTU will communicate with the CTU via Cellular modem. The Modem will interface with the RTU via Ethernet (CAT5) cable.
 - c. The RTU will communicate with the Booster Pump VFDs using Modbus RS-485.
 - d. Ground Storage Tank (GST) Level monitoring and control functions:
 - i. The GST level shall be monitored via a primary level Transducer and backup float switches. The Low-Level Cut Out and Restore floats shall be mounted at elevations outside of normal transducer levels. The Booster Pump Cutout / Restore functions are active only in the event of a transducer failure.
 - Low Level Cut Out Float – (activation of this float switch will generate a low level alarm, cut out booster pumps and open the GST Fill Valve.
 - Low Level Restore Float – (removes Booster Pump low level lockout) and (Closes GST Fill Valve)
 - GST High Level Alarm Float (generates high level alarm).
 - The Control system will continue to operate in float backup float control until the level transducer operation is restored and control is reset to Primary via the PLC HMI.
 - e. GST Control Scheme:
 - i. The GST level shall be monitored and filled by an Electrically Actuated Fill Valve. There shall be open and closed set points. The GST shall also have Low and High level alarms.
 - f. Booster Control Scheme:
 - i. The Booster Pumps will be controlled based on System Pressure Control Setpoints.

- ii. The RTU shall monitor the GST Level. Low Level Pressure Cutout / Restore setpoints shall be provided to inhibit Booster Pump operation if level falls below the cutout setpoint, and resume operation when the level rises above the restore setpoint. An alarm will be generated at the RTU/CTU and SCADA. Pump Control scheme shall be provided as follows:
 - Manual Control from VFD: Operator selects Manual mode on the VFD and manually sets the desired speed.
 - Manual Control from the RTU Controller: VFD's must be set to Automatic control. The VFD;s can then be controlled manually via a Soft HOA on the RTU Controller HMI screen. Operator selects the Hand position on the HOA. The Controller will send a start command to the VFD. The VFD will ramp to a preset speed setting programmed into the drive.
 - Manual Control from SCADA: The VFD's and RTU Controller Soft HOA's must be set to Automatic. The Soft HOA switch for the Well VFD is set to Hand. A start command is passed to the VFD via the RTU Controller to start the VFD. The VFD will ramp to its preset speed setting.
- iii. Automatic Control scheme:
 - All HOA Selectors need to be set to Automatic. The RTU will start and stop the Booster Pump VFD's based on lead /lag System Pressure control setpoints. The Controller will vary VFD speed to maintain a desired System Pressure setting. VFD speed will be controlled by the RTU Controller in a proportional ramp / dead-band control to maintain a desired system pressure.
 - If the lead pump cannot maintain desired pressure at 100%speed, the lag booster pump will be started and VFD speeds adjusted in tandem to maintain desired pressure. The VFD's will be controlled in reverse fashion in response to rising system pressure. Booster pumps will be alternated with each pump cycle and/or timeclock, forced alternation.
- iv. Pump Status will be monitored by the RTU Controller and SCADA. See I/O list for details.

- 5. The Electrical Contractor shall terminate power, pump leads and all field instrumentation as required to customer terminals in the Control Panel / RTU. Contractor shall provide all necessary wire, conduit, set all panels and instrumentation in place and provide all terminations.

D. Alarms

1. Pump Failure Alarms

- a. Pumps in Lead-Lag Pump Operation- If a pump is called to start and fails to prove running within 15 seconds (adjustable from Local and CTU HMI), fails to continue running when required, and or fails to stop when called to stop, it shall be removed from service and the next pump in sequence shall take its place.

- b. Pumps in Fixed Sequence Pump Operation- If a pump is called to start and fails to prove running within 15 seconds (adjustable from CTU HMI), fails to continue running when required, and or fails to stop when called to stop, it shall be removed from until the condition is corrected and placed back into operation.
 - E. The most recent active alarms shall be displayed on an alarm banner located on the bottom of the HMI and SCADA screens. All active, acknowledged and cleared alarms shall be displayed in the SCADA system's historical alarm log. Refer to I/O listing for a comprehensive listing of alarms for Plant and Distribution System
- 2.03 CONTROL PANEL CONSTRUCTION and COMPONENTS
- A. Supervisory controls shall operate from a source of 120 volts, 1 phase, 60 Hz. All controls shall be protected from lightning or other transient voltages by a lightning arrestor.
 - B. All power supplies required for operation shall be provided. Power supplies shall be sized to have a minimum of 40% spare capacity providing increased reliability and allowing for the addition of future equipment.
 - C. WIRING
 - 1. All wiring shall be minimum 600-volt UL type MTW or AWM and have a current-carrying capacity of not less than 125% of the full load current. The conductors shall be in complete conformity with the national electric codes, state, local and NEMA electrical standards. For ease of servicing and maintenance, all wiring shall be color-coded. The wire color code shall be clearly shown on the drawings, with each wire's color indicated.
 - 2. All low voltage (120 volt or less) control wiring shall be contained within plastic/PVC wiring duct with covers. Where dimensional constraints prevent the use of wiring duct, wires shall be trained to panel components in groupings. The wire groupings shall be bundled and tied not less than every 3 inches with nylon self-locking cable ties as manufactured by Panduit or equal.
 - 3. Every other cable tie shall be fastened to the enclosure door or inner device panel with a cable tie mounting plate with pressure tape. Where wiring crosses hinged areas such as when trained from the inner device panel to the enclosure door, spiral wrap shall be used.

D. SERIALIZED UL LABEL REQUIREMENT (508A)

1. Panels provided under this section shall be constructed in compliance with Underwriter's Laboratories Inc. category 508A standards - Enclosed Industrial Control Panels listing and following-up. The control panel(s) shall bear the Underwriter's Laboratories serialized label for "Enclosed Industrial Control Panel".
2. While the use of U.L. listed, components is encouraged, their use alone will not be considered an acceptable or satisfactory alternate to the "Enclosed Industrial Control Panel" serialized label specified above. Upon request from the Engineer, the panel manufacturer shall supply documentation to the owner proving they are a U.L. recognized manufacturing facility for the type of equipment required. Only the labeled products of U.L.508A "Enclosed Industrial Control Panel" recognized panel manufacturer shall be considered acceptable for use on this project.

E. PLC & HMI

1. Operator Interface
 - a. General – The operator interface shall be a transfective LCD, sunlight readable, with optional touch screen display.
 - i. MicroVPAC 4 – 640x480 LCD TFT color graphics display with a high-resolution resistive touchscreen.
 - b. Screens – Expected lifetime shall be greater than 1,000,000 operations. It shall include no less than 8 MB of memory and display up to 10 screens with 20 objects per screen. An alarm handling system shall be provided as described above. The alarm log shall store at least 100 entries before overwriting the oldest entry.
 - c. Environmental Ratings & Agency Approvals – The operator interface shall be suitable for Type 12, 4 & 4X environments. Additionally, the front panel shall be manufacture from a UV resistant polyester substrate. The Operator interface shall be suitable for installation in Class 1, Div. 2, group A, B, C & D environments. CE, UL and C-UL labels shall be provided.
2. PLC
 - a. General – The PLC shall include an integral Operator interface and on-board I/O . Expansion I/O shall interface to the PLC vis Ethernet (CAT5) Cable.
 - b. Processor and memory – The PLC Processor shall scan no less than 1K of memory every 0.2 seconds. A real –time clock shall be provided. 32 KB of register memory and 256KB of ladder logic memory shall be provided.
 - c. FLASH memory – A 2 GB FLASH card shall be provided. When delivered it shall have a copy of the latest PLC and HMI programs and routine for loading them in the PLC and HMI. All process variables shall be written to the flash card at 1-minute intervals. Daily run time and starts shall be written to the card at the end of each day.

- d. Web server and FTP server - The PLCs embedded Ethernet shall be capable of supporting and hosting of HTML based web pages and FTP sites, remote data access, and remote programming.
- e. I/O – The processor and I/O system shall be capable of monitoring 2048 digital inputs, 2048 digital outputs, 512 analog inputs, and 512 analog outputs. A wide selection of I/O module shall be available. They shall include DC inputs with ESP, AC inputs, DC outputs PNP & NPN, AC outputs, relay outputs, combination input output, analog input, analog output, isolated analog output, combination analog input & output.
- f. Communication I/O & Protocols –
 - i. Three serial ports (2, RJ-45 type RS-232/RS-485; 1 DB-25 type RS-232/RS-485 Protocols supplied shall include: Modbus RTU Master & Slave, Modbus ASCII read/write, Healy-Ruff PRO-Line Modem. CAN network or DeviceNet Slave
- g. Ethernet port
 - i. The PLC I/O shall communicate with the Operator interface and PLC processor via Ethernet I/P (CAT6 cable). A managed switch shall be provided if needed for setup and field service.
 - ii. Supported Ethernet Protocols shall include TCP/IP, Modbus TCP, FTP, SRTP, EDG, ICMP, ASCII.
 - iii. The processor and I/O system shall be capable of monitoring 2048 digital inputs, 2048 digital outputs, 512 analog inputs, and 512 analog outputs. A wide selection of I/O module shall be available. They shall include DC inputs with ESP, AC inputs, DC outputs PNP & NPN, AC outputs, relay outputs, combination input output, analog input, analog output, isolated analog output, combination analog input & output.
- h. PLCs & HMIs shall be manufactured by the same company to ensure cross platform compatibility of hardware and software. PLC and HMI shall be PRIMEX VPAC Series.

F. FIREWALL APPLIANCE / ROUTERS / SWITCHES

1. Firewall Appliance / Routers shall be provided for all remote access to the Control System including Web-hosted SCADA and or Virtual Private Network (VPN) access. Firewall Appliance / Routers shall be managed 4 or 8 port as required by the application, and be fully IEEE 802.3 compliant.
2. All routers and media converters shall be manufactured by of the same manufacturer. They shall be specifically designed for an industrial environment and suitable for wall mounting. Equipment shall be Cisco 5506X series.

G. RTU LIGHTNING AND SURGE PROTECTION

1. 120 VAC Surge Protection

- a. Provide a DIN rail mounted 120 VAC surge protector on the incoming power line. The surge protector shall be suitable for parallel connection. It shall be configurable for line to neutral, line to ground, and neutral to ground applications.
- b. It shall utilize thermally fused MOV technology and be rated for 40,000 amps of surge protection. An indicator shall be provided to allow users to access the in-service protection capability of surge protector. A form "C" contact shall be provided to indicate the status of the surge protector.

H. Analog Loop Surge Protection

1. Transient protection shall be provided with all equipment to protect all instrumentation and telemetry devices either receiving or sending signals.
2. The transient protectors shall be a three-stage surge suppression device which shall effectively arrest most transients encountered in an instrumentation environment. Transient protectors utilizing single or dual stage suppression devices shall not be acceptable.
3. The first stage of the transient protector shall consist of a gas tube arrestor connected across the signal wires and to ground. This stage shall be designed to suppress transients greater than 150 to 300 volts.
4. The second stage of the transient protector shall consist of two varistors each connected between a signal line and ground. This stage shall suppress any transients less than 150 to 300 volts and clamps them to 56 volts.
5. The third stage of the transient protector shall consist of two special purposes, high speed Zener diodes which suppress any remaining transients to 51 volts. 50 ohm, 5 watt resistors shall be connected between the stages to dissipate the potential energy of the transients.

RELAYS & TIMERS

6. Control relays shall be rated for general purpose duty. They shall have four single pole double throw contacts. Contacts shall carry a UL inductive and resistive rating of 5 amps at 240 volts. They shall have a mechanical life expectancy of 50,000,000 operations and an electrical life expectancy of 200,000 operations with a 3 amp 120 VAC load. A LED shall be provided to indicate relay coil status.
7. Time delay relays shall be rated for general purpose duty. They shall have four single pole double throw contacts. Contacts shall carry a UL inductive rating .8 amps and a resistive rating of 3 amps at 240 volts. They shall have a mechanical life expectancy of 50,000,000 operations and an electrical life expectancy of 200,000 operations with a 3 amp 120 VAC load. LEDs shall be provided to indicate

“power on” and timing “out.” The timing range shall be adjustable from .1 second to 10 minutes.

8. All relays and timers shall be mounted on DIN rail with 14 blade sockets.

I. PILOT DEVICES

1. Selector switches shall include removable 10 amp, 600-volt double make double break contacts. All pilot lights, selector switches and pushbuttons shall be rated for NEMA/UL 4 applications. They shall be not less than 22mm diameter. Pilot lights shall be provided with high intensity LED lamps. Pilot light status (on vs. off) shall be easily distinguishable in all types of light including direct sunlight

J. Spare Parts

1. As part of this contract, the Contractor shall furnish a minimum of one (1) each of the following spare parts:
 - a. PLC Processor
 - b. Input/Output modules (one each type),
 - c. PLC power supply module
 - d. Analog isolator module.
 - e. Cellular Radio Transceiver
 - f. Fuses – 10% or a minimum of one of each types and size

2.04. Web-Hosted SCADA Service

A. General

1. The service provider shall supply implementation and comprehensive ongoing administration of an Internet SCADA System (ISS) suitable for electronic monitoring and control of a utility system. The ISS shall consist of servers and telecommunications and related equipment located in the service provider’s central-data center facilities.
2. The service provider is responsible for establishing the communication link between the ISS and the customer’s utility site(s).
3. The service provider is responsible to ensure the continuous (24x7) ongoing operation and performance of all aspects of the web hosted SCADA service with an overall availability of 98.5% or greater.

B. Service Scope/Definitions

1. Internet SCADA System (ISS): Hardware, software, firmware and communication services collectively configured to provide centralized monitoring and control of the Utility System. This is inclusive of communication devices interconnected with the Utility System, central-site communication devices, server systems, and related peripherals, and the communication services which connect them. It is exclusive of local Utility System control devices such as RTU’s, PLC’s, and related control devices.

2. Utility System: The equipment and related facilities used for production, transport, storage and/or processing of water and/or wastewater, including localized control panels and devices such as RTU's, PLC's, and related instrumentation.

C. Web-Hosted SCADA Service Components

1. Central Data Center Site

- a. SCADA System: The service provider shall supply a hosted SCADA system based on industry-standard hardware and software.
- b. Capabilities: The SCADA software must be OPC compliant, and support the services further described in this specification, below, including: interval monitoring of the system, web-based user access, user data input, historical data storage and access, standardized and customized reporting, PLC control, and alarm setting, configuration, and reporting.
- c. Security/Reliability: The network and server systems providing the core ISS functionality shall be hosted in a tier 4 data center environment. This environment shall include the following features:
 - i. The Data Center site shall be physically and logically secured against unauthorized access.
 - ii. The Data Center environment shall have redundant heating, ventilation, and air conditioning (HVAC) systems to ensure temperature and humidity are maintained within the data center equipment specifications.
 - iii. The Data Center facility shall have fault-tolerant site infrastructure with electrical power storage and distribution facilities guaranteeing 99.995% availability.
 - iv. The Data Center power distribution system shall be configured to provide redundant power sources to all Data Center equipment including all network and server systems and (HVAC) systems.
 - v. Redundant or multiple independent Internet distribution paths shall serve the IT equipment.
- d. ISS system security, monitoring, redundancy, and recovery capabilities:
 - i. Security - All equipment at the ISS data center shall be protected from intrusion via an industry standard firewall and strong system and application passwords. ISS system security shall be monitored continuously using industry standard practices and procedures.
 - ii. Monitoring – All ISS components and applications shall be monitored by a network management system. The network management system shall provide proactive monitoring of the ISS and shall alert Service Provider technical support personnel of ISS component failure or out of normal operating conditions.
 - iii. Redundancy – All network and server systems providing ISS functionality shall have a fully redundant online backup system. Upon failure of a primary system, failover to the backup system shall be immediate and automatic. ISS technical support personnel be notified of the failover via the network management system.

- iv. Recovery - The Internet SCADA System (ISS) shall be configured to provide for easy recovery in the event of system failures or incidents/disasters affecting the ability to provide services. Besides the online redundant systems at the Data Center site, the ISS shall have a geographically separate site with a backup disaster recovery system. All customer site configuration information and polled interval data shall be backed up to both the redundant systems at the Data Center and the backup disaster recovery system.

2. Utility-Site

- a. Communication Device: The service provider shall supply a communications device for each identified utility-site PLC. The communication device shall provide the interface between the communications network, be it the Internet or proprietary network, and the PLC. The device shall be of a standard configuration, non-proprietary in nature, and available from several providers. The device shall draw primary and backup power from the same source as the PLC.
- b. Interface: The device shall connect to the distributed utility site PLC through a single interface cable between the modem and the PLC. This interface maybe via RS232 Serial or RJ-45 Ethernet.
- c. Capabilities: The communications device shall support the following capabilities:
 - i. Two-way communications between the distributed utility site PLC and the ISS communications network, to support the collection of PLC statistics as well as remote command/control of PLC functions; and remote programming, reconfiguration, and reloading of the PLC logic.
 - ii. The ability to directly read PLC memory to acquire utility system statistics. Communications
- d. Broadband Connectivity: When broadband communications are utilized between the ISS and the customer sites the broadband connection shall meet the following minimum specifications:
 - i. Broadband connectivity shall be defined as asynchronous bidirectional data communications of at least 256Kbps or greater.
 - ii. A static IP address (supplied by Internet provider) shall be provided at each of the customer site(s).
 - iii. Broadband communication service outages pertaining to this connection shall be resolved by the customer's local service provider.
- e. Security/Reliability: Electronic communications traversing the Internet between the ISS and the customer site(s) shall be encrypted with industry standard protection via a VPN connection.

D. Internet SCADA System (ISS) Features

1. Utility-Site System Monitoring and Data Collection

- a. The ISS shall provide continuous electronic polling and gathering of distributed utility system PLC data on a pre-defined interval to maintain current knowledge of the utility system status, including distributed system component condition and performance, operating values, and failures or other out-of-specification conditions.
- b. This feature shall provide electronic collection and distribution of analog and digital data within the following pre-defined intervals:
 - i. Broadband
 - The monthly subscription rate shall be based on interval polling of data once every 30 seconds. Subscription plans with more frequent polling intervals shall be available.
 - The Fast poll feature shall be disabled for customer sites utilizing broadband communications.

2. Data Storage and Management

- a. The ISS shall provide managed storage of interval data and events/alarms as monitored. The most recent two years of historical data monitored shall be available online. Subscription plans shall be available to accommodate storage and retrieval of older historical data storage.

3. Alarming and Notification

- a. The ISS shall perform ongoing electronic detection of alarm conditions and provide automated alarm notification and escalation including:
 - i. Automate Alarm Generation: Alarms shall be automatically generated when analog or digital alarm inputs indicate and alarm condition, and when polled data indicates a condition that exceeds or otherwise does not conform to predefined configuration limits.
 - ii. Automated Notification: A two level alarm notification system shall be provided. Each notification level may have one or more contacts. The time delays defined below are the default values. Time delays shall be adjustable based on the owner's needs during system setup by the ISS provider.
 - The detection of an alarm condition shall automatically generate an initial alarm notification to the contacts in the Level One contact roster after a 1 minute wait period. If a Level One contact does not acknowledge the alarm within 10 minutes, all Level One contacts shall be notified a 2nd time. If a Level One contact does acknowledge the alarm within 10 minutes of the 2nd notification, the alarms shall be sent to all Level One contacts a 3rd time. If none of the Level One contacts acknowledge the alarm within 10 minutes of the 3rd notification the alarm system shall enable the Level Two notification.
 - Level Two notification functions the same as Level One; however, there is no limit on the number of notifications. The system will continue to notify contacts until the alarm is acknowledge. Level One contacts may also be on the Level Two contact notification roster.

- Managers and supervisors shall have the rights to manage the alarm notification contact rosters.

iii. Alarm Acknowledgement:

- Alarms shall be acknowledged via the on-line web application via the current user regardless of the alarm notification method.
- If a user is notified via text message, the user shall acknowledge the alarm via return text message.
- If the user is notified via e-mail message, the user shall acknowledge the alarm via return e-mail message.
- If the user is notified via voice message, the user shall acknowledge the alarm via voice instructions and the telephone keypad.
- Once an alarm has been acknowledged, the acknowledger's ID is stored in the alarm log and no further notification will occur for that alarm incident.

iv. Call Roster:

- Managers or Supervisors shall have the rights to setup a contact call roster. Each contact on the call roster shall have the ability to be contacted via text message, e-mail, or voice message. If desired, the contact may be alert by any or all the contact methods when an alarm occurs. If multiple contact methods are enabled, it shall only be necessary to acknowledge the alarm via a single contact method to stop the notification process.

4. Client Web Application

- a. The ISS shall support a graphical, Internet-based access service (Web Application) for secure, on-demand user connectivity to their utility system. This service shall provide secure access to current system status and trending, system control, alarm management, historical data access, reporting, and user input screens. The Web Application is available via any personal computer, smartphone, or tablet device that supports Java and a standard browser supporting HTTPS and HTML5.
- b. Accessing the Web Application: The authorized user shall the access the Web Application via an SSL connection to the ISS provider's website.
- c. Utility System Status: The service shall provide multiple graphical screens as previously described. A summary (overview) screen shall be provided that rolls up all the sites/screens to depict overall utility system status shall be provided as the main overview screen.
 - i. Standard screens may be used if they fit the application. Additionally, the service shall have the ability to customize standard screens and create new custom screens that closely depict that process being monitored. Systems that are not capable of providing custom graphic screens shall not be considered.

- d. **Utility System Trending:** The service shall be capable of trending any process variable being monitored by the ISS. Process variables to be trended were previously identified in this specification. Trend data shall be graphed on the client's Web Application screen. The authorized user shall select to graph one or more analog points simultaneously. There are two options for outputting trend data: trend graphs can be printed, or trend data can be exported to Excel.
- e. **Utility System Control:** The service shall provide the ability for direct, remote execution of system commands to initiate or suspend various system operations (for example, to start or stop a pump). It shall also provide the ability to reconfigure utility system operating parameters such as set points and pump alternation/sequencing.
- f. **Alarm Management:** The service shall provide access to actively manage alarms and the underlying configuration of alarms and alarm notifications.
 - i. Each of the graphical status screens shall integrate the display of applicable alarms such that components display in flashing red when alarms related to the component are activated.
 - ii. Users of the service shall be able to acknowledge alarms interactively through the web interface via a dedicated alarm screen.
 - iii. Access to the alarm notification configuration shall permit authorized users to configure and/or change notification and alarm sending parameters, including the addition, deletion, or modification of contacts, contact methods, and contact particulars.
- g. **Alarms and Alarm History Screen:** All current alarms are displayed at the bottom of the client's Web Application screen. Unacknowledged alarms are displayed in red, acknowledged alarms are displayed in black. For a history of all alarms from the customer's site the Alarm History Screen displays the alarm name, when the alarm became active, when the alarm was cleared (alarm condition no longer present), when the alarm was acknowledged, and who acknowledged the alarm.
- h. **Performance Reporting:** The service shall provide users with access to generate standard performance reports, including those specified below. These reports shall be user-configurable at time of generation to allow the user to, at a minimum, specify the timeframes to be included in the report, as well as the output format for the report. Reports generated shall be printed or saved in PDF, HTML, or graphical (PNG) formats.
 - i. Basic pump operation performance report, including pump start and runtimes, and total flow over the course of the month.
 - ii. Flow meter report, including daily weekly and current totals for all customer analog flow meters.
- i. **Custom Reporting:** The service shall include the custom report building capability. Custom reports shall be built by the ISS provider to the standard described below. If custom reports are not defined below, no custom reports are required for this project.

- j. Access Security: The Web Application shall implement security to ensure that only authorized users are permitted access to view or modify the operations of the utility system. At a minimum, the service must implement:
 - i. Variable-Privilege Accounts - The service supports the following user accounts:
 - Manager: Controls multiple client sites (if applicable), controls all user accounts for each site, has full control of each site's equipment and parameters. There may only be one Manager account.
 - Supervisor: Controls user accounts for a single customer site, has full control of the site's equipment and parameters. There may be multiple Supervisor accounts.
 - Operator: Has full control of all customer site equipment and parameters. There may be multiple Operator accounts.
 - User: Has view-only access to the customer site. Cannot change set points or turn site equipment on or off. There may be multiple User accounts.
 - k. Password Management: Each user account shall have a strong password associated with it. Passwords shall be eight (8) characters or greater and include both alphabetical and numeric characters. Users may change their password from within the Web Application. Managers and Supervisors may also manage passwords for users assigned to their sites or created by them.
 - l. User Account Control: Managers and Supervisors may manage user accounts for their customer site(s) from within the Web Application. Users with Manager or Supervisor access can:
 - i. Add or remove users.
 - ii. Change user passwords.
 - iii. Enable and disable users.
 - iv. Change user roles (Supervisor, Operator, or User).
 - v. Add or remove users to groups within their site.
 - m. Secured Communications: Information sent between the Web Application and the ISS shall be secured using industry standard data encryption such as but not limited to HTTPS and SSL.
- 5. Service Provider Requirements
 - a. The service provider shall be required to demonstrate its suitability to provide the services described in this section by meeting the following requirements.
 - b. Services: The service provider shall be normally engaged in the integration, configuration, operation, repair, and maintenance of control systems for water\ wastewater systems. The service provider shall modify or supplement its standard services to meet these specifications. Standard services of a provider that do not meet the functional and technical requirements of these specifications are not acceptable.
 - c. Experience: The supplier shall have successfully provided systems of similar or larger complexity in the last five (5) years.

- d. Acceptance: No provider shall be accepted on this project unless they have been found to comply with the above requirements.
6. Service Support & Administration
- a. The service provider shall supply the following services to implement and provide ongoing technical and service support.
 - b. Commissioning: The service provider shall conduct assessment, design, integration, startup and testing services, including:
 - i. Design of the system to meet these specifications and the requirements identified during the business and technical requirements assessment.
 - ii. Integration of the ISS, including utility-site and central-site components, and activation of communications systems.
 - iii. Startup and testing of the ISS service to ensure that it meets specifications and the identified business and technical requirements.
 - c. Technical Support: The service provider shall make telephone support available for the hosted SCADA service on a 24x7, year-round basis, for technical assistance with the ISS hardware, software, communications and the services they support. This shall include:
 - i. Staffing of a support line during normal business hours; calls shall be responded to within 90 minutes of receipt. Normal business is defined as Monday through Friday 8:00AM until 5:00PM CST except Holidays.
 - ii. Emergency calls placed after normal business hours shall page a technical resource that responds within 3 hours of receipt.
 - iii. The service provider shall provide support and timely follow-up and escalation to other technical and managerial resources if needed to resolve the issue, and mutually agreed resolution, closing, and periodic reporting of trouble tickets.
 - d. Account Administration: The service provider shall provide a consolidated quarterly bill for all services, itemizing fixed costs on a per-site basis, and specifying variable- and added-cost items as incurred.
7. Internet SCADA System (ISS) Administration
- a. The service provider shall perform active, ongoing monitoring, management, and administration of the ISS to ensure its continued secure, reliable, efficient and effective performance.
 - b. Configuration and Change Administration: The service provider shall have an established procedure in place to ensure that only communicated, authorized and scheduled changes are made to the ISS. The change procedure shall also include a process for tracking and controlling changes to the ISS.
 - c. Fault Administration: The service provider shall conduct 24x7 continuous monitoring of critical ISS components to detect failures, deficiencies, or other out-of-specification conditions. This includes monitoring, detection, and

resolution of faults to the communications services provided as part of the service. The service provider shall provide notification, escalation, trending, and reporting on out-of-specification conditions affecting the ISS or with communications between the ISS and the customer site(s) consistent with requirements identified during initial commissioning.

- d. **Performance Administration:** The service provider shall track, trend, and report on ISS availability and reliability on a component and system-wide basis. This service shall include ongoing tuning of the ISS to maintain performance per specifications; tracking and reporting of the capacity and utilization of system resources; and, recommending and implementing changes to ensure continued proper performance.
 - e. **Security Administration:** The service provider shall provide ongoing protection and security of the ISS. This service shall be provided through secured login identification and managed password authentication, pre-defined security levels and controls access, monitoring of unauthorized access attempts, application of critical software security updates, system recovery management, implementation of industry standard network and system security practices and procedures, and secured physical access to Data Center system components.
 - f. **System Recovery:** The service provider shall have a recovery procedure in place to should there be a failure of the primary ISS. The recovery procedure shall utilize the geographic off-site backup as part of the recovery procedure.
8. **Web Hosted SCADA Screens**
- a. In general, the web hosted SCADA screens shall incorporate the existing SCADA screens and mimic the new Wecker BPS screens developed for this project. Additional information such as pump run time, pump starts, and station flows may be added to their associated screens.
 - b. **Map Overview Screen –** The Map Overview screen shall include icons representing each RTU location. The Icons shall indicate critical variables for each site, including levels, pressure, flow, pump status and common normal/alarm status. It shall allow the operator to quickly evaluate overall system status at a glance from one screen. Clicking on any of the site icons shall call a site-specific detail screen.
 - c. **Site Detail Screens –** CTU and Each RTU Site shall be represented with a detail screen indicating all relevant status and alarm conditions for that site, including levels, flows, and pressure variables that are monitored by the RTU's. All pump run/fail/ETM information shall be displayed for all pump stations monitored.
 - i. Process variables such as the levels, pressures and flows shall be displayed as a dynamic vertical bar graph. The numeric process value shall be displayed in an obvious location adjacent to its process icon.

- ii. Pump symbols shall be green when its respective pump is running, white when it is off and red when in alarm.
 - iii. Valve Symbols shall be Green when open Red when Closed and Flashing Red when in an alarm / fail condition.
 - iv. Virtual pushbuttons shall be provided to allow the operator to enter setpoints, change sequence and acknowledge alarms.
- d. Menu – Menu selections and “hot boxes” shall be provided to allow the operator to drill down to acquire more detail process data. The following menu selections shall be provided:
 - i. Pump Soft HOA’s, Remote/Off/Backup Control Selectors
- 9. Operation and Setpoint Screens – Each pump icon shall be provided with a pump status sub screen. The screen shall include the following information for each pump in addition to the information previously specified for the CTU screens:
 - a. Pump status – Off, Running, Failed
 - b. Run Time Data
 - c. Run time today
 - d. Run time yesterday
 - e. Run time total
 - f. Start Data
 - g. Starts today
 - h. Starts yesterday
 - i. Starts total
- 10. HOA Control & Status
 - a. If monitored at the RTU, indication shall be provided to indicate that the HOR switch at the pump stations site is in the Remote (Auto) position.
 - b. If the remote HOR is in the Remote position the operator shall be able to start and stop the pump from this screen
- 11. Trending Screens – Each monitored process variables and pump run status in the system shall be trended.
- 12. System Alarm Screen – A time date stamped alarm message shall be displayed on the active alarm screen whenever an alarm condition exists. Events shall be stored in historical alarm log when the alarm is acknowledged and when it clears. All alarms indicated on the pump station OITS shall be displayed on the alarm screen.

13. Historical Log – A time date stamped message shall be displayed in the historical log whenever a monitored alarm occurs, whenever a monitored alarm is acknowledged and whenever a monitored alarm is cleared or reset. Critical events shall also be monitored when they occur and when they reset or clear. Critical events to be monitored shall be defined during the submittal process.

2.05. INSTRUMENTATION

A. SYSTEM PRESSURE TRANSMITTER

1. A loop-powered transmitter shall be provided to sense the system pressure. The transmitter shall provide a linear and proportional 4-20 mA output signal in response to the sensed process variable. The transducer shall be installed in accordance with the manufacturer's instructions and bear CE approval. The transducer shall meet the following:
 - a. Service: Compatible gasses and liquids
 - b. Wetted Materials: Type 316L Stainless Steel
 - c. Accuracy: 1% full scale (includes linearity, hysteresis, and repeatability)
 - d. Temperature Limit: 0 to 200°F (-18 to 93°C)
 - e. Compensated Temperature Range: 0 to 175°F (-18 to 79°C)
 - f. Thermal Effect: +/-0.04% FS/°F (includes zero and span)
 - g. Power Requirements: 13 to 30 VDC
 - h. Output Signal: 4 to 20 mA
 - i. Response Time: 50 mSec
 - j. Loop Resistance: 0-1300 ohms maximum
 - k. Current Consumption: 39 mA (maximum)
 - l. Process Connections: 1/4" female NPT
 - m. The sensing element shall withstand overpressures to 200% of rated range without damage.

B. Electromagnetic Flow Meter (2 required)

1. The electromagnetic flow meter shall be an MJK MagFlux system with MJK Magflux Flow Sensor, MJK MagFlux Flow Converter and MJK MagFlux Display Unit with manufacturer recommended accessories.
2. The electromagnetic flow measurement system shall consist of a Flow Sensor which uses Faradays law of electromagnetic induction along with a microprocessor based Flow Converter and Display. The flow meter shall have built in self-diagnostics, technician service functions and be suitable for use with the manufacturer's system certifying kit to confirm meter's sensor functions, accuracy of electronics including a calibration check of electronics at a zero flow and a mid-range flow rates, and for confirming all components meet factory specifications for accuracy and feature operation.
3. Operating Principle: Utilizing Faraday's Law the sensor converts the liquid flow through the sensor into electrical voltage proportional to the velocity of the flow.

4. Construction: The sensor shall be produced from 304 stainless steel pipe, coils, 316L stainless steel electrodes and a hard rubber liner, soft rubber liner, or PTFE liner as required for compatibility with the media. The sensor shall have a stainless steel outer jacket or carbon steel outer jacket, carbon steel or stainless steel ANSI 150 psi or optionally ANSI 300 psi, ANSI Class D or ANSI Class E flanges. Carbon steel exterior components as well as the exterior of the flow tube shall be protected with two part epoxy coating for corrosion resistance.
5. Installation: A minimum of 3 pipe diameters up stream and 2 pipe diameters down stream of straight smooth pipe are recommended.
6. Flow Sensor Operating Temperature shall be: Media Temperature -10°C to 80°C (15°F to 175°F), Ambient Temperature 10°C to 60°C (15°F to 140°F).
7. Flow Sensor shall be capable of being installed for permanent burial or submergence up to 30 ft. (IP 68/NEMA 6P) using manufacturer's submergence and waterproofing kits. Flow sensor shall be capable of temporary (30 minutes) submergence up to 3 ft. (IP 67/NEMA 4) without a submergence kit.
8. Flow Sensor shall be full bore internal diameter throughout to reduce liner erosion and reduce turbulence at high flow ranges. Sensor shall be factory calibrated and wet tested to deliver $\pm 0.25\%$ reading accuracy when the flow sensor is sized so that velocity through the sensor is 0.2-10m/s. Accuracies will be NIST Traceable. Sensor shall be delivered with a calibration certificate for verification of performance. The Flow Sensor shall have calibration and flow set up data marked on the sensor.
9. Flow sensor shall be capable of being mounted at angles up to 45° from vertical around the center axis of a horizontal pipe and shall be capable of being installed in any direction without regard to flow direction.
10. The Flow Sensor shall also include a grounding electrode to eliminate the need for grounding rings in wastewater applications (except when using non-conducting pipe).
11. Flow Converter shall have an enclosure rating of IP 67 (NEMA 6) with a measurement accuracy of $\pm 0.1\%$.
12. Flow Converter shall energize and detect signals generated at the Flow Sensor electrodes and self-adjust frequency and amplitude to maximize accuracy across a wide range of flow velocities. Converter shall include program for periodic self-cleaning of Flow Sensor electrodes using cyclic reverse polarization systems to prevent material attachment and to detach plated materials.
13. Flow Converter shall be capable of measuring fluid velocities in low ranges from 0 to 0.2m/s (0.6ft/sec.) and up to a maximum velocity up to 10m/s (30ft/sec). Maximum accuracies shall be achieved from 2% of the flow sensors maximum flow rate up through the sensors maximum flow rate.

14. Flow Converter shall be a flow rate transmitter with a fully scaleable 4-20mA output proportional to all or part of the full-scale flow rate and capable of transmitting with a maximum line load of 800 Ω . The Flow Converter shall be capable of transmitting a 4-20mA output proportional to the flow in either direction, or 4-20 mA proportional to flow in both directions, selectable after installation. Flow Converter shall have one voltage free electromechanical relay rated for a maximum of 50VDC at 1 Amp and one optically isolated relay rated for 50VAC/VDC 120mA max. Both relays are programmable for totalizer counter output, batch counters, high/low flow alarm, system error, empty pipe alarm, and flow direction indication.
15. The Flow Converter shall accept one external digital input rated at a maximum of 30VDC with a signal less than 5VDC registered as = 0 and a signal greater than 10 VDC as registered as = 1. Minimum pulse length 100ms. Digital input can be used for reset of batch counters, start and stop batches or alarm acknowledgement.
16. The Flow Converter shall be capable of reading flow in both directions and have three re-settable totalizers and three non-resettable totalizers capable of totalizing the total flow or net flow in both directions.
17. The Flow Converter shall have two batch counters utilizing dynamic adaptive batch counting to minimize under shooting and over shooting of batch volume by self-adjusting the batch cycle based on actual batch size measurement results. Flow Converter shall have a MODBUS RTU-mode for control and communication using either the MJK MagFlux Display unit or for communication with a PLC. The manufacturer shall supply a document with the list of program registers upon request. Flow Converter shall use an RS 485 communication interface capable of transmitting up to 3000 ft. the controls and data in the MODBUS RTU mode to a PLC or MJK Display Unit.
18. Flow Converter shall be capable of operating without a display, with a remote display, with an integral display or as a member of a group of two to four converters working from a single display. Flow converter shall be capable of being operated remote to the Flow Sensor.
19. Flow converter shall have user adjustable low flow cut off for automatic zeroing of flow rate, totalizing and mA output. No external switching shall be required to achieve zero flow. Flow Converter and must be capable of interchanging with any other flow sensor from the same manufacturer, without the use of electronic memory media exchange. Flow Converter must be capable of being remote mounted up to 150 ft from the flow sensor and require only one set of communication cabling to the sensor for operation.

20. Display Unit shall be a white dot matrix 64 x128 pixel graphic backlit display and shall allow up to four lines of customizable text with automatic font scaling allowing maximum size up to ½ an inch for the primary measurement parameter. Unit shall indicate flow, flow direction, volume, totalizers, configuration, and set-up operations in plain English text. The Display Unit shall display a graphical trend line of the flow history which can be expanded to show greater detail down to 5 minutes increments of flow rates.
21. The Display Unit shall communicate with the Flow Converter using a MODBUS RTU mode using RS485 communications on standard twisted wires for distances up to 3000 ft. The Display Unit shall be capable of controlling, configuring, and data logging for up to four Flow Converters and flow sensors at the same time with simultaneous displays of measurements. The Display unit shall also have options for Modbus or Profibus data transmission in addition to the Converter communications modes.
22. The Display Unit shall hold all settings in a flash memory in the event of a power outage. Battery back-up is not acceptable. The Display Unit shall have a USB port for connection or options for BlueTooth communication to a personal computer for downloading data in CSV file types suitable for use with commonly available spreadsheet and data management software. The USB port shall also be capable of letting the operator store all flow meter settings as a file on a PC, configure the flowmeter converter from a PC, upload software updates, and upload standard configurations. The Display Unit shall be able to be remote mounted up to 3000 feet from Flow Converters.
23. The Display Unit shall have four keypad buttons for configuration and operation by the user and for use as a digital input for control and shall be capable of showing 'pop-up' alarm messages which shall persist as long as the alarm condition exists and will disappear 5 minutes after.

PART 3. EXECUTION

3.05. GENERAL

- A. Coordinate all work with the engineer/owner to avoid conflicts, errors, delays and unnecessary interference with operation of the existing system during installation, testing, cutover and startup.
- B. Install all new equipment in accordance with the manufacturer's instructions and approved submittals.
- C. Installation and startup of new system shall be coordinated to maintain adequate water supply to the Nebo Water System at all times. Any system down-time required for system cutover shall be coordinated with the Owner & Engineer.

- END OF SECTION -

SECTION 16800**STANDBY DIESEL POWER SYSTEMS**PART 1 - GENERAL1.1 Scope:

A. This Contractor shall furnish and install four (4) complete standby diesel drive electrical power systems consisting of diesel engine, generator, exhaust system, fuel system including transfer pump, base mounted double wall fuel tank, interconnecting piping, all as necessary to provide a completely automatic system at MRWA Well Site, Booster Station 2 Site, Booster Station 3 Site and Booster Station 4 Site. The area served by each generator shall be provided with an automatic transfer switch which shall call for the generator to start up in the event of a power failure. The transfer switch shall be provided with an exerciser.

1.2 Submittals:

A. Provide three sets of Engineering Submittals for approval, prior to production release, showing all components, in addition to the engine and generator. Submittals shall include compliance with these specifications.

PART 2 - PRODUCTS2.1 Engine:

A. The engines shall be water-cooled Vee-type four-stroke cycle compression ignition diesel. They shall meet Specifications when operating on Number 2 domestic burner oil. Two-stroke cycle engines or those diesel engines requiring premium fuels will not be considered. The engines shall be equipped with fuel, lube oil, and intake air filters, lube oil cooler, fuel transfer pump, fuel priming pump, service meter, gear driven water pump, and unit mounted instruments, including a fuel pressure gauge, water temperature gauge, and lubrication oil pressure gauge.

2.2 Governor: The isochronous governor shall maintain frequency regulation not to exceed 0.5% from no load to full rated load.

2.3 Generator:

Location	Rating	Power Factor	Volts	Phase	Wire	Hz	RPM
MRWA Well Site	150 kW	0.8	277/480	3	4	60	1800
Booster Station 2	35 kW	0.8	120/240	1	3	60	1800
Booster Station 3	25 kW	0.8	120/240	1	3	60	1800
Booster Station 4	25 kW	0.8	120/240	1	3	60	1800

A. Type: The generator shall be a single bearing, synchronous-type built to NEMA standards. Class F insulation shall be used on the stator and rotor, and no materials which will support fungus growth shall be used. The generator shall incorporate reactive droop compensation for parallel operation and shall include a resettable thermal protector for exciter/regulator protection against extended low power factor loads.

B. Regulator: A generator-mounted, volts-per-hertz-type exciter/regulator shall be provided to match the characteristics of the generator and engine. Voltage regulations shall be $\pm 0.5\%$ from no load to full rated load. Readily accessible voltage droop, voltage level, and voltage gain controls shall be provided. The solid state regulator module shall be shock-mounted and epoxy-encapsulated for protection against vibration and atmospheric deterioration.

2.4 Cooling System:

A. Radiator: A radiator with blower type fan shall be sized to maintain safe operation at 110°F ambient temperature.

B. The engine cooling system shall be pre-treated by the engine supplier for the inhibition of internal corrosion. A 50% ethylene glycol solution shall be installed in the cooling system.

2.5 Fuel System:

Location	Fuel Type	Useable Capacity
MRWA Well Site	#2 Diesel	720 gallons
Booster Station 2	#2 Diesel	80 gallons
Booster Station 3	#2 Diesel	80 gallons
Booster Station 4	#2 Diesel	80 gallons

A. At the end of the year's warranty a free oil and filter change shall be provided along with a free complete maintenance inspection.

2.6 Exhaust System:

A. Exhaust Silencer: A critical type silencer, muffler companion flanges, and flexible stainless steel exhaust fitting properly sized shall be furnished and installed according to the manufacturer's recommendations. The silencer shall be mounted on top of the weatherproof housing. A rain guard shall be provided where the flexible exhaust piping exits the weatherproof housing with insulated isolators. The silencer shall be mounted so that its weight is not supported by the engine nor will exhaust system growth due to thermal expansion be imposed on the engine. Exhaust pipe size shall be sufficient to ensure that exhaust back pressure does not exceed the maximum limitations specified by the engine manufacturer. The exhaust pipe on the discharge of the silencer, shall turn up and terminate with a rain cap.

2.7 Automatic Starting System:

- A. Starting Motor: A DC electric starting system with positive engagement shall be furnished. The motor voltage shall be as recommended by the engine manufacturer.
- B. Automatic Control: Fully automatic generator set start-stop controls in the generator control panel shall be provided. Control shall provide shutdown for low oil pressure, high water temperature, overspeed overcrank and a 3PDT auxiliary relay for activating accessory items.
- C. Jacket Water Heater: A unit mounted thermal circulation type water heaters incorporating thermostatic switches shall be furnished to maintain engine jacket water to 90°F. The heater shall be 120 volt, single phase, 60 hertz.
- D. Batteries: A lead-acid storage battery set of the heavy duty diesel starting type shall be provided and mounted on the generator mounting rails. Battery voltage shall be compatible with the starting system. Necessary rack, cables, and clamps shall be provided.
- E. Battery Charger: A current limiting battery charger shall be furnished to automatically recharge batteries. It shall include overload protection, silicon diode full wave rectifiers, voltage surge suppressor, DC ammeter, DC volt-meter, and defused AC input. AC input voltage shall be 120 volts, single phase. Charger shall be mounted within the weatherproof housing.

2.8 Generator Control Panel:

- A. Type: A generator mounted NEMA 1 type vibration isolated 14 gauge steel control panel shall be provided. Panel shall contain, but not be limited to the following equipment:
 - 1. Frequency meter
 - 2. Voltmeter
 - 3. Ammeter
 - 4. Ammeter-Voltmeter phase selector switch
 - 5. Automatic starting controls as specified
 - 6. Voltage level adjustment rheostat
 - 7. Dry contacts for remote alarms wired to terminal strips
 - 8. Individual fault indicator lights for low oil pressure, high water temperature, overspeed and overcrank
 - 9. Running time meter, oil pressure and water temperature gauges
 - 10. Hinged, solid protective cover with provision for padlock
 - 11. Cooldown relay

2.9 Output Circuit Breaker:

Location	Rating	Poles
MRWA Well Site	250A	3
Booster Station 2	150A	2
Booster Station 3	125A	2
Booster Station 4	125A	2

2.10 Accessories:

- A. Provide emergency off push buttons for exterior mounting on each generator enclosure.

2.11 Approved Manufacturers:

- A. Approved Manufacturers of the standby unit are MTU, Generac, Caterpillar Tractor Company, Cummins, and Kohler (4 cycle engine only). For design purposes, the Generac Industrial Generator set was used.

2.12 Transfer Switches:

- A. General: To be approved as a transfer switch manufacturer, the manufacturer shall have been regularly engaged in the production of UL 1008 listed transfer switches (that are brand names, documented, and offered for sale on the open market,) for a minimum of five (5) years, and shall provide factory trained parts and service support through a factory authorized distributor or service center that is regularly doing business in the area of the installation.

1. The manufacturer shall supply printed literature containing diagrams, parts lists and description sufficient for the Owner's personnel, or subcontract supplier to install, operate, and perform normal service on the equipment.

- B. Ratings: All transfer switches shall be UL listed per standard 1008 and rated for Service Entrance. Transfer switch supplied shall be suitable for use on emergency and legally required standby system in accordance with ANSI-CI, rated for total system load. Transfer switch shall be rated to carry 100% of rated current continuously in the enclosure. Transfer switches which must be derated when installed inside enclosure (due to integral over-current devices or any other reasons) do not meet this specification. Transfer switch shall be rated for continuous operation in ambient temperatures of -40°C to +67°C. Main power switch contact shall be rated for 600 V.A.C.

- C. Operation: The transfer switch automatically starts the generator on interruption of normal power and transfers the load circuits when the set reaches proper speed and voltage. When normal power is restored, the automatic switch transfers the load back to the line and stops the generator set. The source being connected to the load supplies the switching power. A time delay circuit shall be supplied to provide a transition between de-energizing the generator and engaging utility power on retransfer.

1. Transfer Action: Switch shall feature two operating coils electrically interlocked to provide positive, electrically guided action from NORMAL to STANDBY position. A mechanical interlock mechanism shall be provided to prevent both sources from supplying the load simultaneously.
2. The transfer switch main contacts shall double break design, solid silver cadmium oxide, mechanically held on the line side, permitting the operating coil to be de-energized, eliminating AC hum or vibration. Contact pressure shall be maintained by coil springs not subject to weakening or distortion as part of the current path. Individual heat resistant contact chambers shall prevent cross arcing. All models shall be rated for all classes of load, both inductive and non-inductive, at 600 volts, 250 volts tungsten lamp load. NO DERATING.

3.

Location	Rating	Poles
MRWA Well Site	250A	3
Booster Station 2	200A	2
Booster Station 3	200A	2
Booster Station 4	200A	2

4. Control Circuit: Start/stop circuit shall close the 2 or 3-wire remote circuit to start the standby set on interruption of normal line power and open the circuit again to stop the set on return of normal line power. Generator can have either 12 or 24 volt starting systems. Transfer switch pilot circuit shall initiate transfer to standby power when standby output reached approximately 90 percent of rated voltage. Line recovery contacts shall provide immediate retransfer to normal power if emergency power interrupts when supplying load, by bypassing time delay retransfer. Instant transfer relay to provide immediate retransfer to the line when normal power restores, eliminating the few seconds delay otherwise necessary for standby voltage to drop sufficiently. A test transfer switch shall simulate power outage. A terminal block shall be provided for remote test switch. A control circuit disconnect plug shall be provided for use when servicing control circuit of transfer switch which disconnects control circuits from the line without operating transfer switch.
5. The following relays shall be included: Adjustable solid state time delay start, time delay transfer, time delay retransfer, time delay stop, and adjustable solid state under-voltage sensors. Phase loss relay and generator pickup relay shall be included.
6. Enclosure: The transfer switch and control components shall be mounted in a single door enclosure, NEMA 3R construction, wiring space to comply with 2002 NEC Table 312.6(A). Meters and lamps are to be front mounted and readable with the cabinet closed. The cabinet is to be designed for wall mounting and will be provided with padlock hasps.
7. Normal and emergency lights shall be included.

8. Exerciser: Transfer switch shall be equipped with a programmable time clock which shall start the engine once every seven days. A switch shall be provided to select exercising under "load" or "no load."

PART 3 - EXECUTION

3.1 Domestic Equipment:

A. The engine, including engine block, oil pan, and cylinder heads, generator and all major items of auxiliary equipment shall be manufactured in the U.S. by manufacturers currently engaged in the production of such equipment. The unit shall be engaged in the production of such equipment. The unit shall be shipped to the jobsite by an authorized dealer having a parts and service facility within a 150 mile radius of the jobsite.

3.2 Testing:

A. Prior to acceptance of the equipment, it shall be tested to show it is free of any defects and will start automatically and be subjected to full load test through the use of facility load at the installed location.

B. Contractor shall demonstrate the generator's ability to accept total load for a period of two (2) hours.

C. Testing shall be done in the presence of the Owner's Engineer or his appointed representative at the jobsite.

3.3 Start-Up:

A. Start-up and Instructions: On completion of the installation, the start-up shall be performed by the engine manufacturer's trained dealer service representative. Operating and maintenance instruction manuals shall be supplied and procedures explained to operating personnel. The CONTRACTOR shall be responsible for providing sufficient fueling of the engine to ensure successful start-up and training.

3.4 Warranty:

A. Equipment furnished under this section shall be guaranteed against defective parts and workmanship under terms of the manufacturer's and dealer's standard warranty and shall include parts, labor and travel time for necessary repairs at the jobsite.

B. To ensure availability of necessary replacement parts for normal repairs or maintenance to keep the generator set operating, a 48 hours parts guarantee will be part of the warranty. In effect, those parts not provided within 48 hours or order will be provided free of charge to the customer. Also, if repairs necessary to keep the generator set in operating condition are not completed within 48 hours, a temporary generator set of sufficient capacity will be delivered to the user site at no cost to the user.

--- END OF SECTION ---