

COPY NO. _____

**FORGE ROAD TANK AND
SAUNDERSTOWN WATER TANK
MIXING PROJECT**

**TOWN OF NORTH KINGSTOWN
NORTH KINGSTOWN, RI**

**BIDDING AND CONTRACT REQUIREMENTS
AND SPECIFICATIONS**

JANUARY 2023

BID DOCUMENTS

20820

TOWN OF NORTH KINGSTOWN
NORTH KINGSTOWN, RI
BIDDING AND CONTRACT REQUIREMENTS
AND SPECIFICATIONS
FOR
FORGE ROAD TANK AND
SAUNDERSTOWN WATER TANK
MIXING PROJECT

JANUARY 2023
BID DOCUMENTS



Prepared By:
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Town of
NORTH KINGSTOWN, RHODE ISLAND

100 Fairway Drive
North Kingstown, RI 02852-6202
Phone: (401) 291-3331
Fax: (401) 583-7125
www.northkingstown.org

INVITATION FOR BIDS
FORGE ROAD TANK AND SAUNDERSTOWN
WATER TANK MIXING PROJECT
DEPARTMENT OF WATER SUPPLY

*Sealed bids for the above will be accepted at the Town of North Kingstown Municipal Offices, ATTN: Purchasing/Finance, 100 Fairway Drive, North Kingstown, Rhode Island 02852, and clearly marked with the name of the item bid, and the date and time of opening, until **10:00am on Thursday, February 9, 2023.** The bids will be publicly opened and read aloud.

Site visits may be scheduled by contacting Tim Cranston, Director of Water Supply at (401) 268-1520 or gcranston@northkingstown.org. There will be no site visits scheduled after **Fri-day, January 27, 2023**. Questions are to be submitted to Purchasing/Finance tmcdavitt@northkingstown.org by **Wednesday, February 1, 2023** at 4:30pm.

An Addendum, if necessary, will be posted NO LATER than **Tuesday, February 7, 2023** at 10:00am answering any questions submitted at the site visits and/or email.

NO BIDS WILL BE ACCEPTED AFTER THE THURSDAY,
FEBRUARY 9, 2023 10:00AM DEADLINE.

IT IS THE RESPONSIBILITY OF THE PROSPECTIVE BIDDERS TO MONITOR THE TOWN AND/OR STATE OF RHODE ISLAND PURCHASING WEBSITES FOR ANY SUBSEQUENT BID ADDENDUM. NO ADDENDA WILL BE ISSUED OR POSTED WITHIN FORTY-EIGHT (48) HOURS OF THE BID SUBMISSION DEADLINE.

The bid will be evaluated as to R.I.G.L. 45-55-5. (2) "Competitive Sealed Bidding" and the award shall be made on the basis of the lowest evaluated or responsive bid price.

Specifications may be obtained at the Purchasing Agent's Office at address listed above.

A certificate of Insurance showing \$1 million General Liability and \$1 million Any Auto, with the Town being named as an additional insured, Worker's Compensation, with a waiver of subrogation will be required of the successful bidder.

The Town of North Kingstown reserves the right to reject any or all proposals or parts thereof; to waive any formality in same, or accept any proposal deemed to be in the best interest of the Town.

The Town of North Kingstown will provide interpreters for the hearing impaired at any pre-bid or bid opening, provided a request is received three (3) days prior to said meeting by calling 294-3331, ext. 142.

***PLEASE SUBMIT ONE (1) ORIGINAL,
AND ONE (1) FLASHDRIVE WITH PDF COPY OF SUBMISSION.**

**TOWN OF NORTH KINGSTOWN, RHODE ISLAND
FORGE ROAD TANK AND SAUNDERSTOWN WATER TANK
MIXING SYSTEMS**

BID FORM

TO: Town of North Kingstown
100 Fairway Drive
North Kingstown, RI 02852
ATTN: Tim McDavitt, Purchasing/Finance

Proposal of _____ (hereinafter called "**BIDDER**"), organized and existing under the laws of the State of _____ doing business as _____* to the **TOWN OF NORTH KINGSTOWN, RHODE ISLAND** (hereinafter called "OWNER"):

In compliance with our Advertisement for Bids, BIDDER hereby proposes to furnish and perform all work in accordance with the Plans, Specifications and Contract Documents, within the time set forth therein, and at the prices stated on the attached Bid Form.

In accordance with Article 6. Obligations of the Bidder, of the Information for Bidders, the BIDDER shall explain in detail and attach to this proposal any exceptions or deviations from the provisions contained in the Technical Specifications.

In accordance with Article 14. Insurance, of the Information for Bidders, the BIDDER shall provide a certificate of insurance covering all operations under this contract. The certificate of insurance meeting all conditions set forth therein shall be submitted prior to award of contract.

By submission of this bid, the BIDDER acknowledges to have inspected the project sites and report any irregularities and/or unusual conditions to the Owner.

By submission of this bid, the BIDDER certifies, and in the case of a joint bid each party thereto certifies as to his own organization, that his bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this bid with any other bidder or with any competitor.

DATE OF SUBSTANTIAL COMPLETION: _____

BIDDER acknowledges receipt of the following ADDENDA:

ADDENDUM _____	DATED _____
ADDENDUM _____	DATED _____
ADDENDUM _____	DATED _____

*Insert, "A corporation, a partnership", or "an individual" as applicable.

**TOWN OF NORTH KINGSTOWN, RHODE ISLAND
WELL STATION REHABILITATION**

BID FORM

BASE BID: _____ **DATE** _____

Contractor's Name: _____

Address: _____

To: Town of North Kingstown/Finance Department.

The undersigned Contractor proposes to furnish all materials and labor to perform the scope of work outlined in Section 01010, if more work from unforeseen conditions is required, this must be discussed with the Town to come up with a time and material cost that is agreed upon by the Town and contractor. All debris is to be removed from site and be disposed in the appropriate manner. Warranty to include 100% labor and material. A North Kingstown Building Permit is required for this work.

BID ITEMS

<u>Item No.</u>	<u>Description</u>	<u>Est. Quantity</u>	<u>Unit</u>	<u>Total</u>
1.	<u>Mobilization & Demobilization</u> _____ Dollars Lump Sum	1	LS	\$ _____
2.	<u>Installation of Mixing System at Forge Road Tank</u> _____ Dollars Lump Sum	1	LS	\$ _____
3.	<u>Installation of Mixing System at Saunderstown Tank</u> _____ Dollars Lump Sum	1	LS	\$ _____

TOTAL BID PRICE

_____ Dollars \$ _____
Written Amount

The quantities shown above are estimates only. The town does not guarantee the amounts and advises

that they could be more or less without adjustment in the unit price to be paid to the Contractor. The bid total shall be used for comparison of proposals.

The BIDDER understands that the OWNER reserves the right to reject any or all bids and to waive any informality in the bidding.

The BIDDER agrees that this bid shall be good and may not be withdrawn for a period of ninety (90) calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of his bid, the BIDDER will execute the formal contract attached within 10 days and deliver a performance bond and a labor and material payment bond as required by the General Conditions.

Is to become the property of the OWNER in the event the contract and bonds are not executed with the time above set forth, as liquidated damages for the delay and additional expense to the OWNER caused thereby.

The undersigned declares: that the only person interested in this proposal as principals are named herein as such; that no official of the OWNER and no person acting for or employed by the OWNER is interested directly or indirectly in this proposal or in any contract which may be made under it, or in any expected profits to arise therefore; that this proposal is made in good faith, without fraud, collusion or connection with any other person bidding or refraining from bidding for the same work; that he has examined carefully the said instructions and all other documents bound herewith, and the contract drawings relating to the contract covered by this proposal and hereby makes them part of this proposal; that he has informed himself fully in regard to all conditions pertaining to the work and carefully checked his estimates of cost and from them makes this proposal.

Respectfully submitted:

Contractor (BIDDER)

SEAL-
If bid is by a Corporation

By _____
Signature & Title

Address: _____

Telephone: _____

SELECTION CRITERIA

The bid will be evaluated as to R.I.G.L. 45-55-5.2(2) “Competitive Sealed Bidding” and the award shall be made on the basis of the lowest evaluated or responsive bid price from a qualified vendor.

The following factors will be considered in determining the lowest evaluated or responsive bid price:

- Competence to perform the services as reflected by technical training and education; general experience in providing the required services; and the qualifications and competence of persons who would be assigned to perform the services.
- Ability to perform the services as reflected by workload and the availability of adequate personnel, equipment, and facilities to perform the service expeditiously; and
- Past performance as reflected by the evaluation of private persons and officials of other Governmental and Utility entities that have retained the services of the vendor with respect to such factors as control of costs, quality of work, and an ability to meet deadlines;
- Demonstrated experience in the type of work required;
- Record of the vendor in accomplishing work on similar projects in the required time: (List references and listing of like projects completed or currently in progress on Experience Sheet.) Completion of Experience Sheet is required for bid consideration;
- Quality of work previously performed by the vendor for the Town of North Kingstown, if any;
- Meets or exceeds Insurance Requirements;
- Review of Bidder’s Qualification Statement;
- Review of Subcontractors;
- Time schedule for completion MUST BE SUBMITTED ON BID FORM;
- Rhode Island Contractors License number as issued by the State of Rhode Island, if required;
- Bid Price;
- Early Payment Discount;
- Acknowledgement of Bid Addenda (if any) – SEE BID FORM.

TOWN OF NORTH KINGSTOWN, RHODE ISLAND INFORMATION FOR BIDDERS

ARTICLE 1. RECEIPT AND OPENING OF BIDS

Sealed bids must be submitted in SEALED ENVELOPES, addressed to the **Town of North Kingstown Municipal Offices, ATTN: Purchasing/Finance, 100 Fairway Drive, North Kingstown, Rhode Island 02852,** and clearly marked with the name of the item bid, and the date and time of opening. Bids will be received by the Purchasing Agent up to the specified time as noted on the Invitation to Bid, and publicly opened and read aloud at the specified time.

Proposals submitted for a specified item must not be combined under the same cover with any other bid item.

It is the bidder's responsibility to see that their bid is delivered within the time and at the place prescribed. Proposals received prior to the time of opening will be securely kept unopened. No responsibility will attach to any officer or person for the premature opening of a proposal not properly addressed and identified.

Any bid received after the time and date specified shall not be considered, by messenger or by mail, even if it is determined by the Town that such non-arrival before the time set for opening was due solely to delay in the mails for which the bidder is not responsible. Conditional or qualified bids will not be accepted.

ARTICLE 2. PREPARATION OF BID

Each bid must be submitted on the prescribed form. All blank spaces for bid prices must be filled in, in ink or typewritten, both in words and figures. Erasures or other changes must be explained or noted over the signature of the bidder.

Each bid must be submitted in sealed envelopes, clearly labeled, so as to guard against opening prior to the time set therefore.

The Town may consider any bid not prepared and submitted in accordance with the provisions hereof and reserves the right to reject any or all proposals in whole or in part, toward any item, group of items, or total bid; to waive any technical defect or formality in same, or to accept any proposal deemed to be in the best interest of the Town.

ARTICLE 3. TELEGRAPHIC MODIFICATION

Telephonic, telegraphic or oral bids, amendments or withdrawals will not be accepted.

ARTICLE 4. WITHDRAWAL OF BIDS

Bids may be withdrawn personally or by written request at any time prior to the time specified for the opening. Bids may be modified in the same manner. Negligence on the part of

the bidder in preparing the bid confers no right of withdrawal or modifications of their bid after such bid has been opened.

ARTICLE 5. QUALIFICATIONS OF THE BIDDER

The Town reserves the right to request each bidder to present evidence that they are normally engaged in purveying the type of product or equipment bid on. No bid shall be considered from bidders who are unable to show that they are normally engaged in purveying the type of product or equipment specified in the bid proposal.

To receive full consideration, the bidder must submit literature and necessary details, when applicable, on the material or service they propose to furnish in order that the Town may have full information available when analyzing the proposals.

ARTICLE 6. OBLIGATIONS OF THE BIDDER

At the time of opening of bids, each bidder will be presumed to have inspected the Specifications and Contract Documents (including all addenda) which has been sent to the address given by such bidder. The failure or omission of any bidder to receive or examine any form, instrument, or document shall in no way relieve any bidder from any obligation in respect to their bid.

Any exceptions or deviations from the provisions contained in this Specification must be explained in detail and attached to proposal. If such deviations do not depart from the intent of this notice and are in the best interest of the Town, the proposal will receive careful consideration.

ARTICLE 7. "OR EQUAL" BIDDING

The Town intends to permit liberal scope in bidding and specifically does not intend to limit bidding to any one make or model. Whenever a material, article or piece of equipment is identified by reference to manufacturers' or vendors' names, trade names, catalogue numbers, etc., it is intended merely to establish a standard; and any proposed material, article, or equipment of other manufacturers and vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided it is in the opinion of the Town to be of equal substance and function.

ARTICLE 8. PRICES

Bidders shall state the proposed price in the manner as designated in the Bid Proposal Form. In the event that there is a discrepancy between unit prices and the extended totals, the unit prices shall govern. In the event that there is a discrepancy between the price written in words and written in figures, the prices written in words shall govern.

The prices in this bid shall be irrevocable for ninety (90) days, or until the bid is awarded by the Town Council. After award by the Town Council, said prices shall then remain firm for the duration of the Contract.

ARTICLE 9. TAX EXEMPTIONS

The Town is exempt from payment of the Rhode Island Sales Tax under the 1956 General Laws of the State of Rhode Island, 44-18-30 Para. I, as amended. The Town is exempt from payment of Federal Excise Taxes. The prices bid must be exclusive of taxes and will be so construed. Exemption certificates will be completed as required by the successful bidder.

ARTICLE 10. CONTRACT PERIOD AND TERM OF AGREEMENT (*When Applicable to Bid*)

Contract period is found in the Standard Form of Agreement. If financially advantageous to the Town of North Kingstown, these contracts may be renewed or extended, from time to time, when agreed to, in writing, by both parties.

ARTICLE 11. LABOR REGULATIONS

The following paragraphs regarding nondiscrimination in employment shall be included and become part of these specifications:

- a. Contractors shall comply with the provisions of the General Laws of Rhode Island and attention is called to Title 37, Chapter 13, Section 1-16, relative to the payment of wages, obligations and charges by Contractors on public works projects.
- b. Non-resident Contractors are subject to Section 44-1-6 of the Rhode Island General Laws, as amended. (OUT OF STATE CONTRACTORS.)
- c. The successful bidder will be required to comply with the Davis-Bacon Act (40 USC 2 to a-7) as supplemented by Department of Labor regulations (29CFR Part 5).
- d. The successful bidder will be required to comply with the Contract Works Hours and Safety Standards Act (40 USC 327-330) as supplemented by Dept. of Labor Regulations (29CFR, Part 5).
- e. The successful bidder will be required to comply with Executive Order 11246, entitled Equal Employment Opportunity, as amended, and as supplemented in Department of Labor regulations (41 CFR Part 60).
- f. The successful bidder will be required to comply with the Copeland "Anti-Kickback" Act (18 USC 874) as supplemented in Department of Labor regulations (29 CFR, Part 3).
- g. The successful bidder will be required to comply with the Safety and Health regulations (29 CFR, Part 1926 and all subsequent amendments) as promulgated by the Department of Labor.
- h. The successful bidder will be required to comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352).

ARTICLE 12. INSURANCE

The Vendor shall assume responsibility and liability for all injuries to persons or damages to property, directly or indirectly due to, or arising out of, their operations under the contract and shall be responsible for the proper care and protection of all work performed until completion and final acceptance by the Town.

The Vendor shall also indemnify and save harmless the Town of North Kingstown against any and all claims of whatever kind and nature due to, or arising out of, their breach or failure to perform any of the terms, conditions, or covenants of the contract resulting from acceptance of their bid.

The Vendor shall furnish the Purchasing Agent with certificates of insurance from companies acceptable to the Town of North Kingstown. All insurance companies listed on certificates must be licensed to do business in the State of Rhode Island. The Vendor shall provide a certificate of insurance as specified in the bid specifications. Contracts of insurance (covering all operations under this contract) shall be kept in force until the contractor's work is acceptable by the Town.

The limits of the insurance must be at least in the amounts specified below;*

1. Commercial General Liability-Occurrence Form \$1,000,000/\$1,000,000.
2. Automobile Liability - \$1,000,000. With both of the above naming the Town as additional insured.
3. Worker's Compensation (if legally allowed and available). Waiver of subrogation applies to Worker's Compensation

The Vendor shall secure, pay for and maintain insurance as necessary to protect themselves against loss of owned or rented capital equipment and tools, with provision for waiver of subrogation against the Owner, and shall secure, pay for and maintain insurance as necessary to protect against errors and omissions which may result from this project.

ARTICLE 13. LAWS, ORDINANCES, AND CODES

All applicable Federal and State Laws, Ordinances and Codes of the Town of North Kingstown and regulations of all authorities having jurisdiction over this Project shall apply to this contract the same as though written herein in full.

The Town of North Kingstown will not award the Contract to any Contractor who is, at the time, ineligible under the provisions of any applicable regulations issued by the Secretary of Labor, United State Department of Labor, or is not qualified under applicable Ordinances of the Town of North Kingstown, or the laws of the State of Rhode Island.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that of _____ as Principal, hereinafter called Contractor, and, as Surety, hereinafter called Surety, are held firmly bound unto the **TOWN OF NORTH KINGSTOWN, RHODE ISLAND** as obligee, hereinafter called Owner, in the amount of \$ _____ in lawful money of the United States for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Contractor entered into a certain contract with the Owner, dated the _____ day of _____ 2023 a copy of which is hereto attached and made a part hereof for the reconstruction of:

FORGE ROAD TANK AND SAUNDERSTOWN WATER TANK MIXING PROJECT DEPARTMENT OF WATER SUPPLY

for the **TOWN OF NORTH KINGSTOWN, RHODE ISLAND**, in accordance with the Contract and the Contract Documents.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise, it shall remain in full force and effect subject, however, to the following conditions:

1. The Surety, for valued received, hereby stipulates and agrees that no change, extension of time, alteration, or condition to the terms of the contract or to WORK to be performed there under or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.
2. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
3. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.
4. No suit or action shall be commenced hereunder by any claimant;
 - (a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety (90) days after such claimant did or

performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

- (b) After expiration of one (1) year following the date on which Principal ceased Work on said Contract, or one (1) year from the date on which final payment under the contract falls due, whichever is later, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
- (c) Other than a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

5. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this ____ day of _____, 2023.

WITNESS

BY: _____

WITNESS

BY: _____

IMPORTANT: Surety Companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be Authorized to transact business in the state where the PROJECT is located.

LABOR & MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that of _____ as Principal, hereinafter called Contractor, and, as Surety, hereinafter called Surety, are held firmly bound unto the **TOWN OF NORTH KINGSTOWN, RHODE ISLAND** as obligee, hereinafter called Owner, in the amount of \$ _____ in lawful money of the United States for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Contractor entered into a certain contract with the Owner, dated the _____ day of _____ 2023 a copy a copy of which is hereto attached and made a part hereof for the reconstruction of:

FORGE ROAD TANK AND SAUNDERSTOWN WATER TANK MIXING PROJECT DEPARTMENT OF WATER SUPPLY

for the **TOWN OF NORTH KINGSTOWN, RHODE ISLAND**, in accordance with the Contract and the Contract Documents.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise, it shall remain in full force and effect subject, however, to the following conditions:

1. The Surety, for valued received, hereby stipulates and agrees that no change, extension of time, alteration, or condition to the terms of the contract or to WORK to be performed there under or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.
2. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
3. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.
4. No suit or action shall be commenced hereunder by any claimant;
 - (a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety (90) days after such claimant did or

performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

- (b) After expiration of one (1) year following the date on which Principal ceased Work on said Contract, or one (1) year from the date on which final payment under the contract falls due, whichever is later, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
- (c) Other than a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

5. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this _____ day of _____, 2023.

WITNESS

BY: _____

WITNESS

BY: _____

IMPORTANT: Surety Companies executing BONDS must appear on the Treasury Department’s most current list (Circular 570 as amended) and be Authorized to transact business in the state where the PROJECT is located.

LAWS PERTAINING TO PUBLIC WORKS PROJECTS
(General Laws of Rhode Island [1977 Reenactment])

37-13-5. Payment for trucking or materials furnished – Withholding of sums due. –A contractor or subcontractor on public works authorized by a proper authority shall pay any obligation or charge for trucking and material which have been furnished for the use of the contractor or subcontractor, in connection with the public works being performed by them within ninety (90) days after the obligation or charge is incurred or the trucking service has been performed or the material has been delivered to the site of the work, whichever is later. When it is brought to the notice of the proper authority in a city or town, or the proper authority in the state having supervision of the contract, that the obligation or charge has not been paid by the contractor or subcontractor, the proper authority may deduct and hold for a period not exceeding sixty (60) days, from sums of money due to the contractor or subcontractor, the equivalent amount of such sums certified by a trucker or materialman creditor as due them as provided in this section, and which the proper authority determines is reasonable for trucking performed or materials furnished for the public works.

37-13-6. Ascertainment of prevailing rate of wages and other payments-Specifications of rate in call for bids and in contract. –Before awarding any contract for public works to be done, the proper authority shall ascertain from the director of labor and training the general prevailing rate of the regular, holiday, and overtime wages paid and the general prevailing payments on behalf of employees only, to lawful welfare, pension, vacation, apprentice training, and educational funds (payments to the funds must constitute an ordinary business expense deduction for federal income tax purposes by contractors) in the city, town, village, or other appropriate political subdivision of the state in which the work is to be performed, for each craft, mechanic, teamster, laborer, or type of worker needed to execute the contract for the public works. The proper authority shall, also, specify in the call for bids for the contract and in the contract itself the general prevailing rate of the regular, holiday, and overtime wages paid and the payments on behalf of employees only, to the welfare, pension, vacation, apprentice training, and education funds existing in the locality for each craft, mechanic, teamster, laborer, or type of worker needed to execute the contract or work.

37-13-7. Specifications in contract of amount and frequency of payment of wages. – (a) Every call for bids for every contract in excess of one thousand dollars (\$1,000), to which the State of Rhode Island or any political subdivision thereof or any public agency or quasi-public agency is a party, for construction, alteration, and/or repair, including painting and decorating, of public buildings or public works of the State of Rhode Island or any political subdivision thereof, or any public agency or quasi-public agency and which requires or involves the employment of employees, shall contain a provision stating the minimum wages to be paid various types of employees which shall be based upon the wages that will be determined by the director of labor and training to be prevailing for the corresponding types of employees employed on projects of a character similar to the contract work in the city, town, village, or other appropriate political subdivision of the State of Rhode Island in which the work is to be performed. Every contract shall contain a stipulation that the contractor or their subcontractor shall pay all the employees employed directly upon the site of the work, unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment computed at wage rates no less than those stated in the call for bids, regardless of any

contractual relationships which may be alleged to exist between the contractor or subcontractor and the employees, and that the scale of wages to be paid shall be posted by the contractor in a prominent and easily accessible place at the site of the work; and the further stipulation that there may be withheld from the contractor so much of the accrued payments as may be considered necessary to pay to the employees employed by the contractor, or any subcontractor on the work, the difference between the rates of wages required by the contract to be paid the employees on the work and the rates of wages received by the employees and not refunded to the contractor, subcontractors, or their agents.

(b) The terms “wages”, “scale of wages”, “wage rates”, “minimum wages”, and “prevailing wages” shall include:

(1) The basic hourly rate of pay; and

(2) The amount of:

(A) The rate of contribution made by a contractor or subcontractor to a trustee or to a third person pursuant to a fund, plan, or program; and

(B) The rate of costs to the contractor or subcontractor which may be reasonably anticipated in providing benefits to employees pursuant to an enforceable commitment to carry out a financially responsible plan or program which was communicated in writing to the employees affected, for medical or hospital care, pension on retirement or death, compensation for injuries or illness resulting from occupational activity, or insurance to provide any of the foregoing, for unemployment benefits, life insurance, disability and sickness insurance, or accident insurance, for vacation and holiday pay, for defraying costs of apprenticeship or other similar programs, or for other bona fide fringe benefits, but only where the contractor or subcontractor is not required by other federal, state, or local law to provide any of the benefits; provided, that the obligation of a contractor or subcontractor to make payment in accordance with the prevailing wage determinations of the director of labor and training insofar as this chapter of this title and other acts incorporating this chapter of this title by reference are concerned may be discharged by the making of payments in cash, by the making of contributions of a type referred to in subsection (b)(2), or by the assumption of an enforceable commitment to bear the costs of a plan or program of a type referred to in this subdivision, or any combination thereof, where the aggregate of any payments, contributions, and costs is not less than the rate of pay described in subsection (b)(1) plus the amount referred to in subsection (b)(2).

(C) The term “employees”, as used in this section, shall include employees of contractors of subcontractors performing jobs on various types of public works including mechanics, apprentices, teamsters, chauffeurs, and laborers engaged in the transportation of gravel or fill to the site of public works, the removal and/or delivery of gravel or fill or ready-mix concrete, sand, bituminous stone, or asphalt Flowable fill from the site of public works, or the transportation or removal of gravel or fill from one location to another on the site of public works, and the employment of the employees shall be subject to the provisions of subsection (a) and (b).

(D) Omitted.

STANDARD FORM OF AGREEMENT

Owner and Contractor

where the basis of payment is a
STIPULATED SUM

AGREEMENT

Made as of the _____ day of _____ in the year Two Thousand and Twenty-_____,

BETWEEN the Owner: Town of North Kingstown
(Name and address) 100 Fairway Drive
 North Kingstown RI, 02852-6202

and the Contractor: _____
(Name and address) _____

The Project is:

**FORGE ROAD TANK AND SAUNDERSTOWN WATER TANK MIXING PROJECT
DEPARTMENT OF WATER SUPPLY**

The Owner and Contractor agree as set forth below:

ARTICLE 1

THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement; these form the Contract and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral, and includes the bid specifications and all documentation incorporated into the request for bids. The Contractor proposes to furnish all materials and labor to perform the scope of work as outlined on the scope of work. If unforeseen conditions require additional materials and labor, this must be discussed with the Town to come up with a time and material cost that is agreed upon by the Town and contractor.

All debris is to be removed from site and be disposed in the appropriate manner. Warranty to include 100% labor and material per manufacturing defects, including workmanship warranty, contractor to indicate coverage in proposal. A North Kingstown Building Permit is required for this work.

ARTICLE 2
THE WORK OF THIS CONTRACT

The Contractor shall execute the entire Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others, or as follows:

ARTICLE 3
DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

- 3.1 The date of commencement is the date from which the Contract Time of Paragraph 3.2 is measured, and shall be the date of this Agreement, as first written above, unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.
(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

DATE SHALL BE SET IN THE NOTICE TO PROCEED AS WEATHER PERMITS.

Unless the date of commencement is established by a notice to proceed issued by the Owner, the Contractor shall notify the Owner in writing not less than five days before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

- 3.2 The Contractor shall achieve Substantial Completion of the entire work no later than the date submitted on the Bid Form, subject to adjustments of this Contract Time as provided in the Contract Documents.

Liquidated Damages = \$100.00 per Day

ARTICLE 4
CONTRACT SUM

- 4.1 The Owner shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Sum of _____ subject to additions and deductions as provided in the Contract Documents.

- 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If decisions on other alternates are to be made by the Owner subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date until which that amount is valid.)

- 4.3 Unit prices, if any, defined in bid proposal.

ARTICLE 5
PROGRESS PAYMENTS

- 5.1 Based upon Applications for Payment submitted to the Owner by the Contractor, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.
- 5.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

5.3 OMITTED.

5.4 Each Application for Payment shall be based upon the Schedule of Values submitted by the Contractor in accordance with the Contract Documents. The Schedule of Values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Owner may require. This Schedule, unless objected to by the Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment.

5.5 Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

5.6 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

5.7 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the Percentage of completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the Schedule of Values, less retainage of five percent (5%).

5.6.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of five percent (5%).

5.6.3 Subtract the aggregate of previous payments made by the Owner; and

5.6.4 Subtract amounts, if any, for which the Owner has withheld or nullified an Application for Payment.

5.7.1 The progress payment amount determined in accordance with Paragraph 5.6 shall be further modified under the following circumstances:

5.7.2 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to ninety-eight percent (98%) of the Contract Sum, less such amounts as the Engineer shall determine for incomplete Work and unsettled claims.

ARTICLE 6 **FINAL PAYMENT**

6.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when:

6.1.1 The Contract has been fully performed by the Contractor; and

6.1.2 A final Application for Payment has been issued by the Contractor.

6.2 Such final payment shall be made by the Owner not more than 45 days after the issuance of the Final Application for Payment, or as follows:

(Usury laws and requirements under the Federal Truth in Lending Act, similar state and local consumer credit laws and other regulations at the Owner's and Contractor's principal places of business, the location of the Project and elsewhere may affect the validity of this provision.) Legal advice should be obtained with respect to deletions or modifications, and also regarding requirements such as written disclosures or waivers.

ARTICLE 7
MISCELLANEOUS PROVISIONS

7.1 Other provisions:

7.2 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

7.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located. (Insert rate of interest agreed upon, if any.)

ARTICLE 8
TERMINATION OR SUSPENSION

8.1 The Contract may be terminated by the Owner or the Contractor as provided in Articles 13, 54 & 55 of the General Conditions.

8.2 The Work may be suspended by the Owner as provided in Article 60 of the General Conditions.

This Agreement is entered into as of the day and year first written above and is executed in at least three original copies of which one is to be delivered to the Contractor and the remainder to the Owner.

OWNER

CONTRACTOR

(Signature)

(Signature)

A Ralph Mollis, Town Manager
(Printed name and title)

(Printed name and title)

MUNICIPAL CONTRACT ADDENDUM
RHODE ISLAND DEPARTMENT OF LABOR AND TRAINING
PREVAILING WAGE REQUIREMENTS
(37-13-1 ET SEQ.)

The prevailing wage requirements are generally set forth in RIGL 37-13-1 et seq. These requirements refer to the prevailing rate of pay for regular, holiday, and overtime wages to be paid to each craftsman, mechanic, teamster, laborer, or other type of worker performing work on public works projects when state or municipal funds exceed one thousand dollars (\$1,000).

All Prevailing Wage Contractors and Subcontractors are required to:

1. Submit to the Awarding Authority a list of the contractor's subcontractors for any part or all of the prevailing wage work in accordance with RIGL 37-13-4;
2. Pay all prevailing wage employees at least once per week and in accordance with RIGL 37-13-7;
3. Post the prevailing wage rate scale and the Department of Labor and Training's prevailing wage poster in a prominent and easily accessible place on the work site in accordance with RIGL 37-13-11; posters may be downloaded at <http://www.dlt.ri.gov/lmi/business/post/htm> or obtained from the Department of Labor and Training, Center General Complex, 1511 Pontiac Avenue, Cranston, Rhode Island;
4. Access the Department of Labor and Training website, at www.dlt.ri.gov on or before July 1st of each year, until such time as the contract is completed, to ascertain the current prevailing wage rates and the amount of payment for contributions for each covered prevailing wage employee and make any necessary adjustments to the covered employee's prevailing wage rates effective July 1st of each year in compliance with RIGL 37-13-8;
5. Attach a copy of this CONTRACT ADDENDUM and its attachments as a binding obligation to any and all contracts between the contractor and any subcontractors and their assignees for prevailing wage work performed pursuant to this contract;
6. Provide for the payment of overtime for prevailing wage employees who work in excess of eight (8) hours in any one day or forty (40) hours in any one work as provided by RIGL 37-13-10;
7. Maintain accurate prevailing wage employee payroll records on a Rhode Island Certified Weekly Payroll form available for download at <http://www.dlt.ri.gov/pw/pwFormsPubs.htm>, as required by RIGL 37-13-13, and make those records available to the Department of Labor and Training upon request;

8. Furnish the fully executed RI Certified Weekly Payroll form to the awarding authority on a monthly basis for all work completed in the preceding month.
9. For general or primary contracts one million dollars (\$1,000,000) or more, shall maintain on the work site a fully executed RI Certified Prevailing Wage Daily Log listing the contractor's employees employed each day on the public works site; the RI Certified Prevailing Wage Daily Log shall be available for inspection on the public works site at all times; this rule shall not apply to road, highway, or bridge public works projects. Where applicable, furnish both the Rhode Island Certified Prevailing Wage Daily Log together with the Rhode Island Weekly Certified Payroll to the awarding authority.
10. Any violation of RIGL 37-13-13 of Certified Weekly Payroll Forms and Daily Logs will result in the department imposing a penalty on the contractor of a minimum of one hundred dollars (\$100) for each calendar day of noncompliance.
11. Assure that all covered prevailing wage employees on construction projects with a total project cost of one hundred thousand dollars (\$100,000) or more has an OSHA ten (10) hour construction safety certification in compliance with RIGL 37-23-1;
12. Assure that all prevailing wage employees who perform work which requires a Rhode Island trade license possess the appropriate Rhode Island trade license in compliance with Rhode Island law; and
13. Comply with all applicable provision of RIGL 37-13-1, et.seq;

Any questions or concerns regarding this CONTRACT ADDENDUM should be addressed to the contractor or subcontractor's attorney. Additional Prevailing Wage information may be obtained from the Department of Labor and Training at www.dlt.ri.gov/pw.

CERTIFICATION

I hereby certify that I have reviewed this CONTRACT
ADDENDUM and understand my obligations as stated above.

By: _____

Title: _____

Subscribe and sworn before me this ____day of _____, 2023.

Notary Public

My commission expires: _____

GENERAL WAGE DECISION

The State of Rhode Island Department of Labor, Division of Professional Regulation General Decision Modification document current as of the bid issuance date for this Project, is an integral part of the Bid Documents for use in fulfilling prevailing wage rate requirements. A copy is available on the web site of the State of Rhode Island Department of Administration, Division of Purchases.

The Division of Purchases Web Site Address: www.purchasing.ri.gov

Click on “General Information”; under “Information Options”; click on “Prevailing Wage Tables”.

In accordance with RIGL 37-13-13; every Contractor and Subcontractor awarded a contract for Town projects shall submit completed RI Certified Weekly Payroll forms listing employees employed on the project to the Awarding Authority (Town of North Kingstown Representatives) on a monthly basis for all work completed in the preceding month. Awarding Authorities, Contractors and Subcontractors shall provide any and all payroll records to the RI Department of Labor & Training within ten (10) days of any request that is made by the department.

END OF GENERAL DECISION

CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES.

At points where the Contractor's operations are adjacent to properties of National Grid damage to which might result in considerable expense, loss or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

The Contractor shall cooperate with the gas company in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

In the event of contact with or damage to any gas facilities or its protective coating; interruption to gas service as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify National Grid and shall cooperate fully with National Grid in the restoration of service.

Upon the receipt of said notice, National Grid shall immediately dispatch personnel to the subject location to effect temporary or permanent repair of the damage. Under no circumstances shall the excavator back-fill or conceal the damaged area until National Grid arrives at the subject location. Upon the occurrence of the escape of gas from a broken line, the person or public agency responsible for the operations causing the damage shall evacuate the immediate area while awaiting the arrival of National Grid personnel.

Location and depth of existing gas lines as shown on the plans are estimated and should not be relied upon by the Contractor. The Contractor shall check and verify the location of all gas lines underground before proceeding to begin the work or to order materials. Excavation shall be in accordance with all statutes, ordinances, rules and regulations of any city, state or Federal Agency that may be applicable. Any damage to the existing utilities as marked by Dig Safe or as shown on the plans arising out of said excavation or by reason thereof shall be the Contractor's sole responsibility.

It is understood and agreed that the Contractor has considered in their bid all of the permanent and temporary utility appurtenances in their approximate or relocated positions as shown on the plans and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by them due to any interference from the said utility appurtenances of the operation of moving them.

The Contractor shall furnish National Grid with a "Progress Schedule" or "Critical Path Schedule" within thirty (30) days of the bid opening. The municipality will schedule the pre- construction conference after the "Progress Schedule" or "Critical Path Schedule" has been received and approved. The progress schedule shall show the proposed order of work and shall indicate the time required for the completion of the several items of work.

The progress schedule may be used as the basis for establishing major construction operations and as a check on the progress of the work. The schedule shall be updated as required and be kept current during the life of the project.

CONSTRUCTION METHODS. Backfilling around a gas main shall consist of suitable materials (gravel or padding sand) placed in layers of not more than 8 inches after compaction. Compaction shall be achieved by mechanical tampers, vibrators or rammers. Backfill under gas facilities shall be compacted to not less than 95% of maximum density. Unless otherwise directed, the backfill shall be brought to the surface of the surrounding ground and neatly graded.

TRAINING. Prior to start of construction it is highly recommended that the Contractor's field personnel receive training on subjects relating to natural gas pipelines. This training will be provided by National Grid at no charge to the Contractor. Please contact National Grid C & M Trainer at 272-5040, ext. 575 to make arrangements.

R. I. G. L. 44-1-6 ADDITIONAL COLLECTION POWERS - Nonresident Contractors. –

(a) Any person doing business with a nonresident Contractor shall withhold payment of an amount of three percent (3%) of the contract price until thirty (30) days after the Contractor has completed the contract and has requested the tax administrator, in writing, to audit the records for the particular project, a receipted copy of the request to be furnished to the person holding the funds. The tax administrator shall, within thirty (30) days after receipt of the request, furnish to the nonresident Contractor and to the person holding the funds either a certificate of no tax due or a certificate of sales and use tax or income tax withheld, or both, due from the nonresident Contractor.

(b) Upon receipt of a certificate of no tax due, the person holding the payment may pay the nonresident Contractor. Upon receipt of a certificate of taxes due, the person may pay to the Contractor out of the amount withheld the excess over the amount of taxes set forth in the certificate together with the interest and penalties then assessed. If the tax administrator furnished neither certificate to both parties within thirty (30) days after receipt of a written request for the making of the audit, the person holding the payment may forthwith pay the payment withheld to the nonresident Contractor under the terms of the contract free from any claims of the tax administrator against either the person holding the payment or the nonresident Contractor for payment of sales or use taxes or income taxes withheld, or both.

(c) In the event the tax administrator shall serve upon the Contractor and the person holding the payment a certificate showing the taxes due within a thirty (30) day period, the person holding the payment shall deposit with the tax administrator the amount set forth in the certificate which is not in excess of three percent (3%) of the contract price, taking a receipt for the amount, and shall thereupon be free from any claim of the nonresident Contractor for that amount or of the tax administrator for sales and use taxes or income taxes withheld, or both, arising out of the materials, equipment, and services used in performance of the contract of the nonresident Contractor on that project.

(d) As used in this section, a nonresident Contractor is one who does not maintain a regular place of business in this state. "A regular place of business" means and includes any bona fide office (other than a statutory office), factory, warehouse, or other space in this state at which the taxpayer is doing business in its own name in a regular and systematic manner, and which is continuously maintained, occupied, and used by the taxpayer in carrying on its business through its regular employees regularly in attendance. A temporary office at the site of construction shall not constitute a regular place of business.

For further information, please contact the Rhode Island State Tax Administrator at (401) 222- 6269; or Al Pugliese – (401) 222-3053.

RELEASE OF LIENS

Whereas, the undersigned, have furnished labor or materials or both for the execution of work described in a contract named: _____, dated _____, owned by the Town of North Kingstown, hereinafter called "Owner."

Now, therefore, the undersigned, for and in consideration of the property and of other valuable consideration to each of them paid, the receipt whereof is hereby acknowledged, do hereby release and discharge any and all manner of liens, claims and demands whatsoever which the undersigned on any of them now have or might or could have on or against said property of the Owner thereof for work done or materials furnished as aforesaid, or in any other manner, from the commencement of work on said property to the date hereof.

The Contractor also certifies that all of their sub-Contractors and suppliers which have furnished any labor or materials for an amount of \$500.00 or more, for said job, have signed this Release of Liens.

The Contractor assumes full responsibility to hold the Town of North Kingstown safe and harmless from any lien for materials and/or labor which might occur from aforesaid work.

IN WITNESS WHEREOF, the undersigned have caused this Release of Liens to be duly executed on the respective dates indicated.

By: _____
(Contractor)

(Authorized Signature)

(Date)

Trade (Supplier) / Company Name / Authorized Signature / Date

Contractor may sign if materials and/or Subcontractors charges are \$500.00 or less.

GENERAL CONDITIONS

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PART I

ARTICLE 1: CONTRACT AND CONTRACT DOCUMENTS

The drawings, specifications, and addenda enumerated in Article 1 of the Special Conditions, the Advertisement for Bids, the Information for Bidders, and the Bid Proposal as accepted by the OWNER, shall be binding upon the parties to this Agreement as if fully set forth therein. Whenever the terms Contract Documents is used, it shall mean and include this Contract, Special Conditions, General Conditions, the Information for Bidders, the Bid Proposal, Addenda, the Technical Specifications, and the Drawings. The OWNER shall interpret their own requirements. In case of conflict or inconsistency between the provisions of the signed portions of the Contract Documents and those of the specifications, the provisions of the signed portions shall govern.

ARTICLE 2: DEFINITIONS

The following terms as used in this Contract are defined as follows:

- a) **CHANGE ORDER** - A written order to the Contractor authorizing an addition, deletion or revision in the work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time.
- b) **CONTRACT DOCUMENTS** - The contract, including Advertisement for Bids, Information for Bidders, Bid, Bid Bond, Agreement, Payment Bond, Performance Bond, General Conditions, Special Conditions, Technical Specifications, Notice of Award, Notice To Proceed, Change Order, Drawings, and Addenda.
- c) **CONTRACTOR** - A person, firm or corporation with whom the Contract is made by the OWNER.
- d) **DRAWINGS** - The part of the Contract Documents which show the characteristics and scope of the work to be performed and which have been prepared or approved by the Engineer.
- e) **ENGINEER** - Shall mean for the purpose of this Contract, the firm or Public Works Director who shall act as the authorized representative of the Owner whenever reference is made for such authorization.
- f) **FIELD ORDER** - A written order effecting a change in the work not involving an adjustment in the Contract Price or an extension of the Contract Time, issued by the Engineer to the Contractor during construction.
- g) **NOTICE OF AWARD** - The written notice of the acceptance of the Bid from the Owner to the successful Bidder.
- h) **NOTICE TO PROCEED** - Written communication issued by the Owner to the Contractor authorizing them to proceed with the work and establishing the date of commencement of the work.

- i) OWNER: - shall mean, for the purpose of this Contract, the party as defined in the Agreement section of the Contract Documents.
- j) RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the Owner who is assigned to the Project Site or any part thereof.
- k) SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a Sub-Contractor, Manufacturer, Supplier or Distributor, which illustrate how specific portions of the work shall be fabricated or installed.
- l) SPECIFICATIONS (TECHNICAL SPECIFICATIONS) - A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.
- m) SUBCONTRACTOR - A person, firm, or corporation supplying labor and materials, or only labor, for work at the site of the project; for, and under a separate Contract or Agreement with the CONTRACTOR.
- n) SUBSTANTIAL COMPLETION - That data as certified by the Engineer when the construction of the Project or the specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purpose for which it is intended.
- o) WORK ON THE PROJECT: - Work to be performed at the location of the project, including the transportation of materials and supplies to or from the site by employees of the CONTRACTOR or any SUBCONTRACTOR.

ARTICLE 3: QUANTITIES OF ESTIMATE

Whenever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents including the Bid Proposal; they are given for use in comparing bids and the right is especially reserved by the OWNER to increase or diminish them as may be deemed necessary or desirable by the OWNER. Such increases or decreases shall in no way affect this Contract, nor shall any such increases or decreases give cause for claims or liabilities for damages.

ARTICLE 4: CONFLICTING CONDITIONS

Any provisions of these General Conditions which may be in conflict or inconsistent with any of the articles in the Special Conditions shall be void to the extent of such conflict or inconsistency.

ARTICLE 5: PROVISIONS OF LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or is not correctly inserted, the Contract shall forthwith be physically amended to make such insertion or correction.

ARTICLE 6: NOTICE AND SERVICE THEREOF

The service of any notice, letter, or other communication shall be deemed to have been made by one of the contracting parties on the other party to the Contract when such letter, notice or other communication has been delivered to the legal office address of the addressee, by a duly authorized representative of the address or in person, or when such notice, letter, or other communication has been deposited in any regularly maintained mailbox of the United States Post Office, in a properly addressed, postpaid wrapper. The date of such service shall be considered to be the date of such personal delivery or mailing.

The address of the Contractor noted in their bid and/or the address of their field office on or near the site of work shall be considered their legal address for the purposes as set forth above.

ARTICLE 7: GRATUITIES

- a) If it is found, after notice and hearing, by the Owner that gratuities (in the form of entertainment, gifts or otherwise) were offered or given by the Contractor, or any agent or representative of the Contractor, to any official, employee or agent of the Owner, or of the State, with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performance of this Contract, the Owner may, by written notice to the Contractor, terminate the right of the Contractor to proceed under this Contract or may pursue each other rights and remedies provided by law or under this Contract: Provided, that the existence of the facts upon which the Owner makes such findings shall be in issue any may be reviewed in proceedings pursuant to the "Remedies" clause of this Contract.
- b) In the event this Contract is terminated as provided in Paragraph (a) hereof, the Owner shall be entitled (1) to pursue the same remedies against the Contractor as it could pursue in the event of a breach of the Contract by the Contractor, and (a) as a penalty in addition to any other damages to which it may be entitled by law, to exemplary damages in an amount (as determined by the Owner) which shall be not less than three nor more than ten times the cost incurred by the Contractor in providing any such gratuities to any such officer or employee.

ARTICLE 8: COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this Contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty, the Owner shall have the right to annul this Contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE 9: REMEDIES

Except as may be otherwise provided in this contract, all claims, counterclaims, disputes and other matters in question between the Owner and the Contractor arising out of or relating to this

agreement or the breach thereof will be decided by arbitration if the parties hereto mutually agree, or in a court of competent jurisdiction within the State in which the Owner is located.

PART II

The rights and obligations of the CONTRACTOR under this Contract shall include, but not be limited to the following:

ARTICLE 10: REPRESENTATIONS OF THE CONTRACTOR

The Contractor represents and warrants:

- a) That they are financially solvent and that they are experienced and competent to perform the type of work required under this Contract and that they are able to furnish the plant materials, supplies, or equipment that may be necessary to perform the work as specified.
- b) That they are familiar with all Federal, State and municipal laws, ordinances, orders, and regulations which may in any way affect the project work, or the employment of persons thereon, including but not limited to any special acts relating to the work or to the project of which is a part.
- c) That such temporary and permanent work required by the Contract Documents to be done by them will be satisfactorily constructed and can be used for the purpose for which it was intended and that such construction will not injure any person or damage property.
- d) That they have carefully examined the drawings, specifications, and addenda, if any, and the site of the work and that from their own investigations, they have satisfied themselves as to the nature and location of the work, the character of equipment and other facilities needed for the performance of the work, the general and local conditions, and all other items that may affect the work.
- e) That they are aware of the hazards involved in the work and the danger to life and property both evident and inherent and that they will conduct the work in a careful and safe manner without injury to persons or property.

ARTICLE 11: CONTRACTOR'S OBLIGATIONS

The Contractor shall perform all work in a good Workmanlike manner, and in accordance with the plans and specifications and any supplements thereto, and according to any directions or orders given by the Owner. They shall furnish all supplies, materials, facilities, equipment, and means necessary or proper to perform and complete the work required by this Contract. They shall furnish, erect, maintain, and remove any construction plant or temporary work as may be required. They alone shall be responsible for the safety, efficiency, and adequacy of their plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation.

The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the Contract and specifications and shall do, carry on, and complete the entire work to the satisfaction of the Owner.

The Contractor shall be solely responsible for all the work and shall provide all precautionary measures necessary for preventing injury to persons or damage to property. All injury or damage of whatever nature resulting from the work or resulting to persons, property, or the work during its progress, from whatever cause, shall be the responsibility of the Contractor.

The Contractor shall hold the Owner and Engineer, or their duly authorized agents, harmless and defend and indemnify them against damages or claims for damages due to injuries to persons or property arising out of the execution of the project work, and for damages to materials furnished for the work, for infringement of inventions, patents, and patent rights used in doing the work, and for any act, omission, or instance of neglect by the Contractor, their agents, employees, or sub-Contractors.

The Contractor shall bear all losses resulting to them, including but not limited to losses sustained on account of the character, quality, or quantity of any part of the work, or all parts of the work, or because the nature of the conditions in or on the project site are different from what was estimated or indicated, or on account of the weather, elements, or other causes.

ARTICLE 12: TIME FOR COMPLETION AND LIQUIDATED DAMAGES

It is hereby understood and mutually agreed by and between the Contractor and the Owner that the date of beginning and the time of completion of the work as specified in this Contract are ESSENTIAL CONDITIONS of this Contract, and it is further mutually understood and agreed that the work embraced in this Contract shall be Commenced on a date to be specified in the Notice to Proceed.

- a) The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified, and further that time of completion as agreed upon is reasonable, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
- b) If the said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a partial consideration for the awarding of this Contract, to pay to the Owner the amount specified in the Contract, not as a penalty, but as liquidated damages for such breach of Contract as hereinafter set forth for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the work.
- c) The said amount is fixed and agreed upon by and between the Owner and the Contractor, and said amount is agreed to be the amount of damages the Owner would sustain in such an event as the above-mentioned, and said amount shall be retained from time to time by the Owner from current periodical payments.
- d) It is further agreed that time is of the essence in each and every portion of the Contract and specifications; where in a definite and certain length of time is fixed for the performance of

any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the Contractor shall not be charged when the delay in completion of the work is due to:

- 1) Any preference, priority, or allocation order duly issued by the government, subsequent to the date of the Contract.
- 2) Unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including, but not restricted to acts of God, or of the public enemy, act of the Owner, acts of another contractor, floods, epidemics, strikes, and unusually severe weather.
- 3) Any delays of subcontractors or suppliers approved by the Owner. Provided further that the Contractor shall within ten days (10) from the beginning of the delay, unless the Owner shall grant a further period of time prior to the date of final settlement of the Contract, notify the Owner in writing of the causes of the delay. The Owner shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

ARTICLE 13: TERMINATION FOR DEFAULT; DAMAGES FOR DELAY; TIME EXTENSIONS

- a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified in this Contract, or any extension thereof, or fails to complete said work within such time, the Owner may, by written notice to the Contractor, terminate their right to proceed with the work or such part of the work as to which there has been a delay. In such event, the Owner may take over the work and prosecute the same to completion, by Contract or otherwise, and may take possession of and utilize in completing the work such materials, appliances, and plant as may be on the site of the work and necessary therefore. Whether or not the Contractor's right to proceed with the work is terminated, they and their sureties shall be liable for any damage to the Owner resulting from their refusal or failure to complete the work within the specified time.
- b) If fixed and agreed liquidated damages are provided in the Contract and if the Owner so terminates the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Owner in completing the work.
- c) If fixed and agreed liquidated damages are provided in the Contract and if the Owner does not so terminate the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until the work is completed or accepted.

The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:

- a) The delay in the completion of the work arises from causes other than normal weather beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, acts of the public enemy, acts of the Owner in either its sovereign or contractual capacity, acts of another Contractor in the performance of a Contract with the

Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or delays of subcontractors or suppliers arising from causes other than normal weather beyond the control and without the fault of negligence of both the Contractor and such subcontractors or suppliers; and

- b) The Contractor, within 10 days from the beginning of any such delay (unless the Owner grants a further period of time before the date of final payment under the Contract), notifies the Owner in writing of the causes of delay.

The Owner shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in their judgment, the findings of fact justify such an extension, and their findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in the Remedies clause of this Contract.

- a) If, after notice of termination of the Contractor's right to proceed Under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the delay was excusable under the provisions of this clause, the rights and obligations of the parties shall, if the Contract contains a clause providing for termination for convenience of the Owner, be the same as if the notice of termination had been issued pursuant to such clause. If, in the foregoing circumstances, this Contract does not contain a clause providing for termination for convenience of the Owner, the Contract shall be equitably adjusted accordingly; failure to agree to any such adjustment shall be subject to the Remedies clause of this Contract.
- b) The rights and remedies of the Owner provided in this clause are in addition to any other rights and remedies provided by law or under this Contract.
- c) As used in paragraph (d) (1) of this clause, the term, "Subcontractors or suppliers", means Contractors or suppliers at any tier.

ARTICLE 14: CONTRACT SECURITY

The Contractor shall furnish Payment and Performance Bonds in an amount equal to at least one hundred percent (100%) of the Contract price as security for the faithful performance of the Contract, and for the payment of all persons performing labor on the project under this Contract and furnishing materials, equipment and all other incidentals in connection with this Contract. The Surety on such bonds shall be a duly authorized surety company, licensed to do business in the State of Rhode Island and satisfactory to the Owner. The cost of the same shall be paid by the Contractor. Prior to the starting of any work, the bonds must be approved by the Owner.

ARTICLE 15: ADDITIONAL OR SUBSTITUTE BOND

If at any time the Owner, for justifiable cause, shall become dissatisfied with any Surety or Sureties holding payment bonds, the Contractor shall, within five (5) days after notice from the Owner to do so, substitute an acceptable bond or bonds in such form and Signed by such other Surety as may be satisfactory to the Owner. The Premiums of such bonds shall be paid by the Contractor. No further payments will be deemed due, nor will be made until the new Surety or Sureties shall have furnished such an acceptable bond to the Owner.

ARTICLE 16: INDEMNITY

The Contractor shall at all times indemnify and save harmless the Owner and the Engineer, their servants and agents, from any and all claims and from any suits, litigations, damages, losses or the like arising out of injuries sustained or alleged to have been sustained by any persons or property in connection with the contract work, caused in whole or in part by acts or omissions of the Contractor, their subcontractors, materialmen, or anyone directly or indirectly connected with the contract work.

ARTICLE 17: SUPERINTENDENCE BY THE CONTRACTOR

The Contractor shall give the work the constant attention necessary to facilitate the progress thereof and shall cooperate with the Owner in every possible way. At the site of the work, the Contractor shall, at all times, employ a construction superintendent who shall have full authority to act for the Contractor. It is understood that the employment of such representative shall be acceptable to the Owner and shall be such a person as can be continued in the capacity for the duration of the Contract, unless they cease to be on the Contractor's payroll.

ARTICLE 18: CONTRACTOR TO LAY OUT THEIR OWN WORK

The Owner will establish such general reference points as in their judgment will enable the Contractor to proceed with the work. The Contractor, at their own expense, shall provide all materials and equipment and such qualified helpers as the Owner may require for setting the general reference points and shall protect and preserve all stakes, benches, and other markers used to identify the reference points. The Contractor shall lay out all the Contract work from the above and shall be responsible for the accuracy of all lines, grades and measurements.

ARTICLE 19: COMPETENT HELP TO BE EMPLOYED

The Contractor shall employ experienced foremen, craftsmen and other workmen competent in the work in which they are to be engaged.

ARTICLE 20: PERMITS AND REGULATIONS

The Contractor shall procure all permits, licenses, and approvals necessary for the execution of the Contract work. The Town shall waive all application fees for Town permits. **STATE FEES ARE NOT WAIVED.**

The Contractor shall comply with all laws, regulations, ordinances, orders and rules relating to the performance of the work, the protection of the adjacent property, and the maintenance of passageways, guard fences, and other protective facilities.

ARTICLE 21: CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES

Within five (5) days after the date of "Notice to Proceed", the Contractor shall deliver to the Owner an estimated construction progress schedule in a form satisfactory to the Owner, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the contract documents and the anticipated amount of each monthly payment that will become due the Contractor in accordance with the progress schedule. The

Contractor shall also furnish on forms to be supplied by the Owner: 1) a detailed estimate, giving a complete breakdown of the contract price; and 2) periodic itemized estimates of the work done for the purpose of making partial payments thereon.

The Contractor shall perform the work of this Contract to conform with the schedule as approved by the Owner, except that the Owner reserves the right to amend and alter the construction schedule at any time, in a manner which is deemed to be in the best interest of the Owner to do so.

The Contractor shall arrange their work to conform with this schedule as it may be revised from time to time by the Owner, at no additional expense to the Owner.

The Contractor shall notify the Owner immediately of any circumstances which may affect the performance of the work in accordance with current construction schedule.

ARTICLE 22: SEQUENCE OF THE WORK

The Contractor shall be required to prosecute their work in accordance with a schedule prepared by them in advance in accordance with additional requirements specified herein and approved by the Owner. This scheduling shall state the methods and shall forecast the times of doing each portion of the work. Before beginning any portion of the work, the Contractor shall give the Owner advance notice and ample time for making necessary preparations.

ARTICLE 23: AUDIT; ACCESS TO RECORDS

The Contractor shall maintain books, records, documents and other evidence directly pertinent to performance of work under this Contract in accordance with generally accepted accounting principles and practices. The Contractor shall also maintain the financial information and data used by the Contractor in the preparation or support of the cost submission or for any negotiated contract or change order and a copy of the cost summary submitted to the Owner. The Contractor will provide proper facilities for such access and inspection. Audits conducted pursuant to this Provision shall be in accordance with generally accepted auditing standards and established procedures and guidelines of the reviewing or audit agency(ies).

The Contractor agrees to the disclosure of all information and reports resulting from the access to records pursuant to paragraphs above, to any of the agencies referred to above, provided that the Contractor is afforded the opportunity for an audit exit conference, and an opportunity to comment and submit any supporting documentation on the pertinent portions of the draft audit report that the final audit report will include written comments of reasonable length, if any, of the Contractor.

Records under paragraphs above, shall be maintained and made available during performance on work under this Contract and until three years from the date of final payment for the project. In addition, those records which relate to any "Dispute", appeal agreement, or litigation, or the settlement of claims arising out of such performance, or costs or items to which an audit exception has been taken, shall be maintained and made available until three years after the date of resolution of such appeal, litigation, claim or exception.

ARTICLE 24: REPORTS, RECORDS AND DATA

The Contractor and each of their subcontractors, shall submit to the Owner such schedules of quantities, and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning the work performed or to be performed under this Contract.

ARTICLE 25: DIFFERING SITE CONDITIONS

- a) The Contractor shall promptly and before such conditions are disturbed, notify the Owner in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in this Contract, or (2) unknown physical conditions at the site, of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in this Contract. The Owner shall promptly investigate the conditions, and if they find that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any of the work under this Contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the Contract modified in writing accordingly.
- b) No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required in (a) above; provided; however, the time prescribed therefore may be extended by the Owner.
- c) No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this Contract.

ARTICLE 26: PAYMENTS BY THE CONTRACTOR

The Contractor shall pay:

- a) for all transportation and utility services not later than the 20th day of each calendar month following that in which services were rendered.
- b) for all materials, tools, and other expendable equipment to the extent of 90 percent of the cost thereof, not later than the 20th day of the calendar month following that in which such items were delivered to the site of work, and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such material, tools, or equipment are incorporated or used.
- c) to each of their subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by their subcontractors to the extent of such subcontractor's interest therein.

ARTICLE 27: GENERAL GUARANTEE

Neither the final certificate of payment nor any provision in the contract documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the contract documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty workmanship or materials. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which shall appear within a period of one year (1) from the date of final acceptance of the

work, unless a longer period is specified by the Owner. The Owner will give final notice of observed defects with reasonable promptness.

ARTICLE 28: COMPLETENESS OF THE WORK

In addition to the specified or described portions of the work, all other work and all other materials, equipment and labor of whatever description, necessary or required to complete the work, or for carrying out the full intent of the drawings and specifications, such work, labor, materials, and equipment shall be provided by the Contractor, and payment therefore shall be considered as having been included in the prices stipulated for the appropriate item of work listed in the bid.

ARTICLE 29: CARE OF THE WORK

The Contractor shall be responsible for all damages to persons or property that occur as a result of their fault or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance by the Owner, whether or not the same has been covered by partial payments made by the Owner.

ARTICLE 30: PROTECTION OF CONSTRUCTION FEATURES

The Contractor shall take adequate precautions to protect existing side- walks, curbs, pavements, utilities, adjoining property and such incidentals, and to avoid damage thereto. The Contractor shall completely repair any damage at no additional expense to the Owner.

ARTICLE 31: SAFETY AND HEALTH REGULATIONS

These Contract Documents, and the joint and several phases of construction hereby contemplated, are to be governed, at all times, by the applicable provisions of the Federal law(s) including but not limited to the following:

- a) Williams-Steiger Occupational Safety and Health Act, 1970, Public Law 92-596;
- b) Part 1910 of the Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;
- c) This project is subject to all of the Safety and Health Regulations (CFR 29, Part 1926 and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974. Contractors are urged to become familiar with the requirements of these regulations. In the event of any inconsistencies between the above laws and regulations and the provisions of these Contract Documents, the laws and regulations shall prevail.

ARTICLE 32: PROTECTION OF WORK AND PROPERTY - EMERGENCY

- a) The Contractor shall at all times safely guard the Owner's property from injury or loss in connection with this Contract. They shall at all times safely guard and protect their own work, materials incorporated into the work or stockpiled at the site, and that of adjacent property, from damage. The Contractor shall replace or make good any such damage, loss or injury.

- b) In case of an emergency which threatens loss or injury of property, and/or safety of life, the Contractor will be allowed to act, without previous instructions from the Owner, in a diligent manner. They shall notify the Owner immediately thereafter. Any claim for compensation by the Contractor due to such extra work shall be promptly submitted to the Owner for approval.
- c) Where the Contractor has not taken action but has notified the Owner of an emergency threatening injury to persons or damage to the work or to any adjoining property, they shall act as instructed or authorized by the Owner.
- d) The amount of reimbursement claimed by the Contractor on account of any Emergency action shall be determined in the manner provided elsewhere in the Contract Documents.

ARTICLE 33: FIRE PREVENTION AND PROTECTION

All State and municipal rules and regulations with respect to fire prevention, fire-resistant construction, and fire protection shall be strictly adhered to and all work and facilities necessary therefore shall be provided and maintained by the Contractor in an approved manner.

All fire protection equipment such as water tanks, hoses, pumps, extinguishers, and other materials, and apparatus, shall be provided for the protection of the contract work, temporary work, and adjacent property. Trained personnel experienced in the operation of all fire protection equipment and apparatus shall be available on the site whenever work is in progress, and at such other times as may be necessary for the safety of the public and the work.

ARTICLE 34: PROTECTION OF LIVES AND HEALTH

- a) In order to protect the lives and health of their employees under this Contract, the Contractor shall comply with all pertinent provisions of the "Manual of Accident Prevention in Construction", issued by the Associated General Contractors of America, Inc., and shall maintain an accurate record of all cases of death, occupational diseases, and injuries requiring medical attention or causing loss of time from work arising out of, and in the course of employment on the Contract work.
- b) The Contractor alone shall be responsible for the safety, efficiency, and adequacy of their plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation.

ARTICLE 35: PROTECTION AGAINST HIGH WATER AND STORM

The Contractor shall take all precautions to prevent damage to work or equipment by high water or by storms. The Owner may prohibit the carrying out of work at any time when in their judgment high waters or storm conditions are unfavorable or unsuitable, or at any time regardless of the weather when proper precautions are not being taken to safeguard previously constructed work or work in progress. In case of damage caused by the failure of the Contractor to take adequate precautions, the Contractor shall repair or replace equipment damaged and shall make such repairs or rebuild such parts of the damaged work as the Owner may require, at no additional cost to the Owner.

ARTICLE 36: FIRST AID TO INJURED

The Contractor shall keep in their office, ready for immediate use, all articles necessary for giving first aid to injured employees. They shall also provide arrangements for the immediate removal and hospital treatment of any employees injured on the work who require the same.

ARTICLE 37: HURRICANE PROTECTION

Should hurricane warnings be issued, the Contractor shall take every precaution to minimize danger to person, to the work and to adjacent property. These precautions shall include closing all openings, removing all loose materials, tools, and equipment from exposed locations, and removing all scaffolding and other temporary work.

ARTICLE 38: USE OF PREMISES AND REMOVAL OF DEBRIS

The Contractor undertakes, at their own expense:

- a) To take every precaution against injuries to persons or damage to property.
- b) To store their apparatus, materials, equipment, and supplies in such orderly fashion at the site of the work as will not unduly interfere with the progress of their work or any others.
- c) To place upon the work or any part thereof, only such loads as are consistent with the safety of that portion of the work.
- d) To clean frequently all refuse, scrap, and debris caused by their operations, so that the work site is maintained in a neat, workmanlike appearance.
- e) To effect all cutting, fitting, or patching of their work required to make the same conform to the drawings and specifications, and except with the consent of the Owner, not to cut or otherwise alter the work of any other Contractor.
- f) Before final payment, to remove all surplus materials false work, temporary structures, including foundations thereof, plants of any description, and debris of any nature resulting from their operations, so that the site is left in a neat, orderly, and workmanlike condition.

ARTICLE 39: CORRECTION OF WORK

All work, materials, all processes of manufacture, and all methods of construction shall be at all times and places subject to the inspection of the Owner, who shall be the final judge of the quality and suitability of the work performed under this Contract. Should any of the work performed fail to meet with their approval, it shall be forthwith reconstructed, made good, replaced, and/or corrected by the Contractor at their own expense. Rejected material shall be immediately removed from the site. If, in the opinion of the Owner, it is undesirable to replace, reconstruct, or correct any of the work not performed in accordance with the Contract Documents, the compensation to be paid to the Contractor shall be reduced by such amounts as in the judgment of the Owner shall be equitable.

ARTICLE 40: FAILURE TO REPAIR

Any emergency rising from the interruption of electric, gas, water, or sewer service due to the activities of the Contractor, shall be repaired by the Contractor as quickly as is possible. If and when, in the opinion of the Owner, the Contractor is not initiating repair work as expeditiously as possible upon notification to do so, the Owner may, at their own option, make the necessary repairs using their own forces or those of others. The cost of such repairs shall be subtracted from the payments due to the Contractor.

ARTICLE 41: WEATHER CONDITIONS

In the event of temporary suspension of the work, or during inclement weather, or whenever the Owner shall direct, the Contractor shall, and shall cause their subcontractors to protect carefully both their work and materials against damage or injury from the weather. If, in the opinion of the Owner, any work or materials are damaged or injured by reason of failure to protect them on the part of the Contractor, or any of their subcontractors, or otherwise damaged or injured by the contractor's negligence, or are found to be defective, such materials or work shall be removed and replaced at the expense of the Contractor.

ARTICLE 42: WORK IN COLD WEATHER

The Owner may determine when conditions are unfavorable for work and may order the work, or any portion thereof, suspended whenever, in their opinion, the conditions are not such as will insure first class work.

ARTICLE 43: BUS LINE INTERFERENCE

Whenever it may be necessary to interfere with any bus lines, notice shall be given to the corporation owning the same, and reasonable time will be given to said corporation to arrange the schedule for operation of the bus line, as it may be necessary.

ARTICLE 44: NIGHT WORK

Night work, or work on Saturdays, Sundays, or legal holidays requiring the presence of an engineer or inspector, will not be permitted except in case of emergency, and only upon the approval of the Owner.

Should it be necessary for the Owner to operate an organization for continuous night work or for emergency night work, the lighting, safety, and other facilities which are deemed necessary shall be provided by the Contractor. Compensation for this work shall be considered as having been included in the prices stipulated for the appropriate items of work as listed in the bid, and no extra compensation will be paid by the Owner.

ARTICLE 45: LIGHTS, BARRIERS, WATCHMEN, AND INDEMNITY

The Contractor shall erect and maintain such barriers, lighting, warning lights, danger warning signals, and signs that will prevent accidents during the construction work and protect the work and insure the safety of personnel and the public at all times and places; the Contractor shall indemnify and protect the Owner and Engineer in every respect from injury or damage

whatsoever caused by any act of neglect by the Contractor or their subcontractors, or their servants or agents. In addition to the above, when and as necessary, or when required by the Owner, the Contractor shall post signs and employ watchmen or flagmen, for the direction of traffic at the site and for excluding at all times unauthorized persons from the work site, for which the Contractor shall be paid no additional compensation. The Contractor shall be responsible for excluding from the land within the easement areas all persons not directly connected with the work.

All work occurring on State of Rhode Island highways shall be clearly identified, protected and the public's safety ensured by erection of signs, barriers and all other provisions as outlined in the Manual on Uniform Traffic Control Devices for Streets and Highways; issued by U. S. Department of Transportation, Federal Highway Administration, 1978; Part VI, Traffic Controls for Streets and Highway Construction and Maintenance Operations.

ARTICLE 46: LOADING

No part of the structures involved in this Contract shall be loaded during construction with a load greater than it is calculated to carry with safety. Should any accidents or damage occur through any violation of this requirement, the Contractor will be held responsible under their Contract and bond.

ARTICLE 47: DISPOSAL OF MATERIALS

The materials used in the construction of the work, shall be deposited in such manner so they will not endanger persons or the work, and so that free access may be had at any time to all hydrants and gates in the vicinity of the work. The materials shall be kept trimmed up so that as little inconvenience as possible to the public or adjoining tenants is caused.

ARTICLE 48: FINISHING AND CLEANING UP

In completing their operations, the Contractor shall immediately remove all surplus material, tools, and other property belonging to them, leaving the entire street or surroundings free and clean and in good order, at no additional expense to the Owner. The Contractor shall exercise special care in keeping the rights-of-way and private lands upon which work is performed free and clean of all debris and shall remove all tools and other property when they are not in use.

In case the Contractor fails or neglects to promptly remove all surplus materials, tools, and incidentals after backfilling, leaving the street or surrounding area clean and free of debris, and do the required repaving when ordered, the Owner may, after 24 hours' notice, cause the work to be done and the cost thereof deducted from any payment due to the Contractor.

ARTICLE 49: SPIRITUOUS LIQUORS

The Contractor shall neither permit nor suffer the introduction of spirituous liquors upon the work embraced in this Contract, nor the use of the same.

ARTICLE 50: DUST CONTROL

The Contractor shall exercise every precaution and means to prevent and control dust arising out of all construction operations from becoming a nuisance to abutting property owners or surrounding neighborhoods. Pavements adjoining the pipe trench shall be kept broomed off and washed clean of excess materials wherever and whenever directed. Repeated daily dust control treatment shall be provided to satisfactorily prevent the spread of dust until permanent pavement repairs are made and until earth stockpiles have been removed, and all construction operations that might cause dust to have been completed. No extra payment will be made for these dust control measures; compensation shall be considered included in the prices stipulated for the appropriate items as listed in the bid.

If directed by the Owner, the Contractor shall furnish and apply calcium chloride for supplemental control of dust.

Calcium chloride shall conform to the requirements of AASHTO M 144 (ASTM D-98) except that the pellet form and the flake form shall be equally acceptable.

Calcium chloride shall be applied only at the locations, at such times and in the amount as may be directed by the Owner. It shall be spread in such manner and by such devices that uniform distribution is attained over the entire area on which it is ordered placed.

There will be no separate payment for this work. The cost of the work shall be included in the price bid for the various other items of work.

PART III

The rights and obligations of the OWNER under this Contract shall include, but not be limited to the following:

ARTICLE 51: THE OWNER'S AUTHORITY

The Owner shall give all orders and directions contemplated under this Contract and specifications relative to the execution of the work. The Owner shall determine the amount, quality, acceptability, and fitness of the several kinds of work and materials which are to be paid for under this Contract and shall decide all questions which may arise in relation to said work and the construction thereof.

The Owner's estimates and decisions shall be final and conclusive, except as herein otherwise expressly provided. In case any question shall arise between the parties hereto relative to said Contract or specifications, the determination or decision of the Owner shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this Contract affected by such questions. The Owner shall decide the meaning and intent of any portion of the specifications and of any plans or drawings where the same may be found to be obscure or be in dispute. Any differences or conflicts in regard to their work which may arise between the Contractor and other Contractors performing work for the Owner, shall be adjusted and determined by the Owner.

ARTICLE 52: ALL WORK SUBJECT TO CONTROL BY THE OWNER

- a) In the performance of the work, the Contractor shall abide by all orders, directions, and requirements of the Owner, and shall perform all work to the satisfaction of the Owner, and at such times and places, but such methods, and in such manner and sequence as they may require. The Owner shall determine the amounts, quality, acceptability, and fitness of all parts of the work. The Owner shall interpret the drawings, specifications, contract documents, all other documents, and the extra work orders. The Owner shall also decide all other questions in connection with the work. The Contractor shall employ no plant, equipment, materials, methods, or men to which the Owner objects and shall remove no plant, materials, or equipment or other facilities from the work site without the Owner's permission. Upon request, the Owner will confirm in writing any oral order, direction, requirement, or determination.
- b) Inspectors shall be authorized to inspect all work done and materials furnished. Such inspection may extend to all parts of the work and to the preparation or manufacture of the materials to be used. The presence or absence of an inspector shall not relieve the Contractor from any requirements of the Contract. In case of any dispute arising between the Contractor and the inspector as to materials furnished or the manner in which the work is being executed, the inspector shall have the authority to reject material or suspend work until the question has been decided by the Owner. The inspector shall not be authorized to revoke, alter, enlarge, relax, or release any requirement of these specifications, nor to approve or accept any portion of the work, nor to issue instructions contrary to the drawings and specifications. The inspector shall in no case act as foreman or perform other duties for the Contractor or interfere with the management of the work by the latter. Any advice which the inspector may give the Contractor shall in no way be construed as binding the Owner, or the Engineers in any way, nor releasing the Contractor from the fulfillment of the terms of the Contract.

ARTICLE 53: THE OWNER'S CONTROL NOT LIMITED

The enumeration in this Contract of particular instances in which the opinion, judgment, discretion, or determination of the Owner shall control or in which work shall be performed to their satisfaction or subject to their approval or inspection, shall not imply that only matters similar to those enumerated shall be so governed and performed, but without exception all the work shall be so governed and performed.

ARTICLE 54: RIGHT OF THE OWNER TO TERMINATE THE CONTRACT

In the event that any of the provisions of this Contract are violated by the Contractor, or any of their subcontractors, the Owner may serve written notice upon the Contractor and the Surety of its intention to terminate the Contract, such notice to contain the reasons for such intention to Terminate the Contract. If, within ten days (10) such violation or delay shall not cease and satisfactory arrangement or correction made, the Contract shall, at the expiration of the ten days, cease and immediately serve notice thereof upon the Surety and the Contractor, and the Surety shall have the power to take over and perform the Contract, provided, however, that if the Surety does not commence performing thereof within ten days (10) from the date of mailing to such Surety a Notice of Termination, the Owner may take over the work and prosecute the same to completion by Contract or force account at the expense of the Contractor, and the Contractor and their Surety shall be liable to the Owner for any excess cost occasioned the Owner thereby.

ARTICLE 55: TERMINATION FOR CONVENIENCE

- a) The performance of work under this Contract may be terminated by the Owner in accordance with this clause in whole, or from time to time in part, whenever the Owner shall determine that such terminate shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.
- b) After receipt of a Notice of Termination, and except as otherwise directed by the Owner, the Contractor shall:
 - 1) Stop work under the Contract on the date and to the extent specified in the Notice of Termination;
 - 2) Place no further orders or subcontracts for materials, services, or facilities except as may be necessary for completion of such portion of the work under the Contract as is not terminated;
 - 3) Terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;
 - 4) Assign to the Owner, in the manner, at the times, and to the extent directed by the Owner, all of the right, title and interest of the Contractor under the orders and subcontracts so terminated. In which case, the Owner shall have the right, in its discretion, to settle, or pay any or all claims arising out of the termination of such orders and subcontracts;
 - 5) Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Owner to the extent they may require, which approval or ratification shall be final for all the purposes of this clause;
 - 6) Transfer title to the Owner, and deliver in the manner, at the times, and to the extent, if any, directed by the Owner, the fabricated or un-fabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of the work terminated by the Notice of Termination, and the completed or partially completed plans, drawings, information, and other property which, if the Contract had been completed, would have been required to be furnished to the Owner.
 - 7) Use their best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Owner, any property of the types referred to in (6) above; provided, however, that the Contractor (i) shall not be required to extend credit to any purchaser, and (ii) may acquire any such property under the conditions prescribed and at a price or prices approved by the Owner: And, provided further, that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Owner to the Contractor under this Contract or shall otherwise be credited to the price or cost of the work covered by this Contract or paid in other such manner as the Owner may direct;

- 8) Complete performance of such part of the work as shall not have been terminated by the Notice to Termination; and
 - 9) Take such action as may be necessary, or as the Owner may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest.
- c) After receipt of a Notice of Termination, the Contractor shall submit to the Owner their termination claim, in the form and with the certification prescribed by the Owner. Such claim shall be submitted promptly but in no event later than one year from the effective date of termination, unless one or more extensions in writing are granted by the Owner upon request of the Contractor made in writing within such one-year period or authorized extension thereof. However, if the Owner determines that the facts justify such action, they may receive and act upon any such termination claim at any time after such one-year period or extension thereof. Upon failure of the Contractor to submit their termination claim within the time allowed, the Owner may determine, on the basis of information available to them, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.
- d) Subject to the provisions of paragraph (c), the Contractor and the Owner may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or Partial termination of work pursuant to this clause which amount or amounts may include a reasonable allowance for profit on work done: Provided, that such agreed amount or amounts, exclusive of Settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price or work not terminated. The Contract shall be amended accordingly, and the Contract shall be paid the agreed amount. Nothing in Paragraph (e) of this clause, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Owner to agree upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, shall be deemed to limit, restrict, or otherwise determine or affect the amount or amounts which may be agreed upon to be paid to the Contractor pursuant to this Paragraph (d).
- e) In the event of the failure of the Contractor and the Owner to agree as provided in Paragraph (d) upon the whole amount to be paid to the Contract by reason of the termination of work pursuant to this clause, the Owner shall determine, on the basis of information available to them, the amount, if any, due to the Contractor the amounts determined as follows:
- 1) With respect to all contract work performed prior to the effective date of the Notice of Termination, the total (without duplication of any items) of:
 - i. The cost of such work;
 - ii. The cost of settling and paying claims arising out of the termination of work under subcontracts or orders provided in Paragraph (b) (5) above, exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the subcontractor prior to the effective date of the Notice of Termination of work under this

Contract, which amounts shall be included in the cost on account of which payment is made under(i) above, and

- iii. A sum, as profit on (i) above, determined by the Owner to be fair and reasonable: Provided, however, that if it appears that the Contractor would have sustained loss on the entire Contract had it been completed, no profit shall be included or allowed under this subdivision (iii) and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss; and

- 2) The reasonable cost of the preservation and protection of property incurred pursuant to Paragraph (b) (9); and any other reasonable cost incidental to termination of work under this Contract, including expense incidental to the determination of the amount due to the Contractor as the result of the termination of work under this Contract.

The total sum to be paid to the Contractor under (1) above shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. Except for normal spoilage, and except to the extent that the Owner shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor under (1) above, the fair value, as determined by the Owner, of property which is destroyed, lost, stolen, or damaged so as to become undeliverable to the Owner, or to a buyer pursuant to Paragraph (b) (7).

- f) Contractor shall have the right to dispute under the clause of this Contract entitled "Remedies" from any determination made by the Owner under Paragraph (c) or (e) above, except that, if the Contractor has failed to submit their claim within the time provided in Paragraph (c) above and has failed to request extension of such time, they shall have no such right of appeal. In any case where the Owner has made a determination of the amount due under Paragraph (c) or (e) above, the Owner shall pay to the Contractor the following: (1) if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Owner or (2) if a "Remedies" proceeding is initiated, the amount finally determined in such "Remedies" proceeding.
- g) In arriving at the amount due the Contractor under this clause, there shall be deducted (1) all unliquidated advance or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this Contract, (2) any claim which the Owner may have against the Contractor in connection with this Contract, and (3) the agreed price for, or the proceeds of sale of any materials, supplies, or other things kept by the Contractor or sold, pursuant to the provisions of this clause, and not otherwise recovered by or credited by the Owner.
- h) If the termination hereunder be partial, prior to the settlement of the terminated portion of this Contract, the Contractor may file with the Owner a request in writing for an equitable adjustment of the price or prices specified in the Contract relating to the continued portion of the Contract (the portion not terminated by the Notice of Termination) and such equitable adjustment as may be agreed upon shall be made in such price or prices; however, nothing contained herein shall limit the right of the Owner and the Contractor to agree upon the amount or amounts to be paid to the Contractor for the completion if the continued portion of the Contract when said Contract does not contain an established contract price for such continued portion.

ARTICLE 56: RIGHTS OF ACCESS

Nothing herein contained or shown on the drawings shall be construed as giving the Contractor exclusive occupancy of the work area. The Owner or any other Contractors employed by them, the various utility companies, Contractors or subcontractors employed by State or Federal agencies, or any other agencies involved in the general project or upon public rights-of-way, may enter upon or cross the area of work or occupy portions of the area as is directed or necessary.

When the territory of one contract is the convenient means of access to the other, the Contractor shall arrange their work in such a manner as to permit such access to the other and prevent unnecessary delay to the work as a whole.

ARTICLE 57: RIGHTS-OF-WAY AND SUSPENSION OF WORK

Land and rights-of-way for the purpose of this Contract shall be furnished by the Owner to the extent shown on the drawings; the Owner will use due diligence in acquiring said lands and rights-of-way as speedily as possible. If, however, lands or rights-of-way cannot be obtained before work on the project begins, the Contractor shall begin their work upon such land or rights-of-way as have been previously acquired by the Owner, and no claims for damages whatsoever will be allowed by reason of the delay in obtaining the remaining land and rights-of-way.

Should the Owner be prevented or enjoined from proceeding with the work, or from authorizing its prosecution, either before or after the commencement by reason of litigation, or by reason of its inability to procure the lands or rights-of-way for the said work, the Contractor shall not be entitled to make or assert a claim for damages by reason of the said delay, or to withdraw from the Contract except by consent of the Owner. Time for completion of work will be extended to such time as the Owner determines will compensate for the time lost by such delay, such determination to be set forth in writing.

ARTICLE 58: CONFORMANCE WITH DIRECTIONS

The Owner may make alterations in the line, grade, plan, form, dimension, or materials of the work, or any part thereof, either before or after the commencement of construction. Should such alterations diminish the quantity included in any item of work to be done and paid for at a unit price, the Contractor shall have no claim for damages or for anticipated profits on the work that thus may be dispensed with. If they increase the quantity included in any such item, such increase shall be paid for at the stipulated prices.

ARTICLE 59: INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS

Except for the Contractor's executed set, all drawings and specifications are the property of the Owner. The Owner will furnish the Contractor, without charge, three (3) sets of the drawings and specifications. Additional sets will be furnished upon request, at actual cost of reproduction. Such drawings and specifications are not to be used on other work and those sets in usable condition shall be returned to the Owner upon request at the completion of cessation of the work or termination of the Contract. The Contractor shall always keep one (1) copy of the drawings

and specifications at the work site and shall give the Owner and their representatives access thereto. Anything on the drawings and not mentioned in the specifications, or anything in the specifications that is not shown on the drawings shall have the same force and effect as if mentioned in both. In case of conflict or inconsistency between the drawings and the specifications, the specifications shall take precedence. Any discrepancy in the figures and the drawings shall be immediately submitted to the Owner for decision and the decision of the Owner shall be final. In case of differences between small- and large-scale drawings, the large-scale drawings shall take precedence.

ARTICLE 60: SUSPENSION OF WORK

The Owner may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as they may determine to be appropriate for the convenience of the Owner.

- a) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Owner in administration of this Contract, or by their failure to act within the time specified in this Contract (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this Contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the Contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent (1) that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or (2) for which an equitable adjustment is provided for or excluded under any other provision of this Contract.
- b) No claim under this clause shall be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Owner in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of such suspension, delay or interruption, but not later than the date of final payment under the Contract.

ARTICLE 61: INSPECTION

The authorized representatives and agents of the Owner shall be permitted to inspect all work materials, payrolls, records of personnel, invoices for materials, and other relevant data and records.

PART IV

ARTICLE 62: SUBCONTRACTORS

The Contractor may utilize the services of specialty subcontractors on those parts of the work which, under normal contracting practices, are performed by specialty subcontractors.

The Contractor shall not award work to any subcontractor other than those listed in their bid, without the prior written approval of the Owner, which approval will not be given until the Contractor submits a written statement concerning the proposed award to the subcontractor, which statement shall contain such information as the Owner may require.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work, to bind the subcontractors to the contract documents insofar as applicable to the subcontract work and to give the Contractor the same power as regards to terminating any subcontract that the Owner may exercise over the Contractor under any provisions of the contract documents. Nothing contained in this Contract shall create any contractual relationship between the Owner and any subcontractor.

ARTICLE 63: MUTUAL RESPONSIBILITY OF CONTRACTORS

If, through acts of neglect on the part of the Contractor, any other Contractor or any subcontractor shall suffer loss or damage to the work, the Contractor agrees to settle with such other Contractor or subcontractor by agreement or arbitration. If such other Contractor or subcontractor shall assert any claim against the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor who shall indemnify and save harmless the Owner against any such claim.

ARTICLE 64: ASSIGNMENTS

The Contractor shall not assign the whole or any part of this Contract or any monies due or to become due hereunder without the written consent of the Owner. In case the Contractor assigns all or part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms, or corporations for services rendered or materials supplied for the performance of the work called for in this Contract.

ARTICLE 65: SEPARATE CONTRACTS

The Owner reserves the right to let other contracts in connection with the construction of the contemplated work of the project, or contiguous projects of the Owner. The Contractor, therefore, will afford to any such other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, will properly connect and coordinate their work with theirs, and will not commit or permit any act which will interfere with the performance of their work.

The Contractor shall coordinate their operations with those of other Contractors. Cooperation will be required in the arrangement for storage of materials and in the detailed execution of the work. Failure by the Contractor to keep informed on the progress or defective workmanship by others, shall be construed as acceptance by them of the status of the work as being satisfactory for proper coordination with and performance of their own work.

ARTICLE 66: WORK BY OTHERS

The Owner reserves the right to do any other work which may be connected with, or become a part of, or be adjacent to the work embraced by this Contract, at any time, by Contract or otherwise. The Contractor shall not interfere with the work of such others as the Owner may employ and shall execute their own work in such a manner as to aid in the execution of the work of others as may be required. No backfilling of trenches or excavations will be permitted until such work by the Owner is completed.

PART V

ARTICLE 67: WAGE UNDERPAYMENTS AND ADJUSTMENTS

The Contractor agrees that in case of underpayment of wages to any worker on the project under this Contract by the Contractor or any of their subcontractors, the OWNER will withhold from the Contractor out of payments due to them, an amount sufficient to pay such worker the difference between the wages required to be paid under this contract and the wages actually paid such worker for the total number of hours worked, and that the OWNER may disburse such amount so withheld by it for and on account of the Contractor to the employee to whom such amount is due. The Contractor further agrees that the amount withheld pursuant to this article may be in addition to the percentage to be retained by the OWNER pursuant to other provisions of this Contract.

ARTICLE 68: PAYMENT OF EMPLOYEES

The Contractor and each of their subcontractors shall pay each of their employees engaged in the work on the project under this Contract in full, in cash, and not less than once a week, less legally required deductions, provided, that when circumstances render payment in cash unfeasible or impracticable, then payment by check may be effected upon consideration that funds are made available in a local bank and checks may be cashed without charge, trade requirements, or inconvenience to the worker.

ARTICLE 69: NON-DISCRIMINATION IN EMPLOYMENT

In connection with the performance of the work under this Contract, the Contractor agrees not to discriminate against employee because of race, religion, color, or national origin. The aforesaid provisions shall include but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rate of pay or other forms of compensation and selection for training, including apprenticeship.

ARTICLE 70: APPRENTICES

Apprentices shall be permitted to work only under a bona fide apprenticeship program registered with a State Apprenticeship Council which is recognized by the Federal Committee on Apprenticeship, United States Department of Labor; or if no such Council exists in a State, under a program registered with the Bureau of Apprenticeship, United States Department of Labor.

PART VI

ARTICLE 71: SHOP OR SETTING DRAWINGS

- a) The Contractor shall submit promptly to the Owner six (6) copies of each shop or setting drawing prepared in accordance with a schedule predetermined by the Contractor. After examination of such drawings by the Owner, and the return thereof, if resubmission is required, the Contractor shall make such corrections to the drawings as have been indicated and shall furnish the Owner with six (6) corrected copies. Regardless of corrections made in or approval given to such drawings by the Owner, the Contractor will, nevertheless, be responsible for the accuracy of such drawings and for their conformity to the drawings and specifications, unless they notify the Owner in Writing of any deviations at the time they furnish the drawings.
- b) Shop drawings of all fabricated work shall be submitted to the Owner for approval and no work shall be fabricated by the Contractor save at their own risk until approval has been given by the owner. The Special Conditions define the shop drawings required for this project.
- c) The Contractor shall submit all shop and setting drawings on dates sufficiently in advance of requirements to enable the Owner ample time for reviewing the same, including time for correcting, resubmission and reviewing, if necessary, and no claim for delay will be granted the Contractor by reason of their failure in this respect.
- d) All shop drawings submitted must bear the stamp of the Contractor as evidence that the drawings have been checked by them. Any drawings submitted without this stamp of approval will not be considered and will be returned to the Contractor for resubmissions. If the shop drawings show deviations from the requirements of the Contract Documents because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in their letter of transmittal to the Owner, in order that an acceptable, suitable action may be taken for proper adjustment; otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract Documents even though the shop drawings have been approved.
- e) Where shop drawings are submitted by the Contractor that indicate a departure from the Contract which the Owner deems to be a minor adjustment in their interest and not involving a change in the contract price or extension of time, the Owner may approve the drawings but the approval will contain in substance, the following:

"The modification shown on the attached drawings is approved in the interest of the Owner to effect an improvement for the project and is ordered with the understanding that it does not involve any change in the contract price or an extension of time, that it is subject generally to all contract stipulations and covenants; and that it is without prejudice to any rights of the Owner under the contract and bond or bonds."
- f) The approval of the shop drawings will be general and shall not relieve the Contractor from the responsibility for adherence to the Contract, nor shall it relieve them of the responsibility for any error which may exist.
- g) The Contractor agrees to hold the Engineer and the Owner harmless and defend them against damages or claims for damages arising out of injury to others or property of third persons which

result from errors on shop, working or setting drawings whether or not they have been approved by the Engineer and/or the Owner.

ARTICLE 72: WORK TO BE ACCOMPLISHED IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS

The work, during its progress and its completion, shall conform to the lines and grades shown on the drawings and to the directions given by the Owner from time to time, subject to such modifications or additions as they shall determine to be necessary during the execution of the work; and in no case will any work be paid for in excess of such requirements. The work shall also be accomplished in accordance with the data in these specifications.

ARTICLE 73: CONTRACTOR TO CHECK DIMENSIONS AND SCHEDULES

The Contractor will be required to check all dimensions and quantities shown on the drawings or schedules given to them by the Owner, and shall notify the Owner of all errors therein which they may discover by examining and checking the same. The Contractor shall not take advantage of any error or omissions in these specifications, drawings, or schedules. The Owner will furnish all instructions should such error or omissions be discovered, and the Contractor shall carry out such instructions as if originally specified.

ARTICLE 74: PLANIMETER

For estimating quantities in which the computation of areas by analytic and geometric methods would be comparatively laborious, it is stipulated and agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of such areas.

ARTICLE 75: ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

The Contractor will be furnished additional instructions and detail drawings as necessary to carry out the work included in the Contract. The additional drawings and instructions thus supplied to the Contractor will coordinate with the Contract Documents and will be so prepared that they can be reasonably interpreted as part thereof. The Contractor shall carry out the work in accordance with the additional detail drawings and instructions. The Contractor and the Owner prepare jointly a schedule fixing the respective dates for the submission of shop drawings, the beginning of manufacture, testing, and installation of materials, supplies, and equipment, and the completion of the various parts of the work; each schedule to be subject to change from time to time in accordance with the progress of the work.

ARTICLE 76: MATERIALS, SERVICES AND FACILITIES

It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever, necessary to protect, execute, complete, and deliver the work within the specified time. If approved by the Owner, any work necessary to be performed after regular hours, on Saturdays, Sundays, or legal holidays, shall be performed by the Contractor without additional expense to the Owner.

ARTICLE 77: CONTRACTOR'S TITLE TO MATERIALS

No material, supplies, or equipment for the work shall be purchased by the Contractor or any subcontractor, subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The Contractor warrants good title to all material, supplies, and equipment installed or incorporated in the work and further warrants upon completion of all work, to deliver the premises, together with all improvements and appurtenances constructed or placed thereon by them, to the Owner free from any claims, liens, or charges, or encumbrances and further agrees that neither they nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have the right to a lien upon the premises or any improvement or appurtenance thereon.

ARTICLE 78: INSPECTION AND TESTING OF MATERIALS

All materials and equipment used in the construction of the project shall be new and of current manufacture. Testing will be done in accordance with accepted standards and as directed by the Owner; the laboratory or inspection agency shall be selected by the Owner. Except as specified elsewhere in these specifications, the Owner will pay for laboratory inspection. All materials and workmanship shall be subject to inspection, examination, and testing by the Owner at any and all times during manufacture and/or construction and at any and all places where such manufacture and or construction is carried on, to establish conformance with these specifications and suitability for uses intended. Without additional charge, the Contractor shall furnish promptly all reasonable facilities, labor, and materials necessary to make tests so required safe and convenient. They shall also furnish and mill, factory, or other such tests based on the standards and Tentative Standards of the American Society for Testing Materials as required by the Owner.

ARTICLE 79: DEFECTIVE MATERIALS

No materials shall be laid or used which are known or may be found to be in any way defective. Any materials found to be defective at the site of work or upon installation shall be replaced by the Contractor at their own expense. Notice shall be given to the Owner of any defective or imperfect material. Defective or unfit material found to have been laid shall be removed, and replaced by the Contractor with sound and unobjectionable material without additional cost to the Owner.

ARTICLE 80: PATENTS

- a) The Contractor shall hold and save the Owner harmless from liability of any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the Contract, including its use by the Owner.
- b) License and/or royalty fees for the use of a process which is authorized by the Owner must be reasonable, and paid to the holder of the patent, or their authorized agent, directly by the Contractor.

- c) If the Contractor uses any design, device or material covered by letters, patent, or copyright, they shall provide for such use by suitable agreement with the Owner of such patent or copyrighted design, device, or material.
- d) It is mutually agreed and understood that, without exception, the contract prices shall include all royalties, license fees, or costs arising out of the use of such process, design, device, or materials, in any way involved in the work. The Contractor and/or their Surety shall indemnify and save the Engineer and the Owner harmless from all claims for infringement by reason of use of such patented material, device or design, in connection with the work under this Contract, and shall indemnify the Engineer and the Owner for any cost, expense, or damage which it may be obligated to pay for reason of such infringement at any time during the prosecution of the work.

ARTICLE 81: "OR APPROVED EQUAL CLAUSE"

- a) Whenever a material or article required is specified or shown on the drawings by using the name of the proprietary product or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design may be considered equal and satisfactory providing the material or article so proposed is of equal substance and function in the Owner's opinion. It shall not be purchased or installed without their written approval. In all cases, new material shall be used on the project.
- b) If two or more brands, makes of material, devices or equipment are shown or specified, each should be regarded as the approved equal of the other. Any other brand, make or material, device or equipment, which, in the opinion of the Owner or their authorized agent, is the recognized approved equal of that specified, considering quality, workmanship, and economy of operation, and is suitable for the purpose intended, may be accepted.
- c) If any other material or article is substituted for items shown or specified, the project must result in a savings in the contract price and the Contractor shall submit evidence that the substitute product is equal. Upon approval of the substitute product, the Owner will issue a deductive change order.
- d) If an equipment manufacturer must have a specified period of experience with their product, equipment which does not meet with the specified experience period may, at the option of the owner, be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit for the duration of the specified time period which will guarantee replacement of that equipment in the event of failure.

PART VII

ARTICLE 82: INSURANCES

The Contractor shall be responsible for maintaining insurance coverage in force for the life of this Contract of the kind and adequate amounts to secure all of their obligations under this Contract and with insurance companies licensed to write such insurance in the State of Rhode Island and acceptable to the Owner. The kinds and amounts of such insurance carried shall not be less than the kinds and amounts of insurance coverage designated in the Insurance Requirements, and the Contractor agrees that the stipulation herein of the kinds and minimum amounts of coverage or the acceptance by the Owner of certificates indicating the kinds and

limits of coverage shall in no way limit the liability of the Contractor to any such kinds and amounts of insurance coverage. All policies issued shall indemnify and save harmless the Owner, the Engineer, and their agents or representatives from any and all claims for damages arising out of the Contract, to either persons or property.

Policies and certificates of all insurance shall be submitted to the Owner by the Contractor prior to preparation of the construction contract. In the event that the form of any policy or certificate of the amount of the insurance of the companies writing the same are not satisfactory to the Owner, the Contractor shall secure other policies or certificates in form and amount and with such companies that are satisfactory to the Owner.

The Contractor shall not cause policies to be cancelled or permit them to lapse and all insurance policies shall include a clause to the effect that the policy shall not be subject to cancellation or a reduction in the required limits of liability amounts of insurance until notice has been sent by registered mail to the Owner, stating when, not less than ten (10) days thereafter, such cancellation or reduction shall be effective. All certificates of insurance shall contain true transcripts from the policy, authenticated by the proper officer of the insurer evidencing in particular, those insured, the extent of the insurance, the location and operations to which the insurance applies the expiration date, and the above-mentioned notice of cancellation clause.

The Contractor shall be responsible for the provision of identical insurance coverages for all their subcontract operations and, in the event that the Contractor's policies do not cover each and every subcontractor, certificates of insurance issued on policies by companies that are acceptable to the Owner covering each and every subcontractor shall be filed under the Owner prior to the commencement of such subcontract operations. All insurance specified in this Contract shall be provided by the Contractor, at no additional expense to the Owner.

PART VIII

ARTICLE 83: COMPENSATION TO BE PAID TO THE CONTRACTOR

- a) The Owner will pay and the Contractor shall receive as full compensation for everything furnished and done by the Contractor under this Contract, the unit prices and lump sum prices set opposite the respective items in the accepted bid form herein contained, and payment for approved extra work. The cost of all work required not specifically included in any items herein mentioned, and also for all loss or damage arising out of the nature of the work aforesaid or from the action of the elements, or from any unforeseen obstruction or difficulty encountered in the prosecution of the work and for all risks of every description connected with the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work as herein specified, and for assuming all duties, and liabilities, herein required, and for well and faithfully completing the work, and the whole thereof, as herein provided, shall be the responsibility of the Contractor.
- b) The amount of the Contract (accepted bid prices) listed in the bid is based on the estimated quantities and the unit and/or lump sum price as set forth in the bid. It is understood and agreed that the Contractor will accept as payment the actual measured quantities at the unit and/or lump sum price as set forth in the accepted bid.

- c) The estimated quantities given in the bid proposal for the various items of work are given for the purpose of comparing the bids offered for the work under this Contract and if it is found in the performance of the Contract work that any or all of the said estimated quantities are not even approximately correct the Contractor shall have no claim for anticipated profits, or for loss of profit, or for increase in prices as listed in the accepted bid because of the difference between the quantities of the various items of work actually done and the estimated quantities stated in the accepted bid.
- d) No payment or compensation will be made to the contractor for damages because of hindrance or delay from any cause in the progress of the work, whether such hindrances or delays be avoidable or unavoidable.

ARTICLE 84: PAYMENTS TO CONTRACTOR

- a) At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR shall submit to the OWNER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the OWNER may reasonably require. If payment is requested with the OWNER'S permission on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, in accordance with the manufacturers' recommendation and as required by the Owner, the partial payment estimate shall also be accompanied by such supporting data satisfactory to the OWNER as will establish the OWNER'S title to the material and equipment and protect their interest therein, including applicable insurance. The OWNER will within ten (10) days after receipt of each partial payment estimate either indicate in writing their approval or return the partial payment estimate to the CONTRACTOR indicating in writing their reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will within thirty (30) days of presentation to them of an approved partial payment estimate pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate.
- b) Removed.
- c) With each partial payment estimate, the CONTRACTOR shall certify in writing that the project AS-BUILT DRAWINGS are being maintained accurately and currently. Said certificate shall be signed by the CONTRACTOR'S SUPERINTENDENT and the CONTRACTOR'S ENGINEER or SURVEYOR. Any payment estimates not having said certification attached will be subject to refusal of payment.
- d) Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval and concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.
- e) The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

- f) Upon completion and acceptance of the WORK, the OWNER shall issue a Certificate attached to the final payment request that the WORK has been accepted by them under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages but except such sums as may be lawfully retained by the OWNER shall be paid to the CONTRACTOR within forty-five (45) days of completion and acceptance of the WORK.
- g) The CONTRACTOR will indemnify and save the OWNER or the OWNER'S REPRESENTATIVE harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, tools and all supplies incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall at the OWNER's request furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed in accordance with the terms of the CONTRACT DOCUMENTS but in no event shall the provisions of this Sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, their Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

ARTICLE 85: CHANGE ORDERS

- a) The Owner may, at any time, without notice of the sureties, by written order designated or indicated to be a Change Order, make any change in the work within the general scope of this Contract, including but not limited to changes:
 - 1) In the Specifications (including drawings and designs);
 - 2) In the method or manner of performance of the work;
 - 3) In the Owner-furnished facilities, equipment, materials, services, or site; or
 - 4) Directing acceleration in the performance of the work.
- b) Any other written order or an oral order (which terms as used in this paragraph (b) shall include direction, instruction, interpretation or determination) from the Owner, which causes any such change, shall be treated as a change order under this clause, provided that the Contractor gives the Owner written notice stating the date, circumstances and source of the order and that the Contractor regards the order as a Change Order.
- c) Except as herein provided, no order, statement, or conduct of the Owner shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment hereunder.

- d) If any change, by change order, causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this Contract, an equitable adjustment shall be made and the Contract modified in writing accordingly: Provided, however, that no claim for any change order (b) above shall be allowed for any costs incurred more than 20 days before the Contractor gives written notice as therein required: and, provided, further, that in case of defective specifications for which the Owner is responsible, the equitable adjustment shall include only increased cost reasonably incurred by the Contractor in attempting to comply with such defective specifications.
- e) If the Contractor intends to assert a claim for an equitable adjustment under this clause, they must, within 30 days after receipt of a written change order under (a) above or the furnishing of a written notice under (b) above, submit to the Owner a written statement setting forth the general nature and monetary extent of such claim, unless this period is extended by the Owner. The statement of claim hereunder may be included in the notice under (b) above.
- f) No claim by the Contractor for an equitable adjustment hereunder for any amount shall be allowed unless agreed to by Change Order prior to the work being done.

ARTICLE 86: CHANGES IN THE WORK

No changes in the work covered by the approved Contract Documents shall be made without having prior written approval of the Owner. Charges or credits for the work covered by the approved changes shall be determined by one or more, or a combination of the following methods as the Owner shall direct:

- a) Unit price bid previously approved;
- b) The actual cost of: labor, materials, ownership or rental costs of construction plant and equipment during the use of item on the extra work; power and consumable supplies for the operation of power and equipment;
- c) Insurance;
- d) Social Security, Old Age, and Unemployment contributions.

To the cost of "b" above, there shall be added a fixed fee to be agreed upon but not to exceed 15%. The fee shall be compensation to cover the cost of supervision, overhead, bonds, profit, and any other general expenses.

If a subcontractor performs the work, they shall be entitled to a maximum of 15% as a fixed fee, and the general Contractor be entitled to a maximum of 5% (of the cost of the subcontract work excluding subcontractor fixed fee) as a fixed fee.

ARTICLE 87: CLAIMS FOR EXTRA COST

No claims for extra work or cost will be allowed unless the same were done in pursuance of a written order of the Owner as aforesaid, and the claim presented with the first estimate after the changed or extra work is done. When the work is performed under terms specified elsewhere in

the Contract, the Contractor shall furnish satisfactory bills, payrolls, and vouchers covering all items of cost and upon the Owner's request, give them full access to the accounts relating thereto.

ARTICLE 88: CHANGES AND MODIFICATIONS

The Owner reserves the right to delete or cancel any item or items or parts thereof as listed in the bid, without recourse by the Contractor. The Owner also reserves the right to add to any item as listed in the bid. The compensation to be paid to the Contractor for such additional extensions, appurtenances or items shall be made under the applicable items in the bid. If no applicable items are provided in the bid, the compensation to be paid the Contractor shall be set forth under the article entitled "Changes in the Work" as found herein.

ARTICLE 89: ACCEPTANCE OF THE FINAL PAYMENT CONSTITUTES RELEASE

The acceptance of the Final Payment by the Contractor shall be and shall operate as a release to the Owner for all claims and all liability to the Contractor for all things done or furnished in connection with this work and for every act or neglect of the Owner and others relating to or arising out of this work. No payment, however, final or otherwise, shall operate as a release of the Contractor or their Surety from any obligations under this Contract or the performance and payment bond.

END OF SECTION

THE BIDDER SHALL STATE THE NAMES OF ALL THE SUBCONTRACTORS THAT THEY PROPOSE TO USE:

NONE, WRITE "NONE" _____

Description of Work:_____

Proposed Subcontractor-Name: _____

Address: _____

License Number of the contractor as issued by the State of Rhode Island: #_____

Type of License: _____

Description of Work:_____

Proposed Subcontractor-Name: _____

Address: _____

License Number of the contractor as issued by the State of Rhode Island: #_____

Type of License: _____

(USE ADDITIONAL COPIES OF THIS SHEET, IF MORE ROOM IS REQUIRED).

INSERT DESCRIPTION OF WORK AND SUBCONTRACTORS' NAMES AS MAY BE REQUIRED.

THIS IS TO CERTIFY THAT ALL NAMES OF THE ABOVE-MENTIONED
SUBCONTRACTORS ARE SUBMITTED WITH FULL KNOWLEDGE AND CONSENT OF
THE RESPECTIVE PARTIES.

THE BIDDER WARRANTS THAT NONE OF THE PROPOSED SUBCONTRACTORS
HAVE ANY CONFLICT OF INTEREST AS RESPECTS TO THIS CONTRACT

BIDDER: _____

(Fill in name)

BY: _____

(Signature and title)

EXPERIENCE SHEET

The following experience sheet shall be completed by each bidder. Any bid submitted without a fully completed experience sheet may be rejected by the Owner.

Have you ever failed to complete any work awarded to you? If so, please state where and why.

What projects similar to this one has your organization completed within the last 5 years?

(Separate sheets may be submitted for this information)

Class of Work	Contract Amount	When Completed	Name, address and telephone number of Contact person
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BIDDER'S NAME

SECTION 01010SUMMARY OF WORKPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: The installation of tank mixers and control panels at both the Forge Road and Saunderstown water storage tanks. The major proposed work under this Contract includes:
1. Installation of NSF-61 certified mixer in the Forge Road Tank
 2. Installation of NSF-61 certified mixer in the Saunderstown Tank
 3. Installation and connection of control panels at each tank
 4. Electrical service to each control panel. Electrical work shall be completed by an electrical contractor licensed in the State of Rhode Island.
 5. Cleaning and removal of accumulated sediment in both tank prior to installation of mixing equipment.
 6. Testing and validation of mixing equipment.
- B. Related Work Specified Elsewhere:
1. Coordination: Section 01050
 2. Quality Coordination Meetings: Various sections of the Specifications, including those outlined below.
 - a. 11228 Potable Water tank Submersible Mixing System
 - b. 16000 Electrical – Water Tanks
- C. Removals, Relocations and Rearrangements
1. Examine the existing site for the work of all trades which will influence the cost of the work under the bid. This work shall include removals, relocations and rearrangements which may interfere with, disturb or complicate the performance of the work under the bid involving systems, equipment and related service lines, which shall continue to be utilized as part of the finished project. The Contractor is responsible for all coordination in this regard.
 2. Provide in the bid a sufficient amount to include all removals, relocations, rearrangements and reconnections herein specified, necessary or required to provide approved operation and coordination of the combined new and existing systems and equipment.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.1 MAINTAIN EXISTING WORKS

A. Existing Operations:

1. The existing tanks provide daily water supply to the North Kingstown water system. The facilities will be taken off-line, but will remain full of water, to complete the specified work. Work must be completed to not interfere with the delivery of safe drinking water from the water storage tanks. All equipment install must be NSF62 certified and disinfected prior to installation.
2. Water samples shall be collected from the tank and tested for coliform bacteria and volatile organic chemicals (VOCs). Two sets of bacteria samples shall be required, one 24 hours after the first is collected. The CONTRACTOR shall be responsible for the cost of sampling and testing.
3. Samples shall be submitted to a State of Rhode Island certified laboratory. If tests are negative the facilities may be placed into operation. If tests are positive, appropriate measures shall be taken to clean and re-disinfect the facilities until a negative coliform test is obtained.

B. Minimize Interference

1. The Contractor shall at all times conduct his operations so as to interfere as little as possible with existing works.
2. The tanks shall be isolated and taken out of service during and subsequent to the installation of equipment, but shall remain full.
3. Equipment shall be installed while water remains in each tank.
4. The Contractor shall not use the Owner's bathrooms or kitchen facilities.
5. The Contractor shall limit his personnel to the proposed work areas and limits of work.

C. Schedule

1. The Water Department is anticipating installation of equipment during the spring of 2023 with substantial completion prior to May 19, 2023.
2. The tank must be online during the peak season from May 29, 2023 to September 8, 2023, during which time no work can be performed.

3.2 CONSTRUCTION SEQUENCE

- A. Construction of the proposed equipment must be such that it will not disrupt the existing operations. The construction sequence phases and dates must allow the facility to maintain operation as specified in paragraph 3.1,B. Refer to paragraph 3.1,B,5. The Contractor may deviate from this construction sequencing as outlined in paragraph 3.2,C.
- B. The Contractor shall submit to the Engineer for review and acceptance a complete schedule of his proposed sequence of construction operations prior to commencing any work. This schedule shall include the Contractor's plans for doing the work.
- C. The Contractor must submit to the Engineer a written request to deviate from the above sequence, provided he can demonstrate to the Engineer that the water quality within the tank will not be adversely affected.

- D. The Contractor shall notify the Owner a minimum of seven (7) days in advance of any work which may affect or disrupt the operation of the existing facilities and two (2) calendar weeks in advance if it is determined necessary to remove the tanks from service. Once an interruption occurs the Contractor must maintain a workforce on-site to complete the work in the agreed upon time. Work shall be completed such that installation of the equipment and sampling occurs within a one-week time frame.
- E. Any work by the Contractor which requires the mechanical or electrical isolation of an existing piece of equipment, process or system shall be coordinated with the Engineer. Any and all isolation of electrical or mechanical equipment or process shall be accomplished in strict accordance with applicable codes and standards and the stricter of the Contractor's or Owner's lock-out/tag-out procedures.
- F. The Contractor shall have all materials and equipment on-site, and shall receive the Owner's approval, prior to initiating work which requires the water storage tanks to be off-line.
- G. Limited down-time of the existing water storage tanks is specified in this specification. Should the Contractor fail to complete the Work within the down-time specified and should the Owner incur any actual costs directly or indirectly as a result thereof that would otherwise not have incurred had the Contractor successfully completed the Work within the specified down-time, the Contractor agrees to pay the Owner such actual incurred costs. Such costs may include, but not be limited to, Owner's actual costs of any additional maintenance and operations labor, material, equipment, and chemical costs, or any other related actual costs incurred in order for the Owner to keep the existing plant in normal operating condition.
- H. The Contractor shall not be eligible for additional compensation due to interruptions of the Contractor's schedule, in order for the Owner to respond to routine conditions.

END OF SECTION

SECTION 01045CUTTING, CORING AND PATCHINGPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included - This section establishes general requirements pertaining to cutting, excavating, coring, fitting, and patching of the Work required to:
 - 1. Make alterations to existing structures.
 - 2. Make the parts fit properly.
 - 3. Replace work not conforming to requirements of the Contract Documents.
 - 4. Contractor is responsible for all cutting, coring, and rough and finish patching. Contractor shall coordinate the work of any and all subcontracting trades performing the work.
 - 5. Contractor is responsible for reviewing with the Owner and Engineer and receiving permission to proceed prior to cutting and coring and patching.
- B. Related Work Specified Elsewhere:
 - 1. Pipe Sleeves and Seals are specified in Section 15092.
- C. Quality Assurance:
 - 1. Perform all cutting, coring and patching in strict accordance with pertinent requirements of these Specifications, and in the event no such requirements are determined, in conformance with the Engineer's written direction.
- D. Submittals:
 - 1. Provide a shop drawing submittal to include the following information:
 - a. Identification of coring and cutting subcontractor including: Company name, business address contact information, or if by Contractor indicated as such.
 - b. List of type of coring and cutting equipment proposed to be used with equipment cuts of the equipment.
 - c. Schedule indicating the: location of the core or cut, size and any potential obstructions or embedded conduits and wiring.
 - d. Key plan indicating the location of anticipated cores and cuts.
 - 2. Request for the Engineer's consent:
 - a. Prior to cutting which affects structural safety, submit written request to the Engineer for permission to proceed with cutting.
 - b. Should conditions of the work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify the Engineer and secure his written permission prior to proceeding.

PART 2 - PRODUCTS2.1 MATERIALS

- A. Materials for replacement of work shall be equal to those of adjacent construction and shall comply with the pertinent sections of these Specifications.

- B. Concrete and grout for rough patching shall be as specified in Divisions 3 and 4.

PART 3 - EXECUTION

3.1 CONDITIONS

- A. Inspection:
1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, coring, backfilling, and patching.
 2. After uncovering the work, inspect conditions affecting installation of new work.
- B. Discrepancies:
1. If uncovered conditions are not as anticipated, immediately notify the Engineer and secure needed directions.
 2. Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PREPARATION PRIOR TO CUTTING AND CORING

- A. Provide all required protection including, but not necessarily limited to, shoring, bracing and support to maintain structural integrity of the work.
- B. All cutting and coring shall be performed in such a manner as to limit the extent of patching.
- C. All holes cut through concrete and masonry walls or slabs shall be core drilled unless otherwise approved. No structural members shall be cut without approval of the Engineer and all such cutting shall be done in a manner directed by Engineer. No holes may be drilled in beams or other structural members without obtaining prior approval. All work shall be performed by mechanics skilled in this type of work.
- D. If holes are cored through floor slabs they shall be drilled from below.
- E. The Contractor shall determine from Owner's information, logical deduction and field testing if there are embedded electrical conduits, wiring or piping in the coring locations and shall readjust locations if possible to avoid coring through them. If concealed embedded conduit and piping are damaged, or severed, the coring contractor shall immediately notify the Contractor, Owner and RPR to determine impact of the damage and develop and implement a plan to repair the damage and reactive the lines.
- F. If embedded concealed conduit, wiring or pipe is damaged or severed and all reasonable steps were taken by the Contractor to identify embedded items, and alternate routing was investigated, the repair work will be compensated by the Owner through a Change Order. If it was reasonable to expect an embedded item could have been present at the location, the Contractor shall repair at no additional cost to the Owner.

3.3 CORING

- A. Coring shall be performed with an approved non-impact rotary tool with diamond core drills. Size of holes shall be suitable for pipe, conduit, sleeves, equipment or mechanical seals to be installed.

- B. All equipment shall conform to OSHA standards and specifications pertaining to plugs, noise and fume pollution, wiring and maintenance.
- C. Provide protection for existing equipment, utilities and critical areas against water or other damage caused by drilling operation.
- D. Slurry or tailings resulting from coring operations shall be vacuumed or otherwise removed from the area following drilling. Slurry or tailings shall not be allowed to enter floor drains.
- E. Work area (e.g., adjacent walls, floors, ceilings, pipes, conduits, etc.) shall be cleaned to remove splash residues from coring operation.

3.4 CUTTING

- A. Cutting shall be performed with a concrete wall saw and diamond saw blades of proper size.
- B. Provide for control of slurry generated by sawing operation on both sides of wall.
- C. When cutting a reinforced concrete wall, the cutting shall be done so as not to damage bond between the concrete and reinforcing steel left in structure. Cut shall be made so that steel neither protrudes nor is recessed from face of the cut.
- D. Adequate bracing of area to be cut shall be installed prior to start of cutting. Check area during sawing operations for partial cracking and provide additional bracing as required to prevent a partial release of cut area during sawing operations.
- E. Provide equipment of adequate size to remove cut panel.
- F. Slurry or tailings resulting from cutting operations shall be vacuumed or otherwise removed from the area following drilling. Slurry or tailings shall not be allowed to enter floor drains.
- G. Work area (e.g., adjacent walls, floors, ceilings, pipes, conduits, etc.) shall be cleaned to remove splash residues from cutting operation.

3.5 PERFORMANCE

- A. Perform all required excavating and backfilling as required under pertinent sections of these specifications. Perform cutting, coring and demolition by methods which will prevent damage to other portions of the work and will provide proper surfaces to receive installation of repair and/or new work. Perform fitting and adjustment of products to provide finished installation complying with the specified tolerances and finishes.
- B. Coring or cutting which exposes cut surfaces of reinforcing steel or structural steel shall be coated. Coating shall be 10 mil (dry film thickness) applied in two 5 mil (dry film thickness) coats of a single component moisture cured coal tar urethane or two part coal tar epoxy corrosion barrier. Alternately the exposed steel can be cut back two inches from the surface and a non-shrink grout applied over the steel flush to the concrete core or cut surface.
- C. Rough patching shall be such as to bring the cut or cored area flush with existing construction unless otherwise shown.
- D. Finish patching shall match existing surfaces as approved.

END OF SECTION

SECTION 01050COORDINATIONPART 1 - GENERAL1.1 DESCRIPTION

- A. Contractor is required to work in close proximity to Owner's existing facilities. The Contractor, under this Contract, will be responsible for coordinating construction activities with Owner to ensure that services, facilities, and safe working conditions are maintained.
- B. Other Construction Contractors will be interfacing with this Contract and working within the work area and in the vicinity of this Contract. The Contractor, under this contract, shall act as Construction Coordinator and shall coordinate construction activities with other Contractors working for Owner.
- C. Any damage to existing structures, equipment and property, accepted equipment or structures, and property or work in progress by others; as a result of the Contractor's or his subcontractor's operations shall be made good by the Contractor at no additional cost to the Owner.

1.2 COORDINATION WITH OTHERS

- A. Town of North Kingstown
 - 1. Contractor shall coordinate access, egress, detours and traffic control, if required, at each site with the North Kingstown Police Department. The Contractor shall notify North Kingstown Police, Fire Department and Rescue Squad at least 24 hours in advance of any street closings or detours.
 - 2. Contractor shall coordinate all work on Town property with the Water Department personnel.
 - 3. The Contractor shall be responsible for coordinating and maintaining public services to all public and private properties.
- B. North Kingstown Water Department (NKWD)
 - 1. Contractor shall be responsible for obtaining a building permit from the Town Building Department for all electrical work. Electrical work shall be performed by an electrical contractor licensed in Rhode Island.
- C. North Kingstown Water Department (NKWD)
 - 1. Contractor shall be responsible for coordinating all work in the vicinity of water lines with the NKWD. Contractor shall bear all costs for the NKWD's inspection requirements, temporary facilities, water main adjustments and other requirements.
- D. National Grid (NGRID):
 - 1. The Contractor shall be responsible for coordinating all work around NGRID facilities with NGRID and shall bear all costs of inspection requirements, temporary facilities relocation and other requirements.

- E. Verizon:
 - 1. The Contractor shall be responsible for coordinating and providing telephone service to all construction sites, both temporary and permanent. The Contractor shall also be responsible for coordinating all work around Verizon facilities with Verizon and shall bear all costs of inspection requirements, temporary facilities relocation and all other requirements.
- F. The Contractor shall provide the Resident Project Representative and Chief Operator a construction schedule indicating the times to perform the work required. The Contractor shall update the schedule when required and give the facility one week notice before the start of any work. The Contractor shall provide the facility personnel enough time to obtain materials and perform the work required of them. The Contractor shall daily communicate with the Resident Project Representative and Chief Operator concerning updating the schedule, job progress, delay or early starts that affect the treatment process, facility staffing, etc.
- G. Weekly coordination meetings shall be held between the Contractor, Owner's Chief Operator/Superintendent and the Resident Project Representative. This meeting shall cover the following:
 - 1. Work to be completed the following week
 - 2. Project Schedule
 - 3. Shop Drawing and O&M issues
 - 4. Outstanding RFIs and Clarifications
 - 5. Change Orders and Field Orders
 - 6. Review of Record Drawing Information
 - 7. Discussion/Resolution of any old issues
 - 8. New issues discussion
 - 9. Contractor's Safety and Health Plan Updates
- H. The Contractor shall be responsible for explicitly notifying all equipment suppliers, electrical subcontractor, and the instrumentation supplier that they are required to coordinate their work with the instrumentation supplier by providing operating sequences, input/out specifications with wiring diagrams for all equipment, and that they shall review and comment on each other's shop drawings to insure that all interfaces are compatible.
- I. Snow Removal Coordination: The Contractor shall be responsible for all snow removal activities in construction and laydown areas onsite. NKWD staff will be responsible for snow removal on the main access road around the facility. Contractor is to coordinate closely with NKWD staff to maintain access to all areas of the facility to facilitate normal operations.

1.3 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall have use of the premises within the limits shown on the Drawings and as defined in the General Conditions for the performance of the Work.
- B. Contractor work hours will be limited to 7:00AM to 4:00PM, Monday through Friday. Any work outside these hours will require permission of the Owner and adequate notice.
- C. Contractor shall maintain access and utilities to the NKWD tanks and all other adjacent facilities at all times. Whenever access is cut off in one direction, an

- alternative route for accessing all equipment and tankage must be maintained.
- D. Contractor shall coordinate delivery schedules, site access, and other construction-related activities with any other contractors that may be hired by the Owner during the course of construction.
 - E. Contractor shall assume full responsibility for security of all of their, and their subcontractors, materials and equipment stored on the site.
 - F. If directed by the Owner, Contractor shall move any stored items which interfere with operations of Owner.
 - G. Obtain and pay for use of additional storage or work areas if needed to perform the Work.
 - H. Contractor shall not have access to Owners lunch room, toilet or locker room facilities at any time and shall provide all necessary facilities in accordance with Specification Section 01500.

END OF SECTION

SECTION 01070

ABBREVIATIONS & SYMBOLS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Where any of the following abbreviations are used in these Specifications, they shall have the meaning set forth opposite each.

AASHTO	American Association of State Highway and Transportation Officials
AC	Alternating Current
ACI	American Concrete Institute
ACP	Asbestos Cement Pipe
AGA	American Gas Association
AIC	Ampere Interrupting Capacity
AGMA	American Gear Manufacturers Association
AIEE(IEEE)	American Institute of Electrical Engineers (Institute of Electrical and Electronics Engineers, Inc.)
AISC	American Institute of Steel Construction
amp	Ampere 125-16
Amer. Std.	American Standard for Cast Iron Pipe Flanges and Flanged Fittings, Class 125 (ASA B16 11960)
ANSI	American National Standards Institute
API	American Petroleum Institute
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American or Brown and Sharpe Wire Gage
AWWA	American Water Works Association
BOD	Biochemical Oxygen Demand
c.f.	Cubic Foot
c.f.m.	Cubic Foot Per Minute
c.f.s.	Cubic Foot Per Second
CI	Cast Iron
CIPRA	Cast Iron Pipe Research Association
CSI	Construction Specifications Institute
c.y.	Cubic Yards
DC	Direct Current
DEP	Department of Environmental Protection
DI	Ductile Iron
DOT	Department of Transportation
EDR	Equivalent Directional Radiation

EPA	U.S. Environmental Protection Agency
fps	Feet Per Second
ft.	Feet
gal.	Gallons
gpd	Gallons Per Day
gpm	Gallons Per Minute
HP	Horsepower
IBR	Institute of Boiler and Radiator Manufacturers
in.	Inches
inter.	Interlock
ISA	Instrument Society of America
kva	Kilovolt-ampere
kw	Kilowatt
lb.	Pound
max.	Maximum
MCB	Master Car Builders
MGD	Million Gallons Per Day
Min.	Minimum
NBS	National Bureau of Standards
NEC	National Electrical Code, Latest Edition
NEMA	National Electrical Manufacturers Association
NEWWA	New England Water Works Association
NPT	National Pipe Thread
OS&Y	Outside Screw and Yoke
PCA	Portland Cement Association
ppm	Parts Per Million
%	Percent
psi	Pounds Per Square Inch
psig	Pounds Per Square Inch Gage
PVC	Polyvinyl Chloride
rpm	Revolutions Per Minute
RUS	Rural Utility Service
s.f.	Square Foot
STL. W.G.	U.S. Steel Wire, Washburn and Moen, American Steel and Wire Cos., or Roebling Gage
s.y.	Square yard
TDH	Total Dynamic Head
USAS	Standards of the United States of America Standards Institute (formerly American Standards Association)
USS GAGE	United States Standard Gage
VC	Vitrified Clay
WSP	Working Steam Pressure
Fed. Spec.	Federal Specifications issued by the Federal Supply Service of the General Service Administration, Washington, D.C.

END OF SECTION

SECTION 01150MEASUREMENT AND PAYMENTPART 1 - GENERAL1.1 DESCRIPTION

- A. For lump sum items, payment shall be made to the Contractor in accordance with an accepted Progress Schedule and Schedule of Values on the basis of actual work completed.
- B. For unit-price items, payment shall be based on the actual amount of work accepted and for the actual amount of materials in place, as shown by the final measurements.
 - 1. All units of measurement shall be standard United States convention as applied to the specific items of work by tradition and as interpreted by the Engineer.
 - 2. At the end of each day's work, the Contractor's Superintendent or other authorized representative of the Contractor shall meet with the Resident Project Representative and determine the quantities of unit price work accomplished and/or completed during the work day.
 - 3. The Resident Project Representative will then prepare two "Daily Progress Reports" which shall be signed by both the Resident Project Representative and Contractor's Representative.
 - 4. Once each month the Resident Project Representative will prepare two "Monthly Progress Summation" forms from the month's accumulation of "Daily Progress Reports" which shall also be signed by both the Resident Project Representative and Contractor's Representative.
 - 5. These completed forms will provide the basis of the Engineer's monthly quantity estimate upon which payment will be made. Items not appearing on both the Daily Progress Reports and Monthly Progress Summation will not be included for payment. Items appearing on forms not properly signed by the Contractor will not be included for payment.
 - 6. After the work is completed and before final payment is made there for, the Engineer will make final measurements to determine the quantities of various items of work accepted as the basis for final settlement.

1.2 SCOPE OF PAYMENT

- A. Payments to the Contractor will be made for the actual quantities of the Contract items performed and accepted in accordance with the Contract Documents. Upon completion of the construction, if these actual quantities show either an increase or decrease from the quantities given in the Bid Form, the Contract unit prices will still prevail.
- B. The Contractor shall accept compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced by the Contract; also for all loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work and until its final acceptance by the Engineer, and

for all risks of every description connected with the prosecution of the work, except as provided herein, also for all expenses incurred in consequence of the suspension of the work as herein authorized.

- C. The payment of any partial estimate or of any retained percentage except by and under the approved final invoice, in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damage due to such defects.

1.3 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

- A. When alterations in the quantities of work not requiring supplemental agreements, as hereinbefore provided for, are ordered and performed, the Contractor shall accept payment in full at the Contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as stipulated in such agreements.

1.4 OMITTED ITEMS

- A. Should any items contained in the bid form be found unnecessary for the proper completion of the work contracted, the Engineer may eliminate such items from the Contract, and such action shall in no way invalidate the Contract, and no allowance will be made for items so eliminated in making final payment to the Contractor.

1.5 PARTIAL PAYMENTS

- A. Partial payments shall be made monthly as the work progresses. Partial payment shall be made subject to the provisions of the Supplemental and General Conditions.
- B. Technical Specifications may include Special Payment Provisions which provide additional restrictions on partial payments.

1.6 PAYMENT FOR MATERIAL DELIVERED

- A. When requested by the Contractor and at the discretion of the Owner, payment may be made for all or part of the value of acceptable, non-perishable materials and equipment which are to be incorporated into bid items, have not been used, and have been delivered to the construction site or placed in storage places acceptable to the Owner. Payment shall be subject to the provisions of the General and Supplementary Conditions.
- B. No payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures or other work of any kind which are not a permanent part of the Contract.

1.7 FINAL PAYMENT

- A. The Engineer will make, as soon as practicable after the entire completion of the project, a final quantity invoice of the amount of the Work performed and the value of such Work. Owner shall make final payments of the sum found due less retainages subject to the provisions of the General and Supplementary Conditions.

1.8 INCIDENTAL WORK

- A. Incidental work items for which separate payment is not made include (but are not limited to) the following items:

1. Dust control
2. Clean-up
3. Erosion control
4. Loam, seeding, grading, liming, fertilization, mulching and watering
5. Restoration of property, and replacement of fences, curbs, structures, sign posts, guard rails, rock wall, mail boxes, traffic loop detectors and other minor items disturbed by the construction activities
6. Project record documents
7. Materials testing
8. Construction schedules, bonds, insurance, shop drawings, warranties, guarantees, certifications, and other submittals required by the Contract Documents
9. Temporary utility services to buildings as required to maintain service during construction
10. Quality assurance testing
11. Validation testing
12. Building permits
13. Temporary construction and other facilities not to be permanently incorporated into the Work necessary for construction sequencing and maintenance of operations
14. Weather protection
15. Permits not otherwise paid for or provided by the Owner
16. Visits to the Project site or elsewhere by personnel or agents of the Contractor, including manufacturer's representatives, as may be required
17. On-site and other facilities acceptable to Engineer for the storage of materials, supplies and equipment to be incorporated into the Work
18. Mobilization/demobilization
19. Preconstruction photos and videos
20. Construction administration and insurance

1.9 DESCRIPTION OF PAY ITEMS

- A. The following sections describe the measurement of and payment for the work to be done under the respective items listed in the Bid Form.
- B. Each unit or lump sum price stated in the Bid Form shall constitute full compensation, as herein specified, for each item of the work completed.

(1) Mobilization & Demobilization

Mobilization and demobilization shall be paid for at the Lump Sum unit price as stated in the Bid Schedule. The amount for this item shall not exceed 5% of the subtotal of the remaining Bid Items. The lump sum contract price shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including but not limited to: preparing site for construction, marking public and private utilities, mobilization of equipment, submittal and acceptance of preconstruction photographs and videos, and all incidental work associated with mobilization and demobilization. Payment amount shall be full compensation for mobilization and demobilization costs. 80 percent of the lump sum shall be paid following mobilization of equipment and the submittal and acceptance

of the Pre-Construction Photographs. 20 percent of the lump sum shall be paid following site demobilization and cleanup.

(2) Installation of Mixing System at Forge Road Tank

Payment of the lump sum price for Item 2 shall be full compensation for furnishing all labor, materials, tools and equipment required and for installation of a tank mixer, electrical supply cables and conduits, control panel, electrical supply, and SCADA connection, tank cleaning, disinfection, laboratory testing and retesting, validation testing, repainting areas welded, scratched, or damaged during installation, complete as indicated on the Drawings and as specified and all its' appurtenances in its entirety, except that work included for payment under other items.

(3) Installation of Mixing System at Saunderstown Tank

Payment of the lump sum price for Item 3 shall be full compensation for furnishing all labor, materials, tools and equipment required and for installation of a tank mixer, electrical supply cables and conduits, control panel, electrical supply, and SCADA connection, tank cleaning, disinfection, laboratory testing and retesting, validation testing, repainting areas welded, scratched, or damaged during installation, complete as indicated on the Drawings and as specified and all its' appurtenances in its entirety, except that work included for payment under other items.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the Engineer will conduct project meetings throughout the construction period.
- B. Related work described elsewhere: The Contractor's relations with his subcontractors and materials suppliers and discussions relative thereto, are the Contractor's responsibility and are not part of project meetings content.

1.2 QUALITY ASSURANCE

- A. Persons designated by the Contractor to attend and participate in the project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.3 SUBMITTALS

- A. Agenda items: To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding all items to be added to the agenda.
- B. Minutes: The Engineer will compile minutes of each project meeting and will furnish a copy to the Contractor. The Contractor may make and distribute such other copies as he wishes.

PART 2 - PRODUCTS

(No products are required in this Section.)

PART 3 - EXECUTION

3.1 MEETING SCHEDULE

- A. Except as noted below for Preconstruction Meeting, project meetings will be held monthly. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.2 MEETING LOCATION

- A. Meetings will be held at the job site, unless the Owner and/or Engineer determine that virtual meetings are applicable and appropriate for any reason (e.g., COVID, Safety and Health Plan, etc.).
 - 1. If meetings are required by Owner/Engineer to be held virtually, Engineer will host the meetings via Microsoft Teams. All required meeting attendees are responsible for providing hardware necessary to view, share, be heard and hear content of the meeting.

3.3 PRECONSTRUCTION MEETING

- A. Preconstruction meeting will be scheduled within twenty days after the Effective Date of the Agreement, but before the Contractor starts work at the site. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Engineer will advise other interested parties and request their attendance.
- B. Minimum agenda: Distribute data on, and discuss:
 - 1. Identification of key project personnel for Owner, Engineer, Contractor, funding/regulatory Agencies.
 - 2. Responsibilities of Owner, Engineer, Resident Project Representative, Contractor.
 - 3. Channels and procedures for communications.
 - 4. Construction schedule, including sequence of critical work.
 - 5. Easements, permits.
 - 6. Contract Documents, including distribution of required copies of original documents and revisions.
 - 7. Processing of Shop Drawings and other data submitted to the Engineer for review.
 - 8. Processing of field decisions and Change Orders.
 - 9. Rules and regulations governing performance of the Work, including funding/regulatory Agency requirements.
 - 10. Procedures for safety and first aid, security, quality control, housekeeping, and other related matters.

3.4 PROJECT MEETINGS

- A. Attendance: To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work. The Superintendent shall attend. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspects of the Work are involved.
- B. Minimum agenda:
 - 1. Review, revise as necessary, and approved minutes of previous meeting.
 - 2. Review progress of the Work since last meeting, including status of submittals for approval.
 - 3. Review schedule of work to be accomplished prior to next meeting.
 - 4. Discuss monthly partial payment request.
 - 5. Review status of change order requests and Work Directive Changes.
 - 6. Identify problems which impede planned progress.
 - 7. Develop corrective measures and procedures to regain planned schedule.
 - 8. Complete other current business.

END OF SECTION

SECTION 01310CONSTRUCTION SCHEDULESPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Within ten (10) days after the effective date of the Agreement between Owner and Contractor submit to the Engineer an estimated progress schedule as specified herein.
- B. Form of Schedules:
 - 1. Narrative: Completely describe the construction methods to be employed.
 - 2. Network Analysis System:
 - a. Provide a separate horizontal schedule line for each trade or operation and show concurrent and preceding activities.
 - b. Present in chronological order the beginning of each trade or operation showing duration and float time.
 - c. Scale: Identify key dates and allow space for updating and revision.
 - 3. Mathematical Analysis:
 - a. A mathematical analysis shall accompany the network diagram. A computer printout will be acceptable.
 - b. Information shall be included on activity numbers, duration, early start, late start, etc. and float times.
- C. Content of Schedules:
 - 1. Provide complete sequence of construction by activity:
 - a. Shop Drawings, Project Data and Samples:
 - i. Submittal dates.
 - ii. Dates reviewed copies will be required.
 - b. Decision dates for:
 - i. Products specified by allowances.
 - ii. Selection of finishes.
 - c. Estimated product procurement and delivery dates.
 - d. Dates for beginning and completion of each element of construction.
 - 2. Identify work of separate phases and logically grouped activities.
 - 3. Show the projected percentage of completion for each item of work as of the first day of each month.
 - 4. Provide separate sub-schedules, if requested by the Engineer, showing submittals, review times, procurement schedules, and delivery dates.
 - 5. Schedule sheets shall be printed in color on 24"x36" paper, unless a smaller size paper is allowed by the Engineer.
- D. Updating:
 - 1. Show all changes occurring since previous submission.
 - 2. Indicate progress of each activity, show completion dates.
 - 3. Include:
 - a. Major changes in scope.
 - b. Activities modified since previous updating.

- c. Revised projections due to changes.
 - d. Other identifiable changes.
- 4. Provide narrative report, including:
 - a. Discussion of problem areas, including current and anticipated delay factors.
 - b. Corrective action taken, or proposed.
 - c. Description of revisions that may affect schedules.

1.2 SUBMITTALS

- A. Submit updated schedules with each progress payment request.
- B. Submit 4 copies of initial and updated schedules to the Engineer.

END OF SECTION

SECTION 01320

SAFETY AND HEALTH PLAN

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work, as outlined herein and in the General and Special Conditions of the Contract Documents. Within 10 days after the effective date of the Agreement between Owner and Contractor, submit to the Engineer a Safety and Health Plan as specified herein. Refer to submittals section below.
2. Contractor shall comply with all applicable Laws and Regulations related to the safety of persons or property, or for the protection of persons or property from damage, injury, illness, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
3. Contractor shall designate a qualified and experienced safety representative (OSHA defined "Competent Person") at the site whose duties and responsibilities shall be the prevention of accidents and maintaining and supervising of safety precautions and programs, including a "Job Hazards Analysis".
4. The Contractor shall be solely responsible to provide all labor, equipment, and utilities sufficient to ensure no construction noise, particulates, or odors, are allowed to accumulate to levels which adversely affect health or work in, or near the construction area.

B. Content of Safety and Health Plan:

1. Prepare complete safety and health plan in accordance with the requirements of CFR Title 29 Part 1926 - Safety and Health Regulations for Construction.
 - a. Provide documentation that Contractor's hazardous communication program is up to date.
 - b. Provide documentation that Contractor's safety training is up to date.
 - c. Prepare a project specific Safety and Health Plan addressing construction safety and protection, including but not limited to excavations, fall protection and egress, as well as provisions for construction in hazardous environmental conditions at the wastewater treatment facility. The hazardous environmental conditions at the wastewater treatment facility include, but are not limited to, confined space entry, electrically-classified spaces, chemical storage and handling areas, biological hazards, to name a few.
2. Safety provisions for confined space entry shall follow the requirements of CFR Title 29 Part 1926, Subpart AA – Confined Spaces in Construction and will be incorporated into the Safety and Health Plan.
3. The Owner has provided Table 1 at the end of this section listing chemical storage and handling spaces where the Contractor may be required to carry out

work tasks. The Contractor is required to perform a site evaluation to identify all hazards and potential hazards in work areas whether included in Table 1 or not, prior to control of site. Contractor shall ensure that all employees and subcontractors working in these areas have received appropriate training and are properly equipped in accordance with Contractor's Safety and Health Plan.

- C. Updating:
 - 1. Contractor shall be responsible for updating the Safety and Health Plan as appropriate throughout the course of the construction period.

1.2 SUBMITTALS

- A. Submit the Contractor's site-specific Safety and Health Plan to the Engineer, in accordance with Section 01340. Submit hardcopy submittals, if required.
- B. Submit updated Safety and Health Plans as necessary during the course of the project.
- C. The Safety and Health Plan is provided "for information only" to inform the Owner, Engineer and Resident Project Representative of the project specific safety program requirements; however, if the Safety and Health Plan incomplete (e.g., missing elements relevant to the project work), inadequate (e.g., outdated qualifications) or not project-specific, it will be returned "revise and resubmit". Delays related to an incomplete Safety and Health Plan are the responsibility of the Contractor.
- D. The Contractor will overview the plan with the Owner (and staff), Engineer (and Resident Project Representative) prior to work beginning at the project site, and subsequently when/if the safety plan is updated.
- E. Contractor's most current Safety and Health Plan shall be available at the construction site throughout the construction project.

1.3 ON-SITE COORDINATION MEETINGS

- A. Contractor shall review key aspects of Safety and Health Plan at the Pre-Construction Meeting, and subsequent on-site safety informational meeting.
- B. Contractor shall report to Engineer and Owner at each progress meeting concerning compliance with the Safety and Health Plan for the most recent construction period and new considerations and requirements for the upcoming period.
- C. Contractor shall hold weekly on-site coordination meetings with Resident Project Representative and Owner to ensure that Owner's staff is aware of key Safety and Health Plan requirements of the current phase of construction.

1.4 OWNER'S CONFINED SPACE ENTRY PROGRAM INFORMATION

- A. A copy of the Owner's Confined Space Entry Program is available for viewing at the facility and is not included herein.

1.5 SITE-SPECIFIC INFORMATION

- A. Refer to Tables 1 below for site specific information, excluding items such as manholes, handholes, etc.

TABLE 1
WELL STATIONS NO. 1 THROUGH 10
CHEMICAL HAZARDS LISTING

Location	Chemical Hazard
Well Station No. 1 Through 10	Sodium Hypochlorite, Sodium Hydroxide, Sequest (Blended Polyphosphate)

Note: This list has been provided by the Owner based upon their knowledge of the site and may not include all site hazards. Its intent is to aid the Contractor in determining the magnitude of effort needed to fulfill the safety and health requirements of this Contract.

END OF SECTION

SECTION 01340SUBMITTALSPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included:
 - 1. Submit all shop drawings, operations and maintenance manuals, Manufacturers' certificates, project data, and samples required by the Specifications.
- B. Related Work Specified Elsewhere:
 - 1. Construction Schedules: Section 01310
 - 2. General Conditions
- C. Submittals: This project shall utilize:
 - 1. Submittals – Electronic via Email/FTP with Hard Copy for Record
 - a. The Contractor shall submit to the Engineer an electronic submittal of shop drawings and O&M Manuals in portable document format (PDF) transmitted via email or file transfer protocol (FTP). The Engineer shall return an electronic PDF of the submittal review comments to the Contractor for distribution to subcontractors, suppliers and manufacturers. The electronic submittals shall serve as the electronic record of the project.
 - b. In addition, completed shop drawings and completed operations and maintenance (O&M) manuals shall be provided in hard copy (paper) format, for the record, in accordance with the following requirements.
 - i. Shop drawings and O&M manuals shall be considered “completed” once an action code of “0” or “1” has been attained, as specified below, unless otherwise directed by the Engineer.
 - ii. Once completed, the Contractor shall provide three hard copy sets (for Owner, Engineer and Resident Project Representative, respectively).
 - iii. Hard copy submittals shall be updated on a monthly basis, for those submittals completed during the preceding month.

1.2 SHOP DRAWINGS

- A. Shop Drawings are required for each and every element of the work.
- B. Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the Contractor, his subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.
- C. The Contractor shall provide a completed Contractor Submittal Certification Form (copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of every shop drawing and signed by the Contractor and Manufacturer (where applicable). Shop Drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. 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 the work.

1. Each shop drawing submittal shall include a complete copy of the relevant specification section markup up to reflect “compliance” or “deviation” on an item-by-item basis.
- D. Shop Drawings shall be submitted as a complete package by specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials and samples associated with each specification section be included as a single submittal for the Engineer's review. Any deviation from this requirement, shall be requested in writing with an anticipated shop drawing breakdown/schedule prior to any associated submittal. An exception to this requirement are shop drawings for reinforcing steel, miscellaneous metals and structural steel, which shall be submitted separately for each structure unless otherwise permitted by the Engineer.
- E. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.
- F. No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.
- G. Until the necessary review has been made, the Contractor shall not proceed with any portion of the work (such as the construction of foundations), the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which review is required.
- H. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his subcontractors and returning reviewed drawings to them. Shop drawings shall be formatted to standard paper sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard sizes shall be: (a) 24 inches by 36 inches; (b) 11 inches by 17 inches, and (c) 11 inches by 8-1/2 inches. Provision shall be made in preparing the shop drawings to provide a binding margin on the left hand side of the sheet. Shop drawings submitted other than as specified herein may be returned for resubmittal without being reviewed.
- I. Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, 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. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer.
- J. If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in the transmittal. Shop Drawings that contain significant deviations that are not brought to the attention of the Engineer may be subject to rejection.
- K. Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires and appurtenances, layout, etc., detailed on the Drawings, he shall also submit details of the proposed modifications. If such

equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications.

- L. A maximum of two submissions of each Shop Drawing will be reviewed, checked, and commented upon without charge to the Contractor. Any additional submissions which are ordered by the Engineer to fulfill the stipulations of the Drawings and Specifications, and which are required by virtue of the Contractor's neglect or failure to comply with the requirements of the Drawings and Specifications, or to make those modifications and/or corrections ordered by the Engineer in the review of the first two submissions of each Shop Drawing, will be reviewed and checked as deemed necessary by the Engineer, and the cost of such review and checking, as determined by the Owner, and based upon Engineer's documentation of time and rates established for additional services in the Owner-Engineer Agreement for this Project, may be deducted from the Contractor to make all modifications and/or corrections as may be required by the Engineer in an accurate, complete, and timely fashion. Resubmittals for the sole purpose of providing written responses to review comments will not be considered a resubmittal counting towards the two submission limit.
- M. Shop Drawings that include drawings or other material that is illegible or too small may be returned without review.

1.3 SAMPLES

- A. The Contractor shall submit samples when requested by the Engineer to establish conformance with the specifications, and as necessary to define color selections available. Submittals of "samples" shall be documented through the electronic submittal process by including a photograph of the item(s) and indicating the date the sample was mailed and/or delivered.

1.4 OPERATION AND MAINTENANCE MANUALS

- A. Operation and Maintenance (O&M) Manuals are required for certain elements of the project, as specified herein.
- B. The Contractor shall provide a completed Operation and Maintenance Manual Certification Form (copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of every Manual and signed by the Contractor and Manufacturer.
- C. Each hard copy of an O&M Manual shall be provided in a stand-alone binder or shall be suitable for insertion into a 3-ring binder. Include the General Contractor's and Manufacturer's representative's contact information on the front cover. O&M manuals must be appropriate for the project and customized for the project. If a Manufacturer's standard O&M manual is included in the submittal, all non-applicable content must be removed or crossed out.
- D. O&M Manuals shall contain the following operational information:
 - 1. Safety Precautions: List personnel hazards, equipment or product safety precautions for all operating conditions.
 - 2. Operator Prestart: Include all procedures required to set up and prepare each system, equipment or component for use.
 - 3. Startup Procedures: Provide a narrative description for all startup operating procedures, include all control sequences.
 - 4. Shutdown Procedures: Provide a narrative description for all shutdown operating procedures, include all control sequences.

5. Post-Shutdown Procedures: Provide a narrative description for all post-shutdown operating procedures, include all control sequences.
 6. Normal Operating Procedures: Provide a narrative description of normal operating procedures. Include control diagrams with data to explain operation and control of systems and specific equipment.
 7. Emergency Operations: Include emergency procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include emergency shutdown instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance on emergency operations of all utility systems including valve locations and portions of systems controlled.
 8. Operator Service Requirements: Include instructions for services to be performed by the operator such as lubrication, adjustment, inspection, alignment, spare parts installation and gage reading or recording.
 9. Environmental Conditions: Include a list of environmental conditions (temperature, humidity, and other relevant data) which are best suited for each product or piece of equipment and describe conditions under which the equipment should not be allowed to run.
- E. O&M Manuals shall contain the following maintenance information:
1. Lubrication Data: Include a table showing recommended lubricants for specific temperature ranges and applications. Also, include charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, capacities and a lubrication schedule showing service interval frequency
 2. Preventative Maintenance Plan: Include the manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation as well as to ensure minimization of corrective maintenance and repair. Provide the manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide the manufacturer's specified frequency and procedures for each separate operation.
 3. Troubleshooting Guides: Include recommendations on procedures and instructions for correcting problems and making repairs. Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.
 4. Wiring and Control Diagrams: Provide Wiring diagrams and control diagrams. All diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to the actual installation numbering.
 5. Maintenance and Repair Procedures: Include instructions and list the tools required to restore products and/or equipment to proper conditions or operating standards.

6. Removal and Replacement Instructions: Include step-by-step procedures, list required tools/supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.
 7. Spare Parts and Supply Lists: Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. Special consideration shall be required for facilities at remote locations. List spare parts and supplies that have a long lead times to obtain.
 8. Corrective Maintenance Work Hours: Include the manufacturer's projection of corrective maintenance work-hours including craft requirements by type of craft. Corrective maintenance that requires participation of the equipment manufacturer shall be identified and tabulated separately.
- F. O&M Manuals shall contain the following additional information:
1. Parts Identification: Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirements to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items.
 - a. When illustrations omit a part number and description, both the illustration and a separate listing shall show the index, reference, or key number which shall cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as a master parts catalog, in accordance with the manufacturer's standard commercial practice.
 2. Warranty Information: List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents to keep warranties in force. Include warranty information for all primary components included in product systems.
 3. Personnel Training Requirements: Provide information available from the manufacturers to use in training designated personnel to operate and maintain the equipment and systems properly.
 4. Testing and Special Tools: Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.
 5. Contractor Information: Provide a list that includes the name, address, and telephone number of the General Contractor and each subcontractor installing the respective product or equipment. Include local representatives and service organizations most convenient to the project site. Provide the name, address, and telephone number of the product or equipment manufacturers.

6. Written confirmation from the manufacturer that the Contractor has coordinated the equipment One Year Service Call in accordance with specification Section 01800, par. 1.1, A, 2.

1.5 MANUFACTURER'S CERTIFICATES

- A. Prior to accepting the installation, the Contractor shall submit manufacturer's certificates for each item specified.
- B. Such manufacturer's certificates shall state that the equipment has been installed under either the continuous or periodic supervision of the manufacturer's authorized representative, that it has been adjusted and initially operated in the presence of the manufacturer's authorized representative, and that it is operating in accordance with the specified requirements, to the manufacturer's satisfaction. All costs for meeting this requirement shall be included in the Contractor's bid price.

1.6 SUBMISSION REQUIREMENTS

- A. Accompany submittals with a transmittal cover sheet, containing:
 1. Date.
 2. Project title and number.
 3. Contractor's name and address.
 4. The sequential shop drawing number for each shop drawing, project data and sample submitted shall be:
 - a. Specification Section number followed by a dash and then a sequential number beginning with 01 (e.g., 16000-01).
 - b. Under limited situations when additional different pieces of equipment are submitted under the same specification section, those submittals shall be numbered sequentially (e.g. 05500-01, 05500-02, 05500-03, etc.).
 - c. Resubmittals shall include an alphabetic suffix after the corresponding sequential number (e.g., 16000-01A).
 - d. O&M submittals shall be numbered with the Specification Section number followed by a dash, the letters "OM", another dash, and then a sequential number beginning with 01 (e.g. 16000-OM-01). Resubmittals of O&Ms shall include an alphabetic suffix after the corresponding sequential number (e.g. 16000-OM-01A).
 5. Notification of deviations from Contract Documents.
 6. Other pertinent data.
- B. A completed Contractor Submittal Certification Form shall be attached to each hardcopy and electronic PDF of each shop drawing and must include:
 1. Project name
 2. Specification Section and sequential number with alphabet suffix for resubmittal
 3. Description
 4. Identification of deviations from Contract Documents.
 5. Contractor's stamp, initialed or signed, certifying review of the submittal, verification of field measurements and compliance with Contract Documents.
 6. Where specified or when requested by the Engineer, manufacturer's certification that equipment, accessories and shop painting meet or exceed the Specification requirements.
 7. Where specified, manufacturer's guarantee.

C. Additional Requirements for Electronic Submittals:

1. Each individual shop drawing or O&M submittal shall be contained in one PDF.
2. The first page of the PDF shall be the Contractor Submittal Certification Form as described above.
3. The electronic PDF shall be **exactly** as submitted in the hardcopy.
4. The electronic PDF shall include an electronic table of contents that is bookmarked for each section of the submittal.
5. The electronic PDF shall be configured such that is fully searchable.
6. PDF versions of 24x36 drawings shall be converted to 24 x 36 PDFs so as not to lose the clarity of the original drawing.
7. Electronic PDF submittals that are not submitted in accordance with the requirements stated above will not be reviewed by the Engineer.
8. Electronic submittals shall be transmitted via the protocol established in Part 1 above.

1.7 RESUBMISSION REQUIREMENTS

- A. Revise initial submittals as required and resubmit as specified for initial submittal.
- B. Indicate on submittals any changes which have been made other than those required by Engineer. All renumbering of shop drawings, relabeling of individual pieces or assemblies or relocating of pieces or assemblies to other Drawings within the submittal shall be clearly brought to the attention of the Engineer. If relabeling of individual pieces or assemblies has taken place, the labels from the previous submittal shall be indicated to assist in comparing the original and resubmitted shop drawing.
- C. All resubmittals shall include a summary of the previous submittal review comments with the vendors' written response as to how the previous comments were addressed.

1.8 ENGINEER'S REVIEW

- A. The review of shop and working drawings hereunder will be general only, and nothing contained in this specification shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.
- B. The Engineer's review comments will be summarized on a Submittal Review Form, which includes an action code. A description of each action code is provided below.
 1. No Exceptions Taken (Status 0 on shop drawing log). The shop drawing complies with the Contract Document requirements. No changes or further information are required. Where appropriate, the submittal review form will be used to alert the Contractor, Owner and Field personnel of remaining items within that specification section that still needs to be submitted.
 2. Make Corrections Indicated (Status 1 on shop drawing log). The shop drawing complies with the Contract Document requirements except for minor changes, as indicated. Engineer requires that all comments will be addressed by the Contractor, unless otherwise notified in writing prior to execution of the relevant work.
 3. Conditional to Remarks (Status 2 on shop drawing log). The shop drawing potentially complies with the Contract Document requirements, contingent upon satisfactory resolution of review comments. Remarks will explicitly list

what information needs to be resubmitted. Resubmittal from the Contractor should include a cover letter or summary which indicates how each review comment has been addressed. **This action code will not be used, or will be sparingly used, for electronic submittals.**

4. Revise and Resubmit (Status 3 on shop drawing log). The shop drawing does not comply with the Contract Document requirement as submitted but may with changes indicated and/or submission of additional information. The entire package must be resubmitted with the necessary information and a cover letter which indicates how each review comment has been addressed and where to find the information in the resubmittal.
5. Rejected (Status 4 on shop drawing log). The shop drawing does not comply with the Contract Document requirements, for the reasons indicated in the remarks, and is unacceptable.
6. For Information Only (Status 5 on shop drawing log). The shop drawing review was for information only.
7. In Review (Status 6 on shop drawing log). The shop drawing is currently under review.

CONTRACTOR SUBMITTAL CERTIFICATION FORM

PROJECT: _____ CONTRACTOR'S PROJ. NO: _____

CONTRACTOR: _____ ENGINEER'S PROJ. NO: _____

ENGINEER: _____

SHOP
DRAWING
NUMBER:SPECIFICATION SECTION
OR DRAWING NO:SEQUENTIAL NUMBER
(& ALPHA SUFFIX FOR
RESUBMITTAL)

DESCRIPTION: _____

MANUFACTURER: _____

The above referenced submittal has been reviewed by the undersigned and I/we certify that the material and/or equipment meets or exceeds the project specification requirements with

☐ NO DEVIATIONS

or

☐ A COMPLETE LIST OF DEVIATIONS AS FOLLOWS^a:

By: _____

By: _____

Contractor^bManufacturer^c

Date: _____ Date: _____

a Any deviations not brought to the attention of the Engineer for review and concurrence shall be the responsibility of the Contractor to correct, if so directed.

b Required on all submittals

c When required by specifications Page ____ of ____

General Contractor's Stamp

OPERATIONS AND MAINTENANCE MANUAL CERTIFICATION FORM

PROJECT: _____ CONTRACTOR'S PROJ. NO: _____

CONTRACTOR: _____ ENGINEER'S PROJ. NO: _____

ENGINEER: _____

O&M NUMBER:	_____	- OM -	_____
	SPECIFICATION SECTION OR DRAWING NO:		SEQUENTIAL NUMBER (& ALPHA SUFFIX FOR RESUBMITTAL)

DESCRIPTION: _____

MANUFACTURER: _____

The above referenced operations and maintenance manual has been reviewed by the undersigned and I/we certify that the manual is customized as needed for this project, is suitable for mounting in a 3-ring binder, and contains the following items:

- | | |
|--|--|
| <input type="checkbox"/> Table of Contents | <input type="checkbox"/> Project-Related Design Data |
| <input type="checkbox"/> Contractor and Manufacturer Contact Information | <input type="checkbox"/> Serial Numbers |
| <input type="checkbox"/> Preventative Maintenance Schedule and Summary | <input type="checkbox"/> Maintenance and Repair Procedures |
| <input type="checkbox"/> Removal and Replacement Instructions | <input type="checkbox"/> Wiring and Control Diagrams |
| <input type="checkbox"/> Lubrication Schedule | <input type="checkbox"/> Equipment Drawings & Schematics |
| <input type="checkbox"/> Troubleshooting Information | <input type="checkbox"/> Equipment Performance Curves |
| <input type="checkbox"/> Warranty Information | <input type="checkbox"/> Parts and Service Contact Information |
| <input type="checkbox"/> Rebuild Information for All Components | <input type="checkbox"/> Manufacturer's Contact Information |
| <input type="checkbox"/> Startup, Operation and Shutdown Procedures | <input type="checkbox"/> Emergency Operations Plan |
| <input type="checkbox"/> Normal and Emergency Operations | <input type="checkbox"/> List of All Component Part Numbers |
| <input type="checkbox"/> Safety Procedures and Precautions | <input type="checkbox"/> List of Spare Parts Supplied |
| <input type="checkbox"/> Shop Drawings corrected to As-Built Conditions | <input type="checkbox"/> Testing Equipment & Special Tools |
| <input type="checkbox"/> Personnel Training Requirements | <input type="checkbox"/> Other System Specific Information |

By: _____ By: _____

Contractor^a

Manufacturer^b

Date: _____ Date: _____

^a Contact information shall include name, address and telephone number.

^b Required on all Operation and Maintenance Manuals.

^c When required by Specifications. Page ____ of ____

General Contractor's Stamp

PROCESS EQUIPMENT MANUFACTURER SUBMITTAL CERTIFICATION
(Divisions 11 and 14)

Owner: _____ Date: _____

Project: _____

Contractor: _____

Equipment Manufacturer: _____

Equipment: _____

As an authorized representative of the equipment manufacturer, the undersigned certifies that the equipment listed above conforms to the requirements of Section 11000, Part 1.3.K. The undersigned authorized representative of the manufacturer further certifies that the equipment manufacturer or supplier has: reviewed the Construction Documents, the intended installation by the Contractor, and the intended functional and operational conditions; determined all conditions to be acceptable; and found no conditions which would cause the warranty to be void; or the equipment to function improperly, or not meet the performance requirements.

(Authorized Representative of the Manufacturer)

(Date)

END OF SECTION

SECTION 01380CONSTRUCTION PHOTOGRAPHSPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Pre-Construction Record: Contractor shall take digital photographs and video to obtain a visual record of the project area prior to beginning any work at the project site.

1.2 QUALITY

- A. Pre-Construction Record: Quality shall be such that the condition of existing pavement, curbing, driveway entrances, sidewalks, walls, doors, equipment, piping, etc. can be readily determined.

1.3 SUBMITTAL OF PRINTS

A. Pre-Construction Record:

1. Submit pre-construction photographs/videos in accordance with Section 01340 prior to initiating any work on-site.
- B. The quality of the photos and video are subject to approval by the Engineer.
 - C. Photographs and videos taken for the project and submitted are released to the Owner and Engineer for reproduction and use for records retention, governmental and commercial purposes.

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. General Quality Control.
- B. Workmanship.
- C. Manufacturer's Instructions.
- D. Manufacturer's Certificates.
- E. Manufacturer's Field Services.
- F. Testing Laboratory Services.

1.2 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions: Inspection and testing required by governing authorities.
- B. Section 01340 - Submittals: Submittal of Manufacturer's Instructions
- C. Section 02200 - Earthwork
- D. Section 02210 – Vacuum Excavation/ Hydro-Vacuum Excavation
- E. Section 02300 - Foundation Piles
- F. Section 02513 – Bituminous Concrete Paving
- G. Section 03300 - Cast-in-Place Concrete
- H. Section 03305 - Concrete Testing
- I. Section 03930 – Concrete Coatings
- J. Section 04200 - Masonry
- K. Section 05120 - Structural Steel
- L. Section 13121 – Pre-Engineered Metal Buildings
- M. Section 15064 - Stainless Steel Piping

1.3 QUALITY CONTROL

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.4 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.5 MANUFACTURERS' INSTRUCTIONS

- A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

1.6 MANUFACTURERS' CERTIFICATES

- A. When required by individual Specifications Section, submit manufacturer's certificate that products meet or exceed specified requirements.

1.7 MANUFACTURERS' FIELD SERVICES

- A. When specified in respective Specification Sections, require supplier and/or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to make appropriate recommendations.
- B. Representative shall submit written report to Engineer listing observations and recommendations.

1.8 TESTING LABORATORY SERVICES

- A. Owner will employ and pay for services of an Independent Testing Laboratory to perform inspections, tests, and other services wherever an Independent Testing Laboratory is required by individual specification sections listed in paragraph 1.2 above, unless otherwise indicated.
- B. Services will be performed in accordance with requirements of governing authorities and with specified standards.
- C. Reports will present observations and test results and indicate compliance or non-compliance with specified standards and with Contract Documents. Independent Testing Laboratory will submit one copy of each report directly to each of the following: Engineer, Resident Project Representative, Contractor. Reports will be submitted within 5 days of obtaining test results. If test results indicate deficiencies, Independent Testing Laboratory shall telephone or email results to Engineer, Resident Project Representative and Contractor within 24 hours.
- D. Contractor shall cooperate with Independent Testing Laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.
- E. Contractor shall notify Engineer at least one full working day prior to needing testing laboratory services. Engineer will notify Independent Testing Laboratory. If scheduled tests or sampling cannot be performed because the work is not ready as scheduled, testing costs associated with the delay will be determined by Engineer and invoiced by Owner to Contractor. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price. If adequate notice is not provided, Contractor shall suspend work on that portion of the Project until testing can be performed. Such suspension will not be grounds for a claim against the Owner for delay, nor will it be an acceptable basis for an extension of time.
- F. Payment for Independent Testing Laboratory services shall be as follows:
 - 1. General: Where testing is the Owner's responsibility, payment will be made as stated below unless other requirements are given in Specification Sections. Testing which is the responsibility of the Contractor will be considered an incidental item unless otherwise indicated in Section 01150, Measurement and Payment.
 - 2. Initial Testing: Owner will pay for initial tests.
 - 3. Retesting: Costs of retesting due to non-compliance will be paid by Owner. The cost of retesting will be determined by Engineer and Owner will invoice

Contractor for this cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price.

4. Contractor's Convenience Testing: Inspections and tests performed for Contractor's convenience will be paid for by Contractor.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01500TEMPORARY FACILITIES AND CONTROLSPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Provide and pay for all temporary applicable utilities required to properly perform the Work at no additional cost to the Owner including the placement and removal of the utilities.
2. Completely remove all temporary equipment and materials upon completion of the Work and repair all damage caused by the installation of temporary utilities.
3. Make all necessary applications and arrangements for electric power, light, water and other utilities with the local utility companies. Notify the local electric power company if unusually heavy loads, such as welders, will be connected.
4. Provide temporary protection of existing concrete tanks and other unheated concrete structures taken out of service for the General Contractor to complete the Work as indicated on the Contract Documents in that area.
5. Contractor shall provide temporary ventilation during construction as required to ensure a safe working environment. The temporary ventilation systems shall address the following conditions, including but is not limited to: removal of hazardous fumes from explosion-proof rated spaces (Class 1, Division 1 rated spaces), removal of paint fumes and other potentially toxic conditions associated with the contractor's activities, and ventilation of confined spaces, in compliance with all OSHA and State safety requirements.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Obtain permits as required by local governmental authorities.
2. Obtain easements, when required, across private property other than that of the Owner for temporary power service.
3. Comply with the latest National Electrical Code.
4. Comply with all local, State and Federal codes, laws, and regulations.

B. All temporary utilities are subject to the approval of the Engineer.

PART 2 - PRODUCTS2.1 MATERIALS

A. Electrical:

1. The General Contractor shall make necessary arrangements with the local power company for connection to the existing power supply and shall provide and pay for all temporary light and power requirements except as otherwise specified hereunder. In general, the temporary electrical service shall include all necessary switches, poles, wiring, cables, conduit, raceways, panelboards,

fixtures, lamps and receptacles to supply construction power of adequate capacity for the project. Temporary transformers and meters shall be furnished and installed by the appropriate power authority, but paid for by the General Contractor, who shall be responsible for making all arrangements for their installation prior to using any existing power for temporary purposes.

2. Use new or used materials adequate in capacity for the purposes intended.
 3. Materials must not create unsafe conditions or violate the requirements of applicable codes.
 4. Conductors:
 5. Wire, cable or busses of appropriate type, sized in accordance with the latest National Electrical Code for the applied loads.
 6. Use only UL approved wire.
 7. Conduit:
 8. Rigid steel, galvanized: ANSI C80.1.
 9. Electrical metallic tubing: ANSI C80.3.
 10. Other material approved by NEC.
 11. Equipment: Provide appropriate enclosures for the environment in which used in compliance with NEMA Standards.
 12. Temporary power shall be based upon the following minimum requirements:
 13. Lighting - 300 watt per 1,000 square feet of floor area.
 14. Receptacles - One 15 ampere duplex for 1,000 square feet of floor space.
 15. Special Construction Equipment - Provide one 30-amp, 2-pole fused switch for equipment connection. The cost for cables and connection from switch to the special equipment will be borne by the Sub-Contractor requiring same.
 16. The General Contractor will pay for the cost of energy consumed by all trades, including cost of lamp replacement. The General Contractor and Subcontractors of all trades shall furnish their own extension cords and such additional lamps as may be required for their work, shall pay for the cost of temporary wiring of a special nature for light and power required, other than that above mentioned.
 17. All temporary work shall be furnished and installed in conformity with the National Electrical Code and in accordance with local ordinances and requirements of the municipal power authority. All temporary wiring and accessories shall be removed after it has served its purpose.
- B. Heating and Ventilation:
1. The General Contractor shall furnish, install, and maintain a complete temporary heating and ventilation systems, including fuel therefore, which will provide heat and ventilation as required by the trades and for the protection of personnel in the work spaces, and stored and installed materials from injury as can be caused by dampness and cold. The General Contractor shall employ, within the terms of the General Contract, a competent watchman who will maintain and operate the systems, as required. The General Contractor shall bear all costs incurred from the temporary heating and ventilation from the time the systems are first required until the date of Substantial Completion of the General Contract, as defined in the General Conditions and Supplementary Conditions.

2. Under no circumstance shall the permanent heating system be used for temporary heating purposes, until the building/buildings have been considered as satisfactorily enclosed by the Engineer, specified hereunder.
 3. Temporary heating equipment must be smokeless and fumeless type, Underwriters Laboratories, Factory Mutual, Fire Marshal and Engineer approved, and will fulfill the heating requirements specified hereunder.
 4. As soon as practicable, after the building/buildings have been considered satisfactorily enclosed by the Engineer, the General Contractor shall have the permanent heating and ventilation systems and apparatus put in operation. Electrical service, wiring, controls, and other essential parts of the permanent system must be installed prior to utilizing the heating system. The General Contractor shall pay for all power and fuel consumed in the temporary operation of the permanent systems until the time the building/buildings are partially or permanently occupied by the Owner, whichever comes first in accordance with the provisions specified herein for use and occupancy prior to acceptance by the Owner.
 5. After enclosure of the building/buildings and before installation of wet work such as interior masonry and tile, maintain temperatures of 50 degrees minimum, except for a period commencing 10 days prior to the installation of interior woodwork, interior flooring, or interior painting, whichever occurs first, after which time the temperature shall be maintained at a minimum of 65 degrees F., until the project is either partially or permanently occupied by the Owner.
- C. Water and Sanitary:
1. The General Contractor shall make necessary arrangements for connection to the municipal water supply and shall provide, at his own expense, any extensions as required for the operation of this project. The General Contractor shall bear all costs incurred for the temporary water services, including the costs of the water itself.
 2. All lines, temporary or permanent, shall be protected and maintained by the General Contractor. Temporary lines shall be removed by the General Contractor when the temporary service is no longer required.
 3. The General Contractor shall provide an adequate drinking water supply, satisfactorily cooled, for his employees.
 4. See Site Plan for nearest water hook-up.
 5. The General Contractor shall furnish, install, maintain and pay for adequate temporary chemical type toilet accommodations, for all persons employed on the work and located where approved by the Engineer. The accommodations shall be in proper enclosures and in accordance with Municipal Ordinances and shall be maintained in proper, safe and sanitary conditions and suitably heated when requested.
 6. Relocate temporary toilet facilities as required to facilitate the construction.
 7. Remove all temporary facilities at completion of work when directed by the Engineer.
- D. Protection of Existing Concrete Tanks and other Unheated Concrete Structures taken out of Service:

1. The General Contractor shall provide protection as required to maintain the surface temperatures of the existing concrete above 40 degrees F during the months of November through March and other periods during which the ambient air temperature is below 32 degrees F. The General Contractor shall be responsible for all means and methods to maintain the specified temperature at no additional cost to the Owner.
2. The General Contractor shall furnish and monitor surface thermometers on the concrete surfaces.
3. The above listed requirement is a minimum required to prevent the structure from freezing. If the nature of the work within the structure requires a greater air temperature to perform the work (such as application of coatings), the requirements of Part 2.1.B shall apply.
4. If, in the opinion of the Engineer, the work required in the unheated structure is of a short duration or the anticipated ambient air temperatures will not drop below 40 degrees F, additional protection as required in Part D.1 may not be required. The General Contractor shall still be responsible for monitoring the temperature of the concrete surfaces and providing protection if they drop below 40 degrees F.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Electrical:

1. Provide electrical energy to:
 - a. All necessary points on the construction site so that power can be obtained at any desired point with extension cords no longer than 100 feet.
 - b. Construction site offices.
 - c. Lighting as required for safe working conditions at any location on the construction site.
 - d. Night security light.
 - e. When applicable, Owner's present facilities during the changeover of electrical equipment.
2. Maintain electrical energy throughout the entire construction period.
3. Capacity:
 - a. Provide and maintain adequate electrical service for construction use by all trades during the construction period at the locations necessary, as specified herein.
4. Installation:
 - a. Install all work with a neat and orderly appearance.
 - b. Have all installations performed by a qualified electrician.
 - c. Modify service as job progress requires.
 - d. Locate all installations to avoid interference with cranes and materials handling equipment, storage areas, traffic areas and other work.

B. Heating and Ventilation:

1. Maintain a heated and ventilated environment for the work at the temperature and for the length of time specified or as directed by the Engineer, and as needed to protect all individuals on the construction site.
 2. Precaution:
 - a. Operate temporary heating apparatus in such a manner that finished work will not be damaged.
 - b. Repair all damage, caused by temporary heating operations, to the complete satisfaction of the Engineer.
- C. Water:
1. Provide and maintain water for drinking and construction purposes as required for the proper execution of the Work.
- D. Sanitary Accommodations:
- a. Provide and maintain sanitary accommodations for the use of the employees of the General Contractor, subcontractors, and Engineer.
 - b. Sanitary accommodations shall meet the requirements of all local, State and Federal health codes, laws and regulations.
- E. Protection of Existing Tanks and other Unheated Structures taken out of Service:
1. The General Contractor shall provide protection and/or heat as required to maintain the specified temperature of the existing structure.
 2. The General Contractor shall document the condition of the structures immediately after they are taken out of service with either still photos or video.
 3. Precaution:
 - a. If additional heat is required, operate temporary heating apparatus in such a manner that the existing structure will not be damaged.
 - b. Repair all damage, caused by temporary heating operations, to the complete satisfaction of the Engineer.
 4. The General Contractor shall repair any concrete damaged as a result of the surface temperatures of the concrete dropping below 40 degrees F.

END OF SECTION

SECTION 01520SITE SECURITYPART 1 - GENERAL1.1 SECURITY PROGRAM

A. The Contractor shall:

1. Protect work premises and Owner's operations from theft, vandalism, and unauthorized entry.
2. Initiate program in coordination with Owner's existing security system at job mobilization.
3. Maintain program throughout construction period.

1.2 ENTRY CONTROL

A. The Contractor shall:

1. Restrict entry of persons and vehicles into Project site and existing facilities.
2. Allow entry only to authorized persons with proper identification.
3. Maintain log of workmen, visitors and deliveries and make log available to Owner on request.
4. Coordinate entrance of persons, vehicles (including deliveries) in such a manner to not interfere with Owner's operations.

B. Owner will control entrance of persons and vehicles related to Owner's operations.

1.3 RESTRICTIONS

- A. The Contractor shall not allow cameras on site or photographs taken except by written approval of Owner.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01600DELIVERY, STORAGE AND HANDLINGPART 1 - GENERAL1.1 DESCRIPTION

- A. This Section specifies the general requirements for the delivery, handling, storage and protection for all items required in the construction of the work. An updated delivery and storage log is required with the monthly payment requisition prior to approval. An example log is included in this section.
- B. Related Items:
 - 1. Section 01800: Equipment Start-Up, Certification and Operator Training.
 - 2. Section 11000: Equipment - General.

1.2 TRANSPORTATION AND DELIVERY

- A. Transport and handle items in accordance with manufacturer's instructions.
- B. Schedule delivery to reduce long term on-site storage prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than 120 days prior to installation without written authorization from the Engineer.
- C. Ship equipment, material and spare parts complete except where partial disassembly is required by transportation regulations or for the protection of components.
- D. Pack spare parts in containers bearing labels clearly designating contents and pieces of equipment for which intended, including cross reference of the applicable contract specification section.
- E. Deliver spare parts at the same time as pertaining equipment. Deliver spare parts to the Owner after completion of work.
- F. Deliver products to the site in manufacturer's original sealed containers or other packing system, complete with instructions for handling, storing, unpacking, protecting and installing.
- G. Instructions for handling, storing, unpacking, protecting and installing equipment shall be included in the Equipment O&M Manuals, which shall be submitted prior to the equipment being shipped to the site. This information shall be filed in a dedicated three ring binder(s) on-site, in the Contractor trailers, accessible to the Owner and Engineer. The binder(s) shall be clearly labeled, and include dividers for each specification section. The manufacturer-provided instructions for each equipment item shall be labeled with the specification number, equipment name, and equipment number. The instructions shall also be submitted to the Engineer.
- H. Assume responsibility for equipment material and spare parts just before unloading from carrier at site.
- I. All items delivered to site shall be unloaded and placed in a manner which will not hamper the Contractors normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.
- J. Provide equipment and personnel to unload all items delivered to the site.
- K. Promptly inspect shipment to assure that products comply with requirements, quantities are correct, and items are undamaged. For items furnished by others (i.e.

Owner, other Contractors), perform inspection in the presence of the Engineer.
Notify the Engineer in writing of any problems.

- L. Pay all demurrage charges if failed to promptly unload items.

1.3 STORAGE AND PROTECTION

- A. Store and protect products and equipment in accordance with the manufacturer's instructions, with seals and labels intact and legible. Storage instructions shall be studied by the Contractor and reviewed with the Engineer by them. Instructions shall be carefully followed and a written record of this kept by the Contractor for each product and pieces of equipment.
- B. Arrange storage of products and equipment to permit access for inspection. Periodically, inspect to make sure products and equipment are undamaged and are maintained under specified conditions.
- C. Provide protective maintenance during storage consisting of manually exercising equipment, inspecting mechanical surfaces for signs of corrosion or other damage, lubricating, applying any coatings as recommended by the equipment manufacturer necessary for its protection and all other precautions to assure proper protection of all equipment stored and for compliance with manufactures requirements related to warranties.
- D. Store loose granular materials on a solid flat surface in a well-drained area. Prevent mixing with foreign matter.
- E. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural, miscellaneous and reinforcing steel shall be stored off the ground or otherwise to prevent accumulation of dirt or grease, and in a position to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, cracking and spalling to a minimum.
- F. All mechanical and electrical equipment and instruments shall be covered with canvas and stored in a weather tight building to prevent injury. The building may be a temporary structure on the site or elsewhere, but it shall be satisfactory to the Engineer.
 - 1. All equipment shall be stored fully lubricated with oil, grease and other lubricants unless otherwise instructed by manufacturer.
 - 2. Moving parts shall be rotated at a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Log all rotation maintenance for each piece of equipment in the written record noted above.
 - 3. Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use. Log all startup for each piece of equipment in the written record noted above.
 - 4. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment at the time of acceptance.
 - 5. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the

manufacturer to be in condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

- G. The weather tight building shall be provided with adequate heating/cooling and ventilation as required by the manufacturer to prevent condensation. Maintain temperature and humidity within range required by manufacturer and to prevent condensation on the equipment being stored.
- H. Temporary heating and cooling is acceptable. Equipment shall be protected from environmental effects as required by the manufacturer and dependent on the season. Equipment that arrives on site without coating shall be protected from environmental impacts through coating or protection at the Contractor's expense. Any equipment that displays defects or corrosion from environmental impacts will not be accepted for installation.
- I. The location of all stored material and equipment shall be reviewed with the Owner and Engineer. The Owner and Engineer may request that equipment and material be moved to an alternate location to accommodate plant maintenance and operation, or if the location is deemed unacceptable or unsuitable.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING MONTHLY LOG

- A. An updated storage and delivery log is required with the monthly payment requisition prior to approval.
- B. The monthly log shall include the specification section, equipment description, equipment tagging, submittal approval date, date of equipment delivery, date of O&M submittal, contractor start-up sign-off, certified equipment testing date, operator training date, spare parts turnover date, required maintenance (activity and date), and equipment turnover (Owner's witness and date).

3.2 STORAGE AND PROTECTION

- A. Equipment requires acceptance and verification of the storage from the Owner, Engineer, Manufacturer and Contractor at the Engineer's discretion.
- B. Following delivery, the equipment warranty from the Manufacturer is the responsibility of the Contractor.
- C. All storage and maintenance will be the responsibility of the Contractor, conducted at the Contractor's expenses and verified by the Engineer.
- D. It is the Contractor's responsibility to coordinate all storage requirements on site as required by the Manufacturer to achieve acceptance.

Section 01600 Delivery, Storage and Handling

[illegible]

1. If equipment is delivered and placed in storage, all steps for Stored Equipment shall be followed and tracked separately
2. Log weekly start-ups of installed equipment, performed by Contractor, until Equipment Turnover

END OF SECTION

SECTION 01630SUBSTITUTIONS & PRODUCT OPTIONSPART 1 - GENERAL1.1 DESCRIPTION

- A. The below listed requirements are in addition to the requirements contained in the "Substitutions, (paragraph 8.3 - 8.5)" for other Projects use".

1.2 SUBMITTALS

- A. Submit a written application for approval completely describing the proposed substitution.
- B. Submit, when requested by the Engineer:
 - 1. Manufacturer's catalog data.
 - 2. Illustrations.
 - 3. Specifications.
 - 4. Samples.
 - 5. Other material that may be required to determine acceptability.

1.3 CRITERIA

- A. The following criteria will be used by the Engineer in determining the acceptability of proposed substitutions:
 - 1. Adaptability to the design.
 - 2. Functional performance.
 - 3. Quality of materials.
 - 4. Strength of materials.
 - 5. Complexity, frequency and cost of maintenance.

1.4 RESULTING CHANGES

- A. If proposed substitutions are judged as being acceptable, make all changes to structures, buildings, piping, electrical, and other items necessary to accommodate the substitutions, at no additional cost to the Owner.
- B. Whenever it may be written that an equipment manufacturer must have a specified period of experience with his product, equipment which does not meet the specified experience period can be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit for the duration of the specified time period which will guarantee replacement of that equipment in the event of failure.

- C. Engineer's Cost Reimbursement: 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.

END OF SECTION

SECTION 01710
PROJECT CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Maintain premises and public properties free from accumulations of waste, debris, and rubbish, caused by operations.
2. At completion of work, remove waste materials, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces. Leave project clean and ready for use.

1.2 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Conduct cleaning and disposal operations in accordance with all applicable local and state laws, ordinances, and code requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturers.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Cleaning During Construction:

1. Execute cleaning operations to ensure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
2. Entirely remove and dispose of material or debris during the progress of the work that has washed into or has been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as a result of the Contractor's operations.
3. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
4. At reasonable intervals during the progress of work, clean the site and dispose of waste materials, debris, and rubbish.
5. Clean interiors of buildings, when applicable, prior to finish painting, and continue to clean on an as-needed basis until buildings are ready for occupancy.
6. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw material from heights.
7. When applicable, schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.

- B. Control of Hazards:
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes which may create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- C. Disposal:
 - 1. Do not burn or bury rubbish and waste materials on project site.
 - 2. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.
- D. Final Cleaning:
 - 1. Employ experienced workmen, or professional cleaners, for final cleaning.
 - 2. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from all sight-exposed interior and exterior finished surfaces.
 - 3. Repair, patch and touch up marred surfaces to specified finishes.
 - 4. Broom clean paved surfaces.
 - 5. Rake clean non-paved surfaces of the project site.
 - 6. Restore to their original condition those portions of the site not designated for alterations by the Contract Documents.

END OF SECTION

SECTION 01715

TESTING, CLEANING AND DISINFECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included - Furnish all materials, labor and equipment required to test, clean and disinfect all new facilities to be in contact with potable water. These include:
 - 1. Submersible mixer, supports and electrical cable

1.2 REFERENCE SPECIFICATIONS

- A. AWWA Standard for Disinfection of Water Storage Facilities (AWWA C652).
- B. AWWA Standard for Disinfecting Water Mains (AWWA C651).
- C. AWWA Standard for Hypochlorites (AWWA B300).
- D. AWWA Standard for Disinfection of Water Treatment Plants (AWWA C653).
- E. AWWA Standard for Disinfection of Wells (AWWA C654).
- F. AWWA Standard for Field Disinfection (AWWA C655).

PART 2 - PRODUCTS

2.1 MATERIALS FOR DISINFECTION

- A. Sodium Hypochlorite or Calcium Hypochlorite shall meet the requirements of AWWA B300 and shall be suitable for use in potable water.
- B. Water used for cleaning, mixing chlorine solutions and washing down shall be taken from the distribution system.

2.2 EQUIPMENT

- A. All equipment used to mix, pump, convey, etc. the chlorine solution for disinfecting shall be dedicated for that purpose. Equipment shall be thoroughly cleaned beforehand and shall not have been used for or in contact with sewage, hazardous chemicals or wastes, etc.

PART 3 - EXECUTION

3.1 DISINFECTION

- A. All equipment inserted into the tank shall be disinfected as per AWWA C652 before it is placed back into service. After disinfection is complete prior to placing the tank into service, at least two (2) samples of water shall be taken from the tank and submitted to a certified laboratory for total coliform analysis. Copies of all test results shall be submitted to the Engineer. If results of the bacteriological tests are satisfactory, the disinfection process will be considered complete and the tank may be placed into service. If test results are unsatisfactory, the complete disinfection process shall be repeated. The Owner shall provide to the Contractor at no charge sufficient quantity of water to disinfect the tank once. Water required for repeated disinfection of the tank shall be purchased by the Contractor from the Owner at the current metered rate, or other agreeable pricing method.

- B. Also, if draining the tank is necessary, the water shall be released slowly in order to prevent any erosion downstream. Heavily chlorinated water shall be disposed of in accordance with AWWA C652, Appendix B. All discharged water will be dechlorinated/neutralized utilizing an approved neutralizing agent per AWWA C655. Once the water has been dechlorinated it will be tested for residual chlorine which shall not exceed the RIDEM ambient water quality criteria of 0.019 ppm. Once tested, the dechlorinated water shall be discharged to the localized storm drainage system.

3.2 SAMPLING

- A. Water samples shall be collected from the tank and tested for coliform bacteria and volatile organic chemicals (VOCs). Two sets of bacteria samples shall be required, one 24 hours after the first is collected. Heterotrophic plate count (HPC) analysis must be performed with each of the coliform samples. One (1) sample must be analyzed to confirm the absence of volatile organic compounds (VOCs). If these samples show the presence of coliform bacteria, HPC greater than 500/mL or detection of VOCs, the tank must be emptied, disinfected, and retested to achieve the above results prior to returning the tank into service.
- B. Samples shall be submitted to a State of Rhode Island certified laboratory. If tests are negative the facilities may be placed into operation. If tests are positive, appropriate measures shall be taken to clean and re-disinfect the facilities until a negative coliform test is obtained.

END OF SECTION

SECTION 01720PROJECT RECORD DOCUMENTSPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Keep accurate record documents for all additions, demolition, changes of material or equipment (from that shown on the Drawings), variations in work, and any other additions or revisions to the Contract (via Change Order, Work Change Directive, Field Order or Clarification).

B. Related Work Specified Elsewhere:

1. Shop Drawings, Project Data, and Samples are specified in "General Conditions" and Section 01340, Submittals.
2. Electrical System Record Drawing requirements are outlined in Section 16010.

1.2 MAINTENANCE OF DOCUMENTS

A. Maintain at job site, one copy of:

1. Contract Drawings
2. Specifications
3. Addenda
4. Reviewed Shop Drawings
5. Change Orders
6. Any other modifications to the Contract
7. Field Test Reports

B. Store documents in files and racks specifically identified for Record Drawing use, that are apart from documents used for construction.

C. File documents in a logical manner indexed for easy reference.

D. Maintain documents in clean, dry, legible condition.

E. Do not use record documents for construction purposes.

F. Make documents available at all times for inspection by the Engineer and Owner, and by the end of the project, transmit these documents to the Engineer.

G. Failure to maintain current records, as specified herein, shall be grounds for withholding additional retainage from monthly partial payment requests.1.3 RECORDING

A. Label each document "PROJECT RECORD" in large high printed letters.

B. Keep record documents current and do not permanently conceal any work until required information has been recorded.

C. General Field Recording Issues:

1. All swing ties shall be taken from existing, permanent features such as utility poles, corners of buildings and hydrants. Porches, sheds or other house additions shall be avoided as they could be torn down. A minimum of two swing ties shall be taken. Survey grade GPS coordinates are also acceptable.
2. Stations shall be recorded to the nearest foot.

3. Inverts shall be recorded to the nearest hundredth of a foot.
 4. Elevations shall be recorded to the nearest hundredth of a foot.
 5. Building dimensions shall be recorded to the nearest 1/4".
 6. Equipment and Piping shall be recorded to the nearest tenth of a foot, and the overall dimensions and layout of the equipment shall be adjusted to reflect the equipment provided.
- D. Project Record Drawings - Legibly mark Contract Drawings to record existing utilities and actual construction of all work, including but not limited to the following (where applicable):
1. Existing Utilities
 - a. Water mains and services, water main gate valves, sewer mains and services, storm drains, culverts, steam lines, gas lines, tanks and other existing utilities encountered during construction must be accurately located and shown on the Drawings. In congested areas supplemental drawings or enlargements may be required.
 - b. Show any existing utilities encountered in plan and profile and properly labeled showing size, material and type of utility. Ties shall be shown on plan. Utility shall be drawn to scale in section (horizontally and vertically) and an elevation shall be called out to the nearest hundredth of a foot.
 - c. When existing utility lines are broken and repaired, ties shall be taken to these locations.
 - d. If existing water lines are replaced or relocated, document the area involved and pipe materials, size, etc. in a note, and with ties.
 2. Manholes, Catch Basins, Valve Pits and other structures.
 - a. Renumber structure stationing to reflect changes.
 - b. Show ties to center of structure covers or hatches.
 - c. In general, show inverts at center of structures. However, for manholes with drop structures, or steep channels (greater than 0.2' change on slope), show inverts at face of manhole.
 - d. Show inverts for other structures at the face of the structure.
 - e. Draw any new structures that are added on plan and profile.
 - f. Show any field or office redesigns.
 - g. Redraw plan if the structure's location is moved more than 5 feet in any direction. Note: It is important to show existing utilities, as outlined in Paragraph 1 above, especially if they were one reason for relocating the sewer, manholes and other structures.
 - h. Redraw profile if inverts changed by more than 6 inches.
 3. Water Mains and Force Mains
 - a. Show ties to the location of all valves, bends (horizontal and vertical), tees and other fittings. The use of thrust blocks shall be recorded.
 - b. Revise elevations indicated on the Drawings to reflect actual construction.
 4. House Services
 - a. Draw all house services (even to empty lots) on plan, and show ties.
 - b. Show ties or distances to wyes from manhole.
 - c. Show chimneys heights in the profile.

- d. The Wright-Pierce "Sanitary Sewer Service Location" forms and "Water Service Location" forms shall be used to record sewer and water service information. A copy of these forms shall be provided to the Owner, along with the Record Drawing Set.
- 5. Yard Piping and Buried Electrical Conduit
 - a. Site piping and utilities shall be drawn to reflect the installed locations, with ties and elevation of all bends (horizontal and vertical).
 - b. Show routing for electrical conduits and pull boxes, especially in close proximity to buildings and when the conduits change direction or cross process piping.
- 6. Utilities
 - a. When encountered, additional utilities (e.g., gas, cable, telephone, fiber optic, etc.) shall be indicated on the Record Drawings.
- 7. Equipment Systems and Piping
 - a. Show any changes to equipment systems, whether interior or exterior, for process, HVAC, plumbing, instrumentation or electrical. If any dimensional changes were made in the field, the numerical change shall be made on the Drawing and be properly labeled. Update dimensions and elevations on Drawings. Record Drawings must reflect any equipment configuration and layout changes differing from that shown on the Drawings.
 - b. Show any changes to piping systems, whether interior or exterior, for process, HVAC, plumbing and instrumentation. If any dimensional changes were made in the field, the numerical change shall be made on the Drawing and be properly labeled. Update dimensions and elevations on Drawings.
- E. Specifications and Addenda - Legibly mark up each section to record:
 - 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 - 2. Changes made by Change Order, Field Order, or other method.

1.4 SUBMITTALS

- A. At the completion of the project, and prior to the release of retainage, deliver record documents to the Engineer.
 - 1. Record drawings shall be provided as a bound, red-line paper set.
 - 2. Record drawings shall be provided as a bound, red-line paper set and an electronic file (pdf format) consisting of a full scan of the bound paper set.
 - 3. Record drawings shall be provided as a bound paper set of computer generated drawings, an electronic file (pdf format) of the bound paper set, and electronic files in AutoCAD format. Ownership of the drawings and files shall pass to the Owner at the time of submittal.
 - 4. Record drawings shall be provided as electronic files in ESRI GIS format. Ownership of the drawings and files shall pass to the Owner at the time of submittal.
 - 5. If the Contractor provides alternate or substitute equipment that requires revised arrangements from the Bidding Documents, the Contractor shall provide supplemental record drawings of these items in AutoCAD format.

- B. Accompany submittal with transmittal letter, in duplicate, containing:
 - 1. Date, project title and number.
 - 2. Contractor's name and address.
 - 3. Title and number of each record document with certification that each document is completed and accurate.
 - 4. Signature of Contractor, or his authorized representative.
- C. Failure to supply all information on the Project Record Drawings as specified in Part 1.3 may result in withholding final completion and in non-approval of final payments of the Contract. If Contract Time has elapsed, this shall be grounds for imposing liquidated damages.

1.5 QUALITY ASSURANCE

- A. All horizontal and vertical dimensions, swing-ties, and elevations shall be accurate to within one-tenth of a foot, unless greater accuracy is specified elsewhere in the Specifications (e.g., concrete elevations, weir elevations, etc.).

PART 2 - PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 MAINTAINING AND PROVIDING RECORDS

- A. Records shall be kept current as the work progresses.
- B. Records shall be made available for review by the Owner, Engineer, Resident Project Representative and/or Funding Agency(s) upon request.
- C. Records shall be kept current as the work progresses. Failure to maintain current records, as specified herein, shall be grounds for withholding additional retainage from monthly partial payment requests. Failure to provide records shall also be grounds for withholding of final payment and, if beyond contract time, shall be grounds for imposing liquidated damages.

3.2 AS-BUILT SURVEY PERFORMANCE

- A. From established survey control, and construction baseline as shown on the drawings, conduct surveys of the project area during construction as needed to obtain information of buried and above ground items. Surveys shall include information outlined in Section 1.3.
- B. Actual road alignments; walls; fence and guardrail; existing, new and relocated utility poles; traffic and warning sign locations; crosswalks, parking space and stop bar locations; retaining walls and foundations drains; all underground and overhead utility poles and lines within the project limits, including those installed on private property; all other new features and appurtenances and those existing features and appurtenances changed as a result of this project shall be included in the survey.

3.3 FORMAT FOR ELECTRONIC DELIVERABLES

- A. AutoCAD digital survey data for the as-built survey shall include:
 - 1. Copy of field notes and sketches of the survey.
 - 2. Paper copy of description of layers.
 - 3. Paper copy of base map.

4. Provide digital information on compact disk with paper copy printout; information shall be provided in .DWG format (AutoCAD 2011 or earlier). Data shall be provided in 3D format (northing, easting, elevation, or Y, X, Z).
5. Drawing scale: Minimum one inch = twenty feet.
6. Layering:
 - a. Repetitive symbols made into blocks and defined on layer 0.
 - b. All entities shall be drawn “by layer” as opposed to individual properties.
 - c. Use one linetype and one color per layer as opposed to numerous colors/linetypes on a single layer.
 - d. Preface each layer with the initials of the Survey company or Contractor (example, Survey Company: SC “layername”).
 - e. Database text annotation will be coordinated so the text will be right-reading.
 - f. Place text on separate layers.

END OF SECTION

SECTION 01800

EQUIPMENT STARTUP, CERTIFICATION AND OPERATOR TRAINING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. General: The work included in this Section includes startup of equipment, Certified Equipment Testing and Manufacturer provided Operator Training of the facility personnel in the proper operations and maintenance of the furnished equipment. This shall include all equipment provided for the project, regardless of specification Division, unless specifically noted otherwise. Clean, test and adjust each piece of equipment and/or system to the complete satisfaction of the Engineer.
2. One Year Service Call: In addition to the Manufacturer's installation and startup/testing services, the Contractor shall arrange for the Manufacturer to provide one additional service call of one 8 hour working day on site upon demand of the Owner for each type of equipment within the first year of operation (commencing upon date of Substantial Completion) at no additional cost to the Owner.
 - a. Equipment Systems requiring one year of service call are as follows:

<u>Specification Section</u>	<u>Equipment System</u>
Section 11228	Tank Mixer

General Definitions:

1. Equipment Startup shall be generally defined as the initial placing into operation of the equipment by representatives of the Contractor, any subcontractors directly responsible for the equipment provided, and the equipment Manufacturer.
2. Certified Equipment Testing shall generally be defined as the formal and scheduled demonstration of operations in accordance with the requirements of the Contract Documents. This formal demonstration shall be performed in the presence of the Engineer by representatives of the General Contractor, any Subcontractors directly responsible for the equipment provided, and the equipment Manufacturer.
3. Operator Training shall generally be defined as the formal and scheduled instruction of plant personnel and other Owner designated representatives in the proper operations of provided equipment, and in the techniques, methods, schedules, etc. associated with maintenance. This formal training shall be performed in the presence of the Engineer, by representatives of the Contractor, any subcontractors directly responsible for the equipment provided, and the equipment Manufacturer. Operator Training shall also include assistance to plant personnel by Manufacturer representatives during the initial operations of the equipment.

EQUIPMENT STARTUP, CERTIFICATION AND OPERATOR TRAINING

- C. Related Work Specified Elsewhere:
 - 1. Process equipment/systems are specified in Division 11.
 - 2. Electrical systems are specified in Division 16.
- D. Submittals:
 - 1. A minimum of ten days prior to the Pre-Startup Meeting, Contractor shall provide a preliminary equipment start-up schedule and plan for the Certified Equipment Testing and the Operator Training for each piece of equipment to the Engineer for review. The Manufacturer(s) shall provide the Contractor with a start-up schedule and plan. This preliminary plan will include a written outline description of the means and methods to be employed during the certified equipment test of each piece of equipment. The schedule and means and methods of testing will be discussed with the Engineer at the pre-startup meeting for acceptance.
 - 2. Submit the name(s) and resume(s) of the duly authorized representatives of the Manufacturer proposed for the project at least 30 days prior to the need for such services. The qualifications of duly authorized representatives of the Manufacturer are identified in Paragraph 1.2 below.
- E. Schedules:
 - 1. The pre-startup meeting shall be held at least ten working days prior to the startup of the first piece of equipment supplied under the Contract. The meeting shall be held at the Project Site. Manufacturer(s) may attend in person or via telephone/video conference. At that time, the Contractor shall present his plan as detailed in the previous Part D "Submittals" and review Engineer's comments and concerns associated with the general features of each piece of equipment which must be demonstrated.
 - 2. Contractor shall provide Engineer with at least 72-hours' notice of his desire to perform Certified Equipment Testing and/or training to allow necessary coordination with Owner representatives. Contractor shall be responsible for any and all coordination necessary with the daily operations of the facility to accommodate his testing schedule. Actual date and time for testing and/or training will be the first mutually acceptable date and time available to all parties subsequent to receipt of the request.
 - 3. Operator Training may be conducted concurrently with the Certified Equipment Testing with prior approval of the Engineer. However, under no circumstances will conditions of the testing interfere with the ability of Owner's representatives to observe necessary features, to hear and understand instructions, or to ask questions. Under such conditions, and as deemed necessary by the Engineer, Operator Training will be conducted separately from, and subsequent to, the Certified Equipment Testing.

1.2 QUALITY ASSURANCE

- A. Duly authorized representative of the Manufacturer shall meet the following criteria:
 - 1. A direct employee of the Manufacturer;
 - 2. Fluent in the English language;
 - 3. Has a minimum of 5 years of experience in the proper installation, adjustment, operation, testing, and startup of the specified model, including, but not limited to, equipment calibration, and other mechanical or electrical components of the equipment.
 - 4. Sales personnel, marketing personnel or local representatives will not be accepted as a duly authorized representative of the Manufacturer unless the Manufacturer has certified them accordingly.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.1 EQUIPMENT STARTUP

- A. Equipment startup shall be performed by the authorized representative(s) of the Manufacturer as identified in the Submittals. Refer to Paragraph 1.1.D above.
- B. The Equipment Startup shall be performed prior to Certified Equipment Testing and prior to Operator Training.
- C. No form of energy shall be applied to any part of the system prior to receipt by the Engineer of a certified statement of approval of the installation from the Contractor. This certification shall contain a statement by an authorized representative of the equipment Manufacturer that the equipment is ready for testing, as outlined below.
- D. As part of the equipment startup, the Contractor shall:
 - 1. Verify that the equipment is installed properly and in accordance with Manufacturer's requirements and instructions, and as such, it is appropriate to apply power to the units in question.
 - 2. Verify that all manual, automatic and safety control features of the equipment functions properly, including all alarm, activation and deactivation sequences.
 - 3. Verify that the equipment can operate without excessive noise, vibration, overheating, overloading, jamming, etc. during normal operating conditions.
 - 4. Check amperage draws on all power feeds with equipment running under normal operating conditions.
- E. Each piece of equipment shall be tested sufficiently to ensure that all features required to be demonstrated and/or verified during the equipment certification testing are within acceptable limits. The startup shall not be considered complete until the unit is fully capable of passing the equipment certification testing.
- F. Where multiple units are provided, each unit shall undergo startup procedures.
- G. The duly authorized representative of the Manufacturer shall provide all specialty tools, specialty testing equipment and labor necessary for the start-up of the equipment.

EQUIPMENT STARTUP, CERTIFICATION AND OPERATOR TRAINING

- H. The Contractor shall provide all power, chemical, tools, equipment, labor, water and fuel as required for startup.
 - 1. The Contractor shall be responsible for all contacts and arrangements as necessary with the proper municipal departments and/or public utility companies to arrange for temporary and/or separate billing so that bills associated with testing and startup procedures can be easily identified.
 - 2. Contacts and arrangements with the local power company shall include, but not be limited to, all arrangements as necessary so that peak power demands incurred during testing and startup procedures will not become a part of the permanent record for determining future power demand charges for the Owner.
 - 3. All waste materials shall be disposed of by the Contractor in an environmentally acceptable manner at no additional cost to the Owner.
- I. In the event of an unsuccessful equipment start-up, Manufacturer and Contractor shall make necessary alternations, adjustments, repairs and replacements and the equipment start-up shall be repeated.
- J. The Manufacturer Representative's shall fill out the Equipment Start-Up Certification form included at the end of this Section. Startup will not be considered complete until this form has been provided to the Engineer along with the Manufacturer Representative's field report.

3.2 CERTIFIED EQUIPMENT TESTING

- A. Certified Equipment Testing shall be performed after the equipment startup testing is completed and it has been verified that equipment functions in accordance with the requirements of the Contract Documents in all aspects. Certified Equipment Testing shall be performed by the authorized representative(s) of the Manufacturer as identified in the Submittals. Refer to Paragraph 1.1.D above.
- B. Certified Equipment Testing shall not be scheduled concurrently with the equipment startup without the prior approval of the Engineer. In all cases, if the Engineer has arrived on-site for the scheduled Certified Equipment Testing and the equipment is not capable of demonstrating complete compliance with the Contract Documents, or if the Manufacturer's representative is not present, the Contractor shall be responsible for all costs to the Engineer associated with failed testing, including travel expenses. The importance of prior and proper equipment startup demonstrations to verify the requirements of the Certified Equipment Testing is stressed.
- C. At a minimum during the Certified Equipment Testing, the Contractor shall demonstrate to the complete satisfaction of the Engineer the following:
 - 1. That the equipment is installed properly and in accordance with Manufacturer's requirements and instructions, and as such, it is appropriate to apply power to the units in question.
 - 2. That all manual, automatic and safety control features of the equipment functions properly, including all alarm, activation and deactivation sequences.
 - 3. That the equipment can operate without excessive noise, vibration, overheating, overloading, jamming, etc. during normal operating conditions.
 - 4. Amperage draws on all power feeds with equipment running under normal operating conditions.
 - 5. The noise level of equipment, drives and motors, unless otherwise noted, shall not exceed 90 dBA, as measured 3 feet from the unit under free field conditions.

EQUIPMENT STARTUP, CERTIFICATION AND OPERATOR TRAINING

- i. Each unit shall be monitored for compliance independently with other area equipment deactivated.
 - ii. For monitoring, the equipment will be run under normal operation conditions.
 - iii. Contractor shall provide certified proof of calibration for instrument utilized to measure noise level.
1. Other specific requirements as outlined within the individual specifications sections.
- D. Each piece of equipment shall be tested sufficiently to ensure that all features required to be demonstrated and/or verified are within acceptable limits.
- E. Where multiple units are provided, each unit shall undergo equipment certification testing procedures individually and then with multiple units on-line to verify the total systems output capacity and performance.
- F. The duly authorized representative of the Manufacturer shall provide all specialty tools, specialty testing equipment and labor necessary for the start-up and testing of the equipment.
- G. The Contractor shall provide all power, chemical, equipment, labor, water and fuel as required for startup and testing.
- H. All equipment provided on the project shall be demonstrated to function properly. Demonstration as a component of an overall system shall not relieve the Contractor of his responsibilities to demonstrate proper operation or verify specific requirements for each individual component.
- I. Minimum Certified Equipment Testing Requirements for Pumps:
 1. If sufficient sewage or water is not available for tests, Contractor will provide water at his expense for testing, if so directed.
 2. During tests, observe and record head, output, rpm and motor input. Sufficient test points shall be obtained to develop accurate pump system curve. If multiple operational points are specified, compliance with all points must be sufficiently demonstrated.
 3. Fully demonstrate ability to operate at specified conditions without motor overload.
 4. For mechanical seals, after a run-in period of 30 minutes, the seal area shall be wiped dry. The pump shall be operated for a 10-minute period. No measurable leakage shall be detected from the mechanical seal.
 5. Refer to Section 11000, as applicable, for additional details.
- J. Minimum Certified Equipment Testing Requirements for Blowers/Fans:
 1. During tests, observe and record pressure, unit rpm's and motor input. If multiple operational points are specified, compliance with all points must be sufficiently demonstrated.
 2. Fully demonstrate ability to operate at specified conditions without motor overload.
 3. Refer to Section 11000, as applicable, for additional details.
- K. Minimum Certified Equipment Testing Requirements for Instrumentation/Control Systems:
 1. All instruments shall be calibrated in the presence of the Engineer.

EQUIPMENT STARTUP, CERTIFICATION AND OPERATOR TRAINING

2. All transmitters or direct-operated receivers shall be calibrated to impose input values representing zero percent, ten percent, and eighty percent of full scale.
 3. The inputs and outputs of devices, as appropriate, shall be connected to manometers for differential pressure devices, or compared to measured levels, rates or quantities, during calibration. The receiving devices shall be adjusted to read the calibrated output of the initial calibration.
 4. After placing each measuring system in service, an actual comparison of the measured variable versus readout shall be made. For each differential pressure based measuring system, a manometer shall be connected to the connections provided in the piping, tank, or other appropriate device. Each system shall meet the manufacturer's standard accuracy.
 5. Secondary functions, such as sequencing, timing features, alarm actuation and pacing shall be adjusted during initial calibration and demonstrated after the system is placed in service.
 6. Linkage or range adjustments shall be sealed by colored lacquer in the presence of the Engineer immediately following calibration.
 7. Process calibration, such as volumetric drawdown tests on flows and level measurements, shall be conducted on all measuring systems as requested by the Engineer. Once established as being within acceptable accuracy limits, future tests which require use of the measuring device to demonstrate system operations can utilize generation of mA signals to simulate level, flow or similar variable variations.
- L. Minimum Certified Equipment Testing Requirements for Electrical Systems.
- M. In the event of an unsuccessful Certified Equipment Test, Manufacturer and Contractor shall make necessary alternations, adjustments, repairs and replacements and the equipment testing shall be repeated.
- N. The Manufacturer Representative's shall fill out the Equipment/System Testing Certification form included at the end of this Section. Certification Testing will not be considered complete until this form has been provided to the Engineer along with the Manufacturer representative field report.

3.3 OPERATOR TRAINING

- A. Operator Training shall be performed by the authorized representative(s) of the Manufacturer as identified in the Submittals. Refer to Paragraph 1.1.D above.
- B. Unless otherwise noted within the specific specification sections, provide minimum of one day (8-hour days, not including travel time) of combined training and operational assistance for plant operators for each piece of equipment in the proper operations of provided equipment, and in the techniques, methods, schedules, etc. associated with maintenance.
- C. The level of the training and operational assistance provided shall be as required to ensure proper understanding of the equipment's operations, maintenance and warranty conditions. Should manufacturer require time in addition to the minimums indicated herein, or within the individual specification sections, to sufficiently detail the proper operations and maintenance of the equipment, it will be provided at no additional cost to Owner. Under absolutely no circumstances shall warranties become void due to Owner's failure to follow operational and maintenance procedures which were not fully detailed and described to Owner's representatives during these

EQUIPMENT STARTUP, CERTIFICATION AND OPERATOR TRAINING

sessions.

- D. Certain Operator Training sessions shall be video recorded by an independent video firm. The Contractor shall coordinate and pay the cost of video recording services. Unless otherwise noted within the specific specification section, provide minimum of one half-day (4 hours) not including travel time of video recording of training, for each piece of equipment.

1. Equipment Systems Operator Training Sessions requiring Video Recording are as follows:

<u>Specification Section</u>	<u>Equipment System</u>
Section 11228	Tank Mixer

2. Provide two unedited copies of the video recording to the Owner on thumbdrive
 3. Use tripod mounted video camera, and wireless microphone(s) for recording.
 4. Provide additional lighting as required.
 5. Contractor shall be present during video sessions and shall assist the Video firm with setup as necessary.
- E. Refer to individual equipment specification sections for further requirements.
- F. The manufacturer representative shall fill out the Equipment Training Certification form included within this Section. Training will not be considered complete until this form has been provided to the Engineer.

EQUIPMENT START-UP CERTIFICATION

Owner: _____ Date: _____

Project: _____

Contractor: _____

Equipment Manufacturer: _____

Equipment: _____ Tank Mixer _____

Specification Number: _____ 11228 _____

As an authorized representative of the equipment manufacturer, the undersigned certifies that the equipment listed above conforms to the requirements of the Contract Documents. The undersigned authorized representative of the manufacturer further certifies that the equipment has been installed in accordance with the manufacturer's written instructions, that it is ready for permanent operation and that nothing in the installation will render the manufacturer's warranty null and void.

(Authorized Representative of the Manufacturer) (Date)_____
(Contractor) (Date)_____
(Engineer) (Date)

**** Attach Manufacturer Representative's Field Report ****

EQUIPMENT TRAINING CERTIFICATION

Owner: _____ Date: _____

Project: _____

Contractor: _____

Equipment Manufacturer: _____

Equipment: _____ Tank Mixer _____

Specification Number: _____ 11228 _____

1. I have trained the Owner's personnel in the proper operation and maintenance of the above equipment.

(Authorized Representative of the Manufacturer) (Date)

2. The personnel listed below attended the training session.

(Owner's Representative) (Date)

3. Witnessed by: _____ (Date)
(Engineer)

CERTIFIED EQUIPMENT/SYSTEM TESTING FORM

Owner: _____ Date: _____

Project: _____

Contractor: _____

Equipment Manufacturer: _____

Equipment: _____ Tank Mixer _____

Specification Number: _____ 11228 _____

This certifies that the entire equipment/system has met the requirements of Section 01800, 16950 and all other applicable requirements of the contract documents.

(Authorized Representative of the Manufacturer)

(Date)

(Contractor)

(Date)

(Engineer)

(Date)

**** Attach Manufacturer Representative's Field Report ****

END OF SECTION

SECTION 05565
CLEANING AND PAINTING
STEEL WATER STORAGE TANKS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Repair, grind, clean, paint, test and disinfect the steel water storage tanks of the types and sizes and in the locations as specified, including welding, grinding, scraping, and all testing. The work can generally be described as follows:
 - 1. All Interior Tank Surfaces and Appurtenances in Non-Water Contact Damaged during the Installation of the Mixing System - All interior surfaces not in contact with water shall be spot cleaned and power tooled to an SSPC-SP11 bare metal surface. Cleaned areas shall be primed prior to recoating the entire surface with two coats of new paint (primer, intermediate coat, and final coat) as described herein.
 - 2. All Exterior Tank Surfaces and Appurtenances Damaged during the Installation of the Mixing System - All exterior surfaces not in contact with water shall be spot cleaned and power tooled to an SSPC-SP11 bare metal surface. Cleaned areas shall be primed prior to recoating the surface with four coats of new paint (1 primer, 1 intermediate epoxy coat, 1 intermediate urethane coat, and 1 final coat) as described herein.

1.2 RELATED SECTIONS

- A. Section 11228 – Potable Water Tank Submersible Mixing System

1.3 REFERENCES

- A. 29 CFR 1926.62 - OSHA; The Interim Final Rule for Lead Exposure in Construction.
- B. 40 CFR Part 50 Appendix G - OSHA, National Ambient Air Quality Standard for Lead.
- C. 40 CFR Part 261 - USEPA Identification and Listing of Hazardous Waste.
- D. 40 CFR Part 262 - USEPA Standards Applicable to Generators of Hazardous Waste.
- E. 40 CFR Part 263 - USEPA Standards Applicable to Transporters of Hazardous Waste.
- F. 40 CFR Part 268 - USEPA Land Disposal Restrictions.
- G. USDOT 49 CFR Parts 173, 178 and 179.
- H. ANSI/ASC Z9.4 - Exhaust Systems – Abrasive Blasting Operations – Ventilation and Safe Practice.
- I. I.AWWA C652-92 - Disinfection of Water Storage Facilities.
- J. J.AWWA D102-97 - Coating Steel Water Storage Tanks.
- K. NSF Standard 61 Drinking Water System Components - Health Effects.
- L. OSHA 3142 – Lead in Construction.

- M. SSPC Guide 6 - Guide for Containing Debris Generated during Paint Removal Operations.
- N. SSPC Guide 7 - Guide for Disposal of Lead-Contaminated Surface Preparation Debris.
- O. SSPC SP6/NACE No. 4 - Commercial Blast Cleaning.
- P. SSPC SP10/NACE No. 2 - Near-White Blast Cleaning.
- Q. SSPC Publication 94-20 - Industrial Lead Paint Removal Handbook, Vol I and II.
- R. SSPC PA1 - Shop, Field & Maintenance Painting.
- S. SSPC PA2 - Measurement of Dry Paint Thickness with Magnetic Gauges.

1.4 SUBMITTALS

- A. Submit Certification of Compliance from paint manufacturer stating that paint systems furnished for the project are suitable for the intended application and that the interior coatings are in compliance with NSF Standard 61.
- B. The application methods and product information for the interior and exterior paint systems including:
 - 1. Mixing instructions
 - 2. Thinning
 - 3. Percent solids
 - 4. Surface preparation requirements
 - 5. Spreading rate
 - 6. Weight
 - 7. Curing time at 50°F, 60°F, 70°F and 80°F, and 50 percent relative humidity
 - 8. Pot life
 - 9. Safety precautions
 - 10. Color chart for the exterior paint system.
- C. Submit Exterior and Interior Coatings ASTM Performance Data and other information as specified.
- D. USEPA Form 8700-22 must be completed and returned to the Owner for record keeping.

1.5 WORKMANSHIP AND MATERIALS

- A. All work and material shall be the best of its kind and shall conform to AWWA D102 "Coating Steel Water Storage Tanks" and ANSI A159.1, Section II, Surface Preparation Specifications" as approved by the Steel Structures Painting Council.

1.6 QUALITY ASSURANCE

- A. All materials furnished and all work accomplished shall be of a quality and character required by the Specifications and by good practice.
- B. The Contractor shall have five (5) years previous experience in the removal of coatings from and repainting of steel water tanks of similar design and have successfully coated 10 water storage tanks of similar size and complexity in the New England Region in the last 5 years.

1.7 ENVIRONMENTAL CONDITIONS

- A. Apply coating materials under conditions as follows:
 - 1. Air temperature shall not be below 35 degrees F (2 degrees C) or above 110 degrees F (43 degrees C).
 - 2. Refer to specific product information sheets for minimum surface temperature requirements. Surface temperatures shall be at least 5 degrees F (15 degrees C) above dew point and in a rising mode. Application of the coating system shall be in strict accordance with the manufacturers recommendations and instructions.
 - 3. Relative humidity shall be no higher than 85% or as established by the coatings printed product data sheet.
 - 4. For exterior spray application, wind velocity shall be less than 15 mph (25 kph).
 - 5. Atmosphere shall be relatively free of airborne dust.
- B. No painting shall take place if the relative ambient humidity exceeds 85%.

1.8 WARRANTY

- A. The contractor agrees to make good, without cost to the Owner, any defects in the work or parts of the work furnished or built by him, and any damages due to faulty workmanship, on his part or due to faulty imperfect materials or equipment furnished by him, which may appear within one year from the Date of Substantial Completion of the work agreed to under this Contract. The Date of Substantial Completion shall be as determined under the provision of the Payment Clause.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials to be incorporated into the tank for the installation of the mixing systems and recoating shall be new, and previously unused.

2.2 COATINGS

- A. Materials
 - 1. All materials for the inside and outside paint systems shall be supplied by a single manufacturer and delivered to the site in factory-sealed containers which show the manufacturer's name and the contents of the containers.
 - 2. The exterior color of the water storage tank shall match the existing color.
 - 3. Prior to the application of any paint system specified in this section, the Contractor shall provide the Owner an affidavit from the paint manufacturer or supplier stating that the interior and exterior paint systems are in fact as specified herein.
 - 4. Paint supplier shall send a representative to the pre-construction meeting. Selected contractor MUST fully review all appropriate coating manufacturer written specification pages regarding ALL surface preparation, application, thicknesses, curing times, safety precaution and all other recommendation pertaining to the intended substrate to be painted. Contractor must fully review

and understand these requirements PRIOR to commencing with any aspect of the work.

B. Paint Systems:

1. The interior paint system for non-water contact areas (above shell wall) shall be designed for high moisture environments that meets all the requirements conforming to Tnemec, Sherwin Williams, or equivalent.

TNEMEC

Primer:	Series 94 H2O Hydro-Zinc	2.5-4.0 mils DFT
Intermediate Coat:	Full coat of Series V140 PotaPox Plus to all surfaces (white)	6.0-8.0 mils DFT
Finish Coat:	Full finish coat of V140 PotaPox Plus to all surfaces (white)	6.0-8.0 mils DFT

SHERWIN-WILLIAMS

Primer:	Corothane I Galvapak 1K Zinc Primer	3.0-4.0 mils DFT
Stripe Coat:	Macropoxy 646 Potable Water at all weld seams	2.5-3.5 mils DFT
Finish:	Full finish coat of SherPlate PW (white)	25-35 mils

(OR APPROVED EQUAL)

2. All exterior surfaces (full exterior blast –fluoropolymer top coat meeting AWWA D-102 OSC #4 and meeting AAMA 2604 performance requirements), including all appurtenances such as platforms, columns, standpipes, vent pipes, frames, foundations, hatches, and ladders, shall be coated with a four (4) coat system consisting of an organic zinc rich primer, epoxy intermediate coat, and finish coat as follows

TNEMEC

Primer:	Series 94 H2O Hydro-Zinc	2.5-4.0 mils DFT
Second Coat:	Full coat of V140 PotaPox Plus	3.0-4.0 mils DFT
Third Coat:	Full coat of Series 1095 Endura-Shield	2.5-3.0 mils DFT
Fourth Coat:	Full finish coat of Series V701 HydroFlon (Color selection by Owner)	2.0-3.0 mils DFT

SHERWIN-WILLIAMS

Primer:	Corothane I Galvapak 1K Zinc Primer	2.5-4.0 mils DFT
Second Coat:	Full coat of Macropoxy 646 Fast Cure Epoxy	3.0-4.0 mils DFT
Third Coat:	Full coat of Acrolon 218 HS Polyurethane	3.0-6.0 mils DFT
Fourth Coat:	Full finish coat of Fluorokem HS-100 Urethane	2.0-3.0 mils DFT

(Color selection by Owner)

(OR APPROVED EQUAL)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The Contractor shall make provisions to ensure that no overspray damages adjacent properties.
- B. All work involving the removal of paint shall be in compliance with all state and federal regulations including OSHA regulations 29 CFR 1926.62.

3.2 CLEANING AND PAINTING

- A. General:
 - 1. This section of the specification covers surface preparation and workmanship required for the completion of the exterior and interior surfaces of the water storage tank.
 - 2. All painting shall be done strictly in accordance with the paint manufacturer's instructions.
- B. Application:
 - 1. The prime coat shall be applied to the welds by brush (striping).
 - 2. All materials shall be mixed, thinned, and applied in strict accordance with the manufacturer's printed instructions.
 - 3. The paint systems shall be applied only to clean, dry surfaces in favorable temperatures and weather conditions, in strict accordance with the manufacturer's printed instructions.
 - 4. Sufficient time shall be allowed for each coat to thoroughly dry before the next coat is applied. Adequate ventilation shall be provided for the tank interior during the drying process.
 - 5. A minimum of seven days curing following the application of the final coat on the interior tank surface shall be allowed before disinfecting the tank.
 - 6. Safety precautions as required by paint manufacturer and OSHA shall be followed.
- C. Testing: During application of the inside and outside paint systems and at the completion of the painting, the Contractor shall conduct testing consisting of wet film thickness testing for each 100 square feet of surface painted and dry film thickness as per SSPC-PA2 (one test per 100 square feet). A test report shall be prepared and submitted to the Engineer when painting is complete.

3.3 VOC TESTING

- A. Is interior painting is required, the Contractor shall collect a water sample representative of the volume within tank and have a certified laboratory perform an EPA Method 524.2 VOC test. Owner to receive test results on laboratory letterhead

before tank is placed online. If tests are below the laboratory detection limit and/or background source limit the facilities may be placed into operation. If tests are above the laboratory detection limit, appropriate measures shall be taken to clean, flush, and/or drain the tank and refill and re-analyze for VOC's until below the detection limit.

END OF SECTION

SECTION 11000EQUIPMENT - GENERALPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Furnish, install and test all equipment specified in this Contract and as shown on the Drawings.
- B. Related Work Specified Elsewhere (When Applicable):
 - 1. Submittals are specified in Section 01340.
 - 2. Delivery, Storage and Handling is specified in Section 01600.
 - 3. Equipment Startup, Certification and Operator Training are specified in Section 01800.
 - 4. Field painting of tank is specified in Section 02265.
 - 5. Electrical work and components, and variable frequency drives, are specified in Division 16.

1.2 QUALITY ASSURANCE

- A. Provide only equipment of proven reliability manufactured by reputable manufacturers.
- B. Acceptable manufacturers are listed in each equipment item section in this Division and are intended to indicate the type and quality of materials expected. Refer to the General and Supplemental Conditions for the manner in which "or equals" and "substitutes" will be evaluated.
- C. Certificates, patents, licenses or other required legalities, when applicable, are specified in each Section of this Division.
- D. The Specifications and Drawings direct attention to certain required features of the equipment but do not purport to cover all details entering into its design and construction. Nevertheless, the Contractor shall furnish the equipment complete in all details and ready for operation for the intended purpose.
- E. These Specifications are intended to provide standard equipment of a recognized manufacturer meeting all the requirements of the Specifications. Due to differences in such prefabricated equipment of various manufacturers, submit complete shop drawings, cuts, specifications, etc. to the Engineer to review for compliance with the Contract Documents prior to ordering any equipment. If the equipment differs materially from the dimensions given on the Drawings, submit complete drawings showing elevations, dimensions etc. for the installation. If Engineer's acceptance is obtained for alternate equipment, make any needed changes in the structures, piping or electrical systems necessary to accommodate the equipment at no additional cost to the Owner.
- F. Workmanship shall be first class in all respects.

1.3 SUBMITTALS

- A. Provide shop drawings and samples as specified in the General Conditions and Section 01340 of the Construction Contract. Equipment Systems Manufacturers shall

- integrate all required shop drawings into a common package.
- B. Catalog Data: Submit manufacturer's literature and illustrations for all equipment to be installed, including dimensions, construction details, shop painting details, and materials by generic name.
 - C. Installation Instructions: Submit complete sets of manufacturer's instructions for each equipment item, including equipment storage requirements.
 - D. Complete Operation and Maintenance Manuals in compliance with Specification Section 01340.
 - E. Certificates: Submit manufacturer's certification that equipment, accessories and shop painting meet or exceed the Specification requirements. Submit equipment performance testing results as required by these specifications. Should the proposed equipment not comply with all the specification requirements, all deviations from the specification requirements shall be listed.
 - F. Submit all requirements for interface with controls and/or equipment furnished in Divisions 13 and 16. Submit wiring diagrams as required to accurately depict all such interface requirements to ensure proper operations of each system or item of equipment.
 - G. Provide certified bearing life calculations on all equipment bearings.
 - H. Submittals are further specified in this Division.
 - I. Guarantees/Warranties as specified below.
 - J. Attention is directed to the fact that the Drawings are based upon a particular piece of equipment.
 - K. If the equipment to be provided requires an arrangement differing from that indicated on the Drawings, the Contractor shall prepare and submit for review, detailed mechanical drawings showing all necessary changes. Such changes shall be at no additional cost to the Owner.
 - L. Contractor shall provide a Submittal Certification from each individual Equipment Manufacturer certifying that the Equipment Manufacturer has:
 - 1. Reviewed the Construction Documents, the intended installation by the Contractor, and the intended functional and operational conditions;
 - 2. Determined all conditions to be acceptable; and
 - 3. Found no conditions which would cause the warranty to be void; or the equipment to function improperly, or not meet the performance requirements.The submittals will not be reviewed without the inclusion of these noted certifications. Process Equipment Manufacturer Submittal Certification Form is provided in Section 01340.
 - M. Proposed equipment/valve identification tag information.

1.4 SEISMIC CONTROL

- A. Not Applicable

1.5 GUARANTEE/WARRANTIES

- A. The Contractor shall provide the Owner with a Guarantee/ Warranty for the entire project in accordance with **Sec 17 Guarantee, and as referenced in the General Conditions of the Contract** No shop drawings submittals are required for this item.
- B. Any specified extended warranties (i.e. those which run longer than the Contract Correction/ Warranty Period) shall be prepared in the name of the Owner and shall

become effective after the completion of the Correction/ Warranty Period. The Contractor will be required to handle warranty problems during the Correction/ Warranty Period. Extended warranties shall meet the requirements specified in the relevant Section. Proposed extended warranty language shall be submitted to the Engineer for review as a part of the Shop Drawing process.

- C. Equipment that is supplied by a system supplier and is intended to function as a complete and integrated system shall be warranted accordingly.
- D. Any part of a mechanical equipment system that shows undue or excessive wear, or that fails due to normal operational conditions during the Correction/ Warranty Period, shall be considered as evidence of defective material or defective workmanship, and it shall be replaced with equipment or parts to meet the specified requirements at no cost to the Owner.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 01600 for additional requirements.

PART 2 - PRODUCTS

2.1 GENERAL DESIGN OF EQUIPMENT

- A. All parts and components of mechanical equipment shall be designed for satisfactory service under continuous duty without undue wear under the specified operating conditions.
- B. All parts of mechanical equipment shall be amply proportioned for all stresses which may occur during operations, and for any additional stresses which may occur during fabrication and erection. Iron castings shall be tough, close-grained gray iron casting, Class 30, in accordance with ASTM A48, latest revision. Structural steel shall conform to ASTM A36.
- C. Where galvanizing of materials is required, refer to Division 5, Specification Sections 05120 and 05500, for materials galvanizing requirements.
- D. Mechanical equipment, including drives and electrical motors, unless otherwise noted, shall be supplied and installed in accordance with Occupational Safety and Health Act (OSHA) requirements. The Contractor's attention is drawn to the requirements for equipment guards. The noise level of equipment, drives and motors, unless otherwise noted, shall not exceed 90 dBA measured 3 feet from the unit under free field conditions.
- E. All equipment and machinery furnished under this Contract shall be the latest improved design suitable for the service specified. All equipment and machinery shall be designed and constructed to operate efficiently, continuously and quietly under the specified requirements with a minimum of maintenance, renewals and repairs. The design and construction of all equipment and machinery shall be such as to permit operation with minimum wear, vibration and noise when properly installed.
- F. Ample room for erecting, repairing, inspecting and adjusting of all equipment and machinery shall be provided. The design, construction and installation of all equipment and machinery shall conform to and comply with the latest safety codes and regulations.
- G. All equipment of identical size, type and service shall be the product of the same manufacturer.

- H. All equipment selected shall suit the general arrangement of the space in which it is to be installed.
- I. Unless otherwise specified, electrical SCR controller units shall be furnished with the driven equipment, mounted and factory aligned, where applicable. Wiring of motors and controls shall be in accordance with the requirements of Division 16 and other applicable portions of the Specifications. Electrical variable frequency drives shall be furnished and installed by the electrical contractor, unless otherwise noted as specified in Division 16.
- J. Suitable provisions shall be made for easy access for service and replacement parts.

2.2 BOLTS, ANCHOR BOLTS AND NUTS

- A. Furnish all necessary bolts, anchor bolts, nuts, washers, lock washers or locking nuts, plates and bolt sleeves in accordance herewith. Anchor bolts shall have suitable washers, lock washers and, where so required, their nuts shall be hexagonal.
- B. All bolts, anchor bolts, nuts, washers, lock washers, plates, and bolt sleeves shall be galvanized unless otherwise indicated below or specified elsewhere.
 - 1. Galvanized steel in accordance with Division 5 unless otherwise indicated below or specified elsewhere.
 - 2. Stainless steel hardware (minimum of Type 304, unless otherwise indicated) is required in all corrosive atmospheres, exterior areas, and/or areas with NEMA 4X or NEMA 7 rating.
 - 3. Stainless steel hardware (minimum of Type 316, unless otherwise indicated) is required in all submerged applications, including but not limited to the wetwells, headworks, dewatering rooms, chemical rooms, clarifiers, aeration basins, splitter structures, equalization or storage tanks, etc. For additional description and definition of submerged surfaces refer to Specification Section 09900.
- C. Expansion bolts shall have malleable iron and lead composition elements of the required number of units and size.
- D. Unless otherwise specified, stud, tap, and machine bolts shall be of the best-quality refined bar iron. Hexagonal nuts of the same quality of metal as the bolts shall be used. All threads shall be clean cut and shall conform to AN Standard B 1.1-1974 for Unified Inch Screw Threads (UN and UNR Thread Form).
- E. Anchor bolts and expansion bolts shall be set accurately. If anchor bolts are set before the concrete has been placed, they shall be carefully held in suitable templates of acceptable design. Where indicated on the Drawings, specified, or required, anchor bolts shall be provided with square plates at least 4 in. by 4 in. by 3/8 in. or shall have square heads and washers and be set in the concrete forms with suitable pipe sleeves, or both. If anchor or expansion bolts are set after the concrete has been placed, all necessary drilling and grouting or caulking shall be done by the Contractor and care shall be taken not to damage the structure or finish by cracking, chipping, spalling, or otherwise during the drilling and caulking.
- F. All bolts shall be suitable size for the intended purpose, with direct input from the equipment or product manufacturer. In no case shall anchor bolt size be less than 3/8" diameter.

2.3 FOUNDATIONS, INSTALLATION AND GROUTING

- A. The Contractor shall furnish the necessary materials and construct suitable concrete foundations for all equipment installed by the Contractor, even though such foundations may not be indicated on the Drawings. The tops of foundations shall be at such elevations as will permit grouting as specified below.
- B. All such equipment shall be installed by skilled mechanics and in accordance with the instructions of the manufacturer.
- C. In setting pumps, motors, and other items of equipment customarily grouted, the Contractor shall make an allowance of at least 1 in. for grout under the equipment bases. Shims used to level and adjust the bases shall be steel. Shims may be left embedded in the grout, in which case they shall be installed neatly and so as to be as inconspicuous as possible in the completed work. Unless otherwise permitted, all grout shall be a suitable non-shrink grout.
- D. Grout shall be mixed and placed in accordance with the recommendations of the manufacturer. Where practicable, the grout shall be placed through the grout holes in the base and worked outward and under the edges of the base and across the rough top of the concrete foundation to a peripheral form so constructed as to provide a suitable chamfer around the top edge of the finished foundation.
- E. Where such procedure is impracticable, the method of placing grout shall be as permitted by the Engineer. After the grout has hardened sufficiently, all forms, hoppers, and excess grout shall be removed, and all exposed grout surfaces shall be patched in an approved manner, if necessary. All foundation and grout exposed surfaces shall be given a burlap-rubbed finish and painted with at least two coats of the epoxy-based paint specified for concrete.
- F. If threaded rod with lower support nuts are used to secure the equipment in place temporarily during concrete equipment pad placement, the support nuts shall be removed prior to grouting so that the threaded rod anchor bolts are not supporting the equipment and the top nuts can be tightened to secure the equipment directly to the large bedding surface provided by the non-shrink grout and concrete equipment pad. Equipment foundations shall be designed to absorb equipment vibration and transmit forces to building structure or ground. Contractor shall demonstrate that this has been completed to the RPR prior to grouting.

2.4 ELECTRIC MOTORS

- A. Unless otherwise specified or permitted by the Engineer, all electric motors furnished and installed by the Contractor shall conform to the requirements hereinafter set forth.
- B. All equipment motors and appurtenances (e.g., switches, instruments, etc.) shall meet the area classification and NEMA requirements as listed on Drawing E-1.
- C. All motors shall be specifically designed for the installation orientation required by the equipment submitted (i.e., horizontal motor design for horizontal installation, vertical motor design for vertical installation). Universal motors shall not be allowed.
- D. Ratings of Motors
 - 1. Every motor shall be of sufficient capacity to operate the driven equipment under all load and operating conditions without exceeding its rated nameplate current or power or its specified temperature limit.
 - 2. When the horsepower rating is specified for a motor, the motor furnished shall meet the requirements of the output specified. When the horsepower rating is

not specified, the motor shall have sufficient capacity to operate the driven equipment as given in the Detailed Specifications.

3. All electric motors shall be UL recognized.
4. Motor shall have a service factor of 1.15, unless otherwise specified.

E. Type of Motors

1. All motors shall be NEMA Design B, and shall have starting characteristics and ruggedness as may be necessary under the actual conditions of operation and, unless otherwise specified, shall be suitable for full-voltage starting.
2. Motors shall be manufactured by General Electric Co., Reliance, Toshiba, Siemens, or be an equivalent product, that meets all the requirements herein.
3. All motors shall have Class F insulation with temperature rise in accordance with NEMA Standards for Motors and Generators and based on a maximum ambient temperature of 40 deg. C.
4. Motors Installed in Class I/ Division 1 Hazardous Locations:
 - a. Motors shall be explosion-proof (XP) rated for Class I/ Division 1/ Group C and D rated for hazardous locations and shall meet the requirements of the National Electric Code and other safety codes pertaining thereto.
 - b. Motors shall include integral high temperature thermostats or similar device with a high temperature interlock to shut down the motor and auxiliary contact to activate an alarm condition.
 - c. Thermostats shall be normally closed, hermetically sealed and rated a minimum of 0.5A at 120 VAC. The thermostats shall be set so that the temperature of the motor will not exceed the auto-ignition temperature for a Class I/ Division 1/ Group C and D location.
5. Motors Installed in Class I/ Division 2 Hazardous Locations:
 - a. Motors shall be either explosion-proof (XP) rated for Class I/ Division 1/ Group C and D or Class I/ Division 2 Group C and D locations. Motors may be TEFC rated; however, TEFC motors used in hazardous areas shall be non-sparking type (brushless) and shall have non-sparking cooling fans. All motors shall meet the requirements of the National Electric Code and other safety codes pertaining thereto.
 - b. Motors shall include integral high temperature thermostats or similar device with a high temperature interlock to shut down the motor and auxiliary contact to activate an alarm condition.
 - c. Thermostats shall be normally closed, hermetically sealed and rated a minimum of 0.5A at 120 VAC. The thermostats shall be set so that the temperature of the motor will not exceed the auto-ignition temperature for a Class I/ Division 2/ Group C and D location.
6. All motors shall be NEMA Premium Efficiency type. The nominal and/or minimum guaranteed efficiency shall be printed on the motor nameplate. The efficiency values shall conform to Energy Policy Act of 1992, unless exempted, and shall be as indicated in the following table:

Nominal Full Load Motor Efficiencies						
	Open Motors			Enclosed Motors		
HP	3600 rpm	1800 rpm	1200 rpm	3600 rpm	1800 rpm	1200 rpm
1	77.0*	85.5	82.5	77.0	85.5	82.5
1.5	84.0	86.5	86.5	84.0	86.5	87.5
2	85.5	86.5	87.5	85.5	86.5	88.5
3	85.5	89.5	88.5	86.5	89.5	89.5
5	86.5	89.5	89.5	88.5	89.5	89.5
7.5	88.5	91.0	90.2	89.5	91.7	91.0
10	89.5	91.7	91.7	90.2	91.7	91.0
15	90.2	93.0	91.7	91.0	92.4	91.7
20	91.0	93.0	92.4	91.0	93.0	91.7
25	91.7	93.6	93.0	91.7	93.6	93.0
30	91.7	94.1	93.6	91.7	93.6	93.0
40	92.4	94.1	94.1	92.4	94.1	94.1
50	93.0	94.5	94.1	93.0	94.5	94.1
60	93.6	95.0	94.5	93.6	95.0	94.5
75	93.6	95.0	94.5	93.6	95.4	94.5
100	93.6	95.4	95.0	94.1	95.4	95.0
125	94.1	95.4	95.0	95.0	95.4	95.0
150	94.1	95.8	95.4	95.0	95.8	95.8
200	95.0	95.8	95.4	95.4	96.2	95.8
250	95.0	95.8	95.4	95.8	96.2	95.8
300	95.4	95.8	95.4	95.8	96.2	95.8
350	95.4	95.8	95.4	95.8	96.2	95.8
400	95.8	95.8	95.8	95.8	96.2	95.8
450	95.8	96.2	96.2	95.8	96.2	95.8
500	95.8	96.2	96.2	95.8	96.2	95.8

F. General Design of Motors

1. Motors shall comply with the latest NEMA Standards for Motors and Generators, unless otherwise specified. Motors shall not run beyond nominal full speed rpm.
2. Motor windings shall be braced to withstand successfully the stresses resulting from the method of starting. The windings shall be treated thoroughly with acceptable insulating compound suitable for protection against moisture and slightly acid or alkaline conditions.
3. Bearings shall be of the self-lubricating type, designed to ensure proper alignment of rotor and shaft and to prevent leakage of lubricant.
4. Bearings for open motors shall be of the sleeve or ball type, as specified under the respective items of mechanical equipment. Bearings for totally enclosed and explosion-proof motors shall be of the ball type. The exception to this shall be belt-drive applications in which case the motor manufacturer shall determine if roller bearings are required in lieu of ball bearings due to higher radial loads.

5. Vertical motors shall be provided with thrust bearings adequate for all thrusts to which they can be subjected in operation.
 6. Vertical motors of the open type shall be provided with drip hoods of acceptable shape and construction. When the drip hood is too heavy to be easily removed, provision shall be made for access for testing.
 7. All motors installed above or within potable water storage tanks shall use food grade lubrication that is NSF approved.
- G. Wound-Rotor Induction Motors
1. Wound-rotor motors shall be designed for operation of the motor-driven equipment under the conditions specified in the Detailed Specifications.
 2. Motors shall be of the wound-rotor, induction type suitable for speed control by rotor resistance.
 3. The collector rings shall be constructed of hard composition metal of sufficient conductivity and ample contact surface. The rings shall be mounted accurately and securely on the shaft by means of acceptable insulating construction. The leads to the collector rings shall be fastened to and insulated from the shaft in a suitable manner.
 4. The collector rings and brushes for the wound-rotor induction motors shall be suitable for operation in an atmosphere containing moisture.
 5. The brushes shall be of the electrographite type, or other suitable type, of sufficient hardness and conductivity and shall have ample contact surfaces. Brush holders shall be provided with adjustable, spring-tension devices. Brushes shall be connected to the holders with tinned, flexible, copper-wire pigtails so arranged that no appreciable current shall be carried through the sliding contacts or springs. Brushes shall operate without noise or chattering. Rings and brushes shall be located on top of the motor, and shall be easily accessible for inspection and maintenance.
- H. Synchronous Motors
1. Synchronous motors shall comply in all respects with the latest NEMA Standards for Motors and Generators, and AN Standard C50 for Rotating Electrical Machinery.
 2. Synchronous motors shall be designed for operation of the motor-driven equipment under the conditions specified in the Detail Specifications.
 3. The temperature rise (based on a cooling temperature not exceeding 40 deg. C. and an altitude not exceeding 3,300 ft.) in the various parts of the motors, when operating continuously at rated voltage, frequency, and power factor, shall conform to the applicable requirements of the above- mentioned NEMA Standards.
 4. Synchronous motors shall be manufactured by General Electric Co., or be an equivalent product.
- I. Single-Phase Motors with Auxiliary Devices
1. Single-phase motors requiring switching devices and auxiliary starting resistors, capacitors, or reactors shall be furnished as combination units with such auxiliaries either incorporated within the motor housings or housed in suitable enclosures mounted upon the motor frames. Each combination unit

shall be mounted upon a single base and shall be provided with a single conduit box.

J. Motor Terminal Boxes and Leads

1. Motors shall be furnished with oversize conduit terminal boxes to provide for making and housing the connections and with flexible leads of sufficient length to extend for a distance of not less than 4 inches beyond the face of the box. The size of cable terminals and conduit terminal box holes shall be as permitted by the Engineer. An acceptable type of solderless lug shall be furnished. Totally enclosed and explosion-proof motors shall have cast-iron terminal boxes.

K. Special Motors

1. Hoists and other devices complying with special safety codes shall be furnished complete with their control equipment and with all accessories and safety devices for code-approved, safe, and efficient operation.

L. Premium Efficiency Motors – “For Use with Variable Frequency Drives”

1. Motors other than inverter duty rated type which are used on variable frequency drive equipment shall have an insulation system that is inverter grade to meet NEMA MG1-2016, Class F insulation system with a Class B temperature rise at a 1.15 service factor. Motors shall be wound with inverter duty wire and shall be multi-dipped and baked in a polyester, Class H varnish.
2. Nameplate on motor shall be stamped indicating motor is “Certified for Use with VFDs”.
3. Motors of the sizes indicated below and operated on variable frequency drives shall be equipped with a maintenance free, conductive micro fiber, shaft grounding ring with a minimum of two rows of circumferential micro fibers to discharge electrical shaft currents within the motor and/or its bearings to ground.
 - a. Motors between 25 HP and up to 100 HP shall be provided with a minimum of one shaft grounding ring installed either on the drive end or non-drive end.
 - b. Motors over 100 HP shall be provided with an insulated or hybrid bearing on the non-drive end and a shaft grounding ring on the drive end of the motor. Grounding rings shall be provided and installed by the motor manufacturer or Contractor and shall be installed in accordance with the manufacturer’s recommendations.
 - c. Grounding rings may be external or internal to the motor for open drip proof motors (ODP), totally enclosed fan cooled (TEFC) and totally enclosed non-ventilated (TENV). Grounding rings shall be internal to the motor for all Class 1/ Division 1 and Class 1/ Division 2 motors. Grounding rings shall not interrupt or alter the motor design flame path.
 - d. Grounding rings shall be AEGIS or equal.

M. Premium Efficiency Motors – “Inverter Duty Rated”

1. Inverter Duty Rated motors which are used on variable frequency drive equipment shall meet the following requirements:
 - a. Motor shall be suitable for operation over entire speed range indicated without causing motor overheating at any condition.

- b. Forced ventilation type inverter duty rated motors with a separate external continuously operating fan shall not be acceptable.
 - c. Motors installed in Division 1 hazardous (classified) location shall be identified as acceptable for variable speed when used in Division 1 locations.
 - d. Motor shall have Class F insulation with a Class B temperature rise at a 1.0 service factor (non-sinewave power) and 40°C ambient conditions per NEMA MG1-2016.
 - e. Motor shall be wound with inverter duty wire and phase paper and shall be multi-dipped and baked in polyester, Class H varnish.
 - f. Nameplate on motor shall be stamped indicating motor is "Inverter Duty Rated".
2. Motors of the sizes indicated below and operated on variable frequency drives shall be equipped with a maintenance free, conductive micro fiber, shaft grounding ring with a minimum of two rows of circumferential micro fibers to discharge electrical shaft currents within the motor and/or its bearings to ground.
- a. Motors between 25 HP and up to 100 HP shall be provided with a minimum of one shaft grounding ring installed either on the drive end or non-drive end.
 - b. Motors over 100 HP shall be provided with an insulated or hybrid bearing on the non-drive end and a shaft grounding ring on the drive end of the motor. Grounding rings shall be provided and installed by the motor manufacturer or Contractor and shall be installed in accordance with the manufacturer's recommendations.
 - c. Grounding rings may be external or internal to the motor for open drip proof motors (ODP), totally enclosed fan cooled (TEFC) and totally enclosed non-ventilated (TENV). Grounding rings shall be internal to the motor for all Class 1/ Division 1 and Class 1/ Division 2 motors. Grounding rings shall not interrupt or alter the motor design flame path.
 - d. Grounding rings shall be AEGIS or equal.
- N. Submersible Motors
- 1. Motors which are rated for submersible use shall be of the highest efficiency in the industry for this type of motor and horsepower rating.
 - 2. When used in conjunction with variable frequency drive equipment, the submersible motor shall be rated for inverter duty with Class H insulation.

2.5 DRIVE COUPLINGS

- A. Couplings shall be all metal, flexible, designed for both angular and parallel misalignment, provided with a guard, and provided with a means for lubrication.
- B. Close-coupled connections shall have machined shouldered joints for motor and pump motor support.
- C. High torque couplings shall be all metal gear couplings with external grease fittings. A service factor of 1.50 shall be used based on the motor nameplate rating.
- D. Drive couplings for mixers which differ from the above referenced all metal type, which are standard integral parts of a mixer manufacturer's assembly may be permitted, with review and approval of the Engineer.

2.6 BELT DRIVES

- A. V-belt drives shall be provided with front removable guards (refer to Section 2.12), not requiring disturbing of the sheaves.
- B. Capable of upsize and downsize sheaving.
- C. Design shall be based upon minimum 1.5 service factor, unless specified elsewhere.

2.7 MECHANICAL-TYPE VARIABLE-SPEED DRIVE UNITS: (WHEN APPLICABLE)

- A. Type as specified in equipment specification sections and as shown on the Drawings.
- B. The variable-speed transmission shall be a self-contained drive which shall consist of a totally enclosed constant-speed motor, a housing on which the motor is mounted and which encloses an adjustable, heavy duty V-belt drive between two variable-pitch pulleys and the output shaft.

2.8 SCR CONTROLLERS

- A. Each SCR controller shall be a completely solid state assembly consisting of an electronic switching amplifier, silicon controlled full wave rectifier and associated circuitry.
- B. Bridge and gate trigger circuitry shall employ printed circuit boards.
- C. Any required power transformers shall be supplied as appropriate.
- D. The SCR units shall be heavy duty type suitable for handling the full current rating of the motors and brief acceleration current.
- E. The assembly shall be mounted on a heat sink but insulated therefrom.
- F. Power supply to the SCR controllers shall be 115 volts, single phase, 60 Hz.
- G. Each unit shall be factory wired and tested with all leads brought out to terminal strips to facilitate connections to the motors and local control stations.
- H. Each SCR unit shall include the following features:
 - 1. Full wave rectification.
 - 2. Power cube containing all power semi-conductors in a single component.
 - 3. Armature contactor with auxiliary normally open and normally closed contacts.
 - 4. Circuit breaker to provide overload protection.
 - 5. Surge suppressers to protect semi-conductors from line surges and transients.
 - 6. Adjustable current limit.
 - 7. Adjustable IR compensation.
 - 8. Voltage level and current capacities shall meet the requirements of the connected equipment (i.e. 90V DC output for 90V DC motors).

2.9 GEAR REDUCTION UNITS

- A. Gears of gear reduction units shall be made of highest quality alloys treated for hardness and severe service. All gear reduction units on equipment shall be selected for Class II or more severe service as classified by the American Gear Manufacturers Association.
- B. Unless otherwise specified, the complete reduction unit shall be fully enclosed in a heavy cast-iron or fabricated steel housing with gears running in oil. All bearings shall be of the anti-friction type.
- C. The actual and rated horsepower, torque, overhang capacity, or bearing capacity of each reduction unit shall be not less than the horsepower rating of the drive motor, nor less than that which will be encountered under full load or under the most severe

loading conditions of the equipment. The Engineer may reject any gear reduction unit that does not meet the above requirements. The manufacturer of gear reduction units shall be long established with a good reputation.

- D. Unless otherwise specified, all gear reduction units shall be helical or spiral bevel helical combinations. The planetary gear units and worm gear type units may be used only where specified. Class of service shall be Class II or heavier, as determined by the manufacturer or as directed by the Engineer.
- E. The equipment manufacturer shall furnish the Engineer with complete engineering information, catalog data, design features, loading capacities, and mechanical efficiency ratings for every gear reduction unit incorporated in the work.

2.10 LUBRICATION FITTINGS

- A. All lubrication fittings shall be brought to locations that are readily accessible to operators from normal operating walkways or platforms. Equipment lubrication fittings shall be extended to outside of all equipment so that they are readily accessible from the outside without the necessity of removing covers, plates, housings, or guards, floor plating or other obstruction, and to eliminate creating falling hazards by unusual elevations. Fittings shall be buttonhead type. Lubrication fittings shall be mounted together wherever possible.
- B. Pressure grease-lubricated fittings shall be the "Zerk Hydraulic" type or the "Alemite" type.
- C. Housings of grease-lubricated bearings shall be automatically exhausted to the atmosphere to prevent excessive greasing.
- D. Oil drains shall be piped to a location outside the equipment frame for ease of draining. Provide ball valve for positive shutoff. Pipe shall be type-L copper or galvanized steel.

2.11 SPARE PARTS AND SPECIAL TOOLS

- A. For each type of equipment furnished, the Contractor shall provide spare parts, as specified on the respective sections of the Division, and a complete set of all special tools (including grease guns or other lubricating devices) which may be necessary for the adjustment, operation, maintenance, and disassembly of such equipment.
- B. Tools shall be high-grade, smooth, forged, alloy, tool steel. Grease guns shall be lever type.
- C. Special tools are considered to be those tools which because of their limited use are not normally available, but which are necessary for the particular equipment.
- D. All spare parts and special tools shall be delivered at the same time as the equipment to which they pertain. The Contractor shall properly store and safeguard such spare parts and special tools until completion of the work, at which time they shall be delivered to the Owner.
- E. Spare parts shall be appropriately labeled and containerized, and shall be properly packaged for long-term storage.

- F. If the Contractor utilizes a spare part to remedy an issue during the Contract work (through Final Completion) they shall replace the spare part at no additional cost to the Owner.

2.12 EQUIPMENT DRIVE GUARDS

- A. All equipment driven by open shafts, belts, chains, or gears shall be provided with all-metal or rigid fiberglass OSHA approved guards enclosing the drive mechanism. Guards shall be securely installed but shall be removable with quick open latches.
- B. Guards shall be constructed of galvanized sheet steel or galvanized woven wire or expanded metal set in a frame of galvanized steel members, unless otherwise specified.
- C. Guards shall be secured in position by steel braces or straps which will permit easy removal for servicing the equipment.
- D. The guards shall conform in all respects to all applicable safety codes and regulations.

2.13 PROTECTION AGAINST ELECTROLYSIS

- A. Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis.
- B. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other acceptable materials.

2.14 NAMEPLATES

- A. Each piece of equipment shall be provided with a substantial nameplate of noncorrodible metal, securely fastened in place and clearly and permanently inscribed with the manufacturer's name, model or type designation, serial number, principal rated capacities, electrical or other power characteristics, and similar information as appropriate.
- B. An enlarged paper copy of all the nameplate data on equipment and motors shall be provided in the Shop Drawings and Operation and Maintenance Manuals.

2.15 SURFACE PREPARATION AND SHOP COATINGS

- A. Provide surface preparation and shop coatings in accordance with Specification Section 09905.

2.16 ELECTRICAL CONTROLS

- A. Additional controls for various items of equipment are specified under Division 13 and/or Division 16, as indicated on the Drawings, and as specified. Due to potential differences in electrical requirements for equipment of various manufacturers, the Contractor shall coordinate the electrical requirements of the equipment supplied with the work specified in Division 13 and/or Division 16.
- B. Provide auxiliary contacts as required for remote status and alarm conditions. Contractor shall coordinate each piece of equipment. Refer to the Electrical and Instrumentation Drawings.
- C. Electrical controls for all equipment shall comply with the requirements of Division 16 and the National Electric Code, including provisions to allow each piece of equipment to be locked out/tagged out for maintenance or repairs.

- D. Control panels shall be constructed in conformance with UL 508A and bear the UL 508A seal confirming the construction. UL inspection and seal application can be accomplished at the panel fabrication facility or by field inspection by UL inspectors. Obtaining the UL seal and any inspections shall be provided at no additional cost to the Owner.

2.17 GAUGES

A. General:

1. Unless otherwise indicated, gauge assemblies shall be complete with 1/2-inch brass pipe and fittings, 1/2-inch ball valve with bronze body, stainless steel ball, Teflon seats and a tee with a brass test cock with female outlet end all arranged to allow field checking with a 4½-inch test gauge. Gauge assembly piping and valves for chemical feed systems shall be compatible with the chemicals being handled.
2. All gauges shall be equipped with snubbers or other protective throttling device(s) to dampen workings and pointer. If single snubber does not correct pulsing, provide additional snubbers in series.
3. All gauges shall meet requirements as outlined hereinafter.
4. All gauges provided are to be from the same manufacturer.
5. All gauge assemblies shall be supported by brackets to prevent excessive vibration that will cause damage to the gauge assembly.
6. The ranges of the gauges shall be suitable for any range of pressure that can occur during operation.
 - a. Suction gauges shall be compound-type, having a range of -15 feet to 0 feet to +30 feet of water.
 - b. Discharge gauges shall be selected at the nearest standard range which provides a top limit above the pump shutoff head or pump relief valve setting. Discharge gauges shall read in feet of water.

B. Process Liquid Applications:

1. Gauges shall be round black case, 4½-inches diameter, 1/2-inch NPT bottom male threaded connections, glycerin filled, stainless steel rack and pinion movement, black micro-adjusted rezeroing pointers, rack and pinion movement, black micro-adjusted rezeroing pointers, and black figures with white plastic dials and a threaded ring. Gauges shall have an accuracy of 1/2 percent of scale range.
2. Gauges shall be furnished for the suction and discharge nozzle of each pump and where called for on the Drawings or within other Specification Sections.
3. All gauge assemblies shall be supported by brackets to prevent excessive vibration that will cause damage to the gauge assembly.

C. All Other Applications (Chemical, Process Water, Seal Water, Air)

1. Gauges shall be round black case, 2-1/2-inch, ¼-inch NPT stem mount, glycerin filled, polycarbonate window, stainless steel bourdon tube and rack and pinion movement, black anodized aluminum micro-adjusted rezeroing pointers, white aluminum dial with black lettering. Gauges shall have an accuracy of 1.5% of full range. For chemical feed systems, all materials of construction shall be compatible with process chemical.

2. All gauge assemblies shall be supported by brackets to prevent excessive vibration that will cause damage to the gauge assembly.
- D. Diaphragm Seals
1. Gauges shall be provided with factory-mounted protective diaphragm assembly and snubber. Diaphragm assembly shall be cleanout type, which will allow cleaning of the lower diaphragm assembly without breaking the seal or refilling and shall not require recalibration of the gauge.
 2. The diaphragm shall be 316 stainless steel with a 316 stainless steel housing (process and instrument flanges) and shall be fitted with a bleed screw on the instrument flange, and flushing connection on the process flange. Connecting bolts and nuts shall be 316 SS. Other diaphragm materials will be considered for acceptance on a case-by-case basis when dictated by chemical compatibility, or as specified below.
 - a. Sodium Hypochlorite: PVC/ Teflon or Hastelloy C-276
 3. The diaphragm shall be rated for gauge operating pressure range. Provide a locking plate or lock-wire to prevent turning of the assembly and to maintain the factory calibration.
- E. Process Isolator Diaphragm Ring Seal: Shall be provided for all gauges on wastewater sludge, chemical slurries, grit and polymer applications, as specified in other Division 11 Specifications, and as shown on the Drawings. All other gauge applications shall be provided with a diaphragm seal as specified above
1. Provide a wafer-style pressure isolation flange to isolate the connected gauge from the process fluids.
 2. The ring shall be constructed of 316 stainless steel meeting ANSI B16.5 Class 150 standards.
 3. The pressure shall be transferred from an elastomeric ring embedded around the inside diameter of the flange to a ½" NPT port on the outside of the flange with isolation needle valve.
 4. All nipples, valves and fittings will be 316 stainless steel.
 5. Liner material:
 - a. Wastewater/Sludge Application: NBR, natural rubber or EDPM
 - b. Polymer Applications: NBR
 6. Fill fluid: Silicon (10Cst)
 7. Pressure gauge: per this section
 8. The pressure gauge and diaphragm seal shall be factory assembled and tested.
 9. Manufacturers:
 - a. Ashcroft Type 80 Iso-Ring
 - b. Red Valve Series 48
 - c. Or equal
- F. Gauges Assemblies shall be manufactured by:
1. Ametek U.S. Gauge Division
 2. Ashcroft
 3. Terice
 4. or equal.
- G. Contractor shall provide a gauge schedule listing all gauges, functions, locations, scales, etc., as part of the shop drawing submittal package.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Contractor shall carefully inspect receiving structures and anchor supports for defects in workmanship prior to equipment arrival.
- B. Contractor shall carefully inspect all equipment for:
 - 1. Damage in shipping.
 - 2. Defects in workmanship and materials.
 - 3. Tightness of all nuts and bolts.
- C. Inspection shall include, but not be limited to, the following as applicable:
 - 1. Soundness (without cracked or damaged parts).
 - 2. Correctness of setting, alignment, and relative arrangement of various parts.
 - 3. Adequacy and correctness of packing, sealing and lubricants.
 - 4. Completeness in all details, as specified.
- D. Field Quality Control
 - 1. As part of the equipment cost, the Contractor shall provide the services of a duly authorized Manufacturer's representative to assist the Contractor with equipment adjustment, start-up, and necessary testing to prove that the equipment is in proper and satisfactory operating condition.
 - 2. On completion of the work, the Manufacturer's representative shall provide written certification that the equipment conforms to the requirements of the Contract and is ready for permanent operation and that nothing in the installation will render the manufacturer's warranty null and void, as outlined in the attached equipment certification form.
 - 3. As part of the startup services, the Manufacturer's representative shall provide the Owner's personnel with training in the proper operation and maintenance of all associated equipment. The equipment training certification form shall be used for this purpose.
 - 4. When the work is substantially complete the Contractor will be required to demonstrate, to the satisfaction of the Engineer, the ability of all equipment to operate as intended without defect including binding, vibration, jamming, overheating, etc.
 - 5. Owner-Furnished Acceptance Testing Company - The Owner shall utilize the services of an independent inspector in order to verify that all equipment is operating in full compliance with the Specifications. The independent inspector shall be selected by the Owner. Cost for initial testing of equipment by independent inspector shall be by Owner. The Contractor shall provide assistance to the independent inspector as needed to complete the required equipment testing at no additional cost to the Owner, the Engineer, or the independent inspector. The Owner's independent inspector will conduct the following acceptance testing:
 - a. Equipment pre-installation alignment;
 - b. Equipment final alignment check;
 - c. Vibration analysis;
 - 6. All equipment shall meet the Commissioning and/or Acceptance Testing Specifications and Tolerances for Rotating Equipment included in Appendix of the Specifications.

7. All equipment found defective by the Engineer shall be replaced by the Contractor at no expense to the Owner.
8. The cost of any retesting by Owner's independent inspector, required because of defective equipment, shall be borne by the Contractor.

3.2 PREPARATION

- A. Provide all required adhesives, sealants, insulation, lubricants, waterproofing, fireproofing or other protection specified in each Section of this Division.

3.3 INSTALLATION

- A. Contractor shall install equipment in accordance with Manufacturer's requirement. Manufacturer(s) shall work with the Contractor to ensure that the equipment has been properly installed.
- B. Do not install equipment until all defects or inadequacies in receiving structure have been corrected to meet Specifications.
- C. Erect and lubricate equipment in strict accordance with the manufacturer's instruction. Installation shall include all oil and grease required for proper operation.
- D. All equipment mechanisms shall withstand all stresses that may occur during fabrication, erection, and intermittent or continuous operation.
- E. Contractor to furnish and install supports as indicated on the Drawings, and as required by the equipment manufacturer.
- F. Thoroughly clean all equipment and appurtenant piping to remove all dirt, grease, mill scale, and other foreign matter and touch up factory finish to the satisfaction of the Engineer.

3.4 STARTUP AND TESTING

- A. Test and adjust all equipment in accordance with the general requirements of Specification Section 01800, and the specific requirements of the various Division 11 Specification Sections.
- B. Demonstrate the equipment's ability to operate without overloading jamming, excessive vibration, etc. during normal operation conditions.
- C. Demonstrate the equipment's ability to meet all the performance requirements specified for the equipment system to make a complete operational system, suited for its intended use.

3.5 EXISTING EQUIPMENT RELOCATION

- A. All relocated equipment shall be reconditioned and serviced prior to operation in the new locations. Equipment shall be cleaned, rust removed, re-primed and painted in accordance with Section 09900, balanced, lubricated, oiled, calibrated and properly wired and plumbed to provide the intended service. Start-up of relocated equipment shall be done in accordance with the manufacturer's instructions.

END OF SECTION

SECTION 11228

POTABLE WATER TANK SUBMERSIBLE MIXING SYSTEM

PART 1 - GENERAL

1.1 SCOPE

A. This section covers Tank Mixing System, which consists of a submersible tank mixer and control panel. The components shall be provided by a single manufacturer and shall be designed to operate in unison and be controlled by a single integrated control panel to deliver the specified mixing rate.

1. The tank mixing system shall consist of one (1) 0.5 HP minimum mixer intended for continuous use while submersed in potable water storage tanks. Each mixer shall have the ability to function continuously on a 24-hour per day year-round basis, regardless of drain and fill cycles. Each mixer shall consist of a water-filled submersible motor and an impeller. The mixer shall be suitable for use in potable water and shall be NSF-61 certified.

1.2 REQUIREMENT

A. CONTRACTOR shall furnish and install mixing systems together with all drives, motors, controls, power and communications connections, piping, and accessories necessary for a complete and operable system.

Tank Name	Forge Road Tank
Tank Type	Ground Steel
Tank Volume (gal)	575,000
Tank Inside Diameter (ft)	28
Tank Wall Height (TH) (ft)	125
Power Available (volts/phase/amps)	120V/Single-phase
High Water Level (HWL) (ft)	120
Low Water Level (LWL) (ft)	100
Minimum Headspace Height (ft)	4

Tank Name	Saunderstown Tank
Tank Type	Ground Steel
Tank Volume (gal)	528,000
Tank Inside Diameter (ft)	30
Tank Wall Height (TH) (ft)	100
Power Available (volts/phase/amps)	120V/Single-phase
High Water Level (HWL) (ft)	98.5
Low Water Level (LWL) (ft)	85
Minimum Headspace Height (ft)	4

- B. Provide and install all accessories necessary for a complete and operational system.
 - 1. The Contractor shall furnish electrical conduit with 120VAC Single Phase voltage based on System configuration and a Safety disconnect switch.
 - 2. A 20 Amp non-GFCI circuit breaker up to the point of installation of the mixing system utilizing the Manufacturer control center.
 - 3. The Contractor shall also provide conduit from control center to tank penetration for submersible motor cable and penetration through the side of the tank hatch.

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Comply with the applicable reference specification as specified in the General Requirements
- B. Occupational Safety and Health Administration (OSHA).
- C. NSF/ANSI Standard 61
- D. Underwriters Laboratories Inc., UL 508

1.4 CONTRACTOR SUBMITTALS

- A. NSF Certification
 - 1. Copies of the NSF-61 certified listing for all submersible mixer system being placed inside the tank and headspace, including the motor and power cable.
- B. Installation, Operations, and Maintenance Manuals shall be obtained from the equipment manufacturer and submitted. The following sections shall be included:
 - 1. General equipment specifications and data sheets
 - 2. Installation instructions
 - 3. Factory operation and maintenance manual
 - 4. Factory-recommended maintenance schedule
 - 5. Wiring diagrams specifying what electrical wiring needs to be done onsite during and prior to the installation, and by which responsible party
 - 6. List of equipment or tooling necessary for diagnostics, trouble-shooting, repair, or general maintenance

1.5 QUALITY ASSURANCE

- A. Each component of the Mixing System, as listed above, shall be tested prior to deployment according to standard engineering practices at the factory testing facilities.

1.6 WARRANTY

- A. For the period of time beginning with shipment to Buyer and ending on the time periods listed below, the Product is warranted to be substantially free from defects in material and workmanship and to conform to Seller's specifications applicable to the Product:
 - 1. Five (5) years for tank mixing system
 - 2. One hundred twenty (120) days labor

PART 2 - PRODUCTS

2.1 PERFORMANCE

- A. Mixing system shall completely mix reservoir according to the following minimum performance requirements. These requirements shall be measured and validated after installation by the CONTRACTOR with readily available tools such as temperature probes and total chlorine grab samplers.
 - 1. Temperature Uniformity
All temperatures shall converge to within 0.50°C (0.9°F) within 24 hours after mixer is installed and activated. The CONTRACTOR shall be responsible for the cost of sampling and testing.
 - 2. Disinfectant Residual Uniformity
Disinfectant residual within top five feet of tank and bottom five feet of tank will converge to within 0.20 ppm within 24 hours after mixer is installed and activated. During continuous operation of the mixer, under normal disinfectant dosing parameters, disinfectant residual will converge to within 0.20 ppm at least once every 24 hours. The CONTRACTOR shall be responsible for the cost of sampling and testing.

2.2 TANK MIXING SYSTEM

- A. Mixing system consists of an impeller mounted on a submersible motor and supported approximately three feet in height from the tank floor in order for it to launch a jet of water from the bottom of the tank up toward the surface of the water. Mixer shall weigh less than 56 pounds and able to be hoisted, installed, and/or removed by on-site personnel without additional equipment needed, and so there is no crush hazard or entanglement hazard present, and so that weight of mixer on tank floor does not cause damage to interior coating.
- B. Mixers shall include a buoyancy mechanism to keep nozzle pointing upright no matter the angle of the tank floor, unless suspended above the floor and secured to the roof with stainless steel cables or chain in two locations to avoid any movement within tank and also to be utilized as a lowering mechanism.
- C. Mixers shall include integrated power cable and included with the NSF System certification.
- D. Mixer provider must have more than 500 installations of similar equipment in potable water tank.
- E. All wet-side mixer system shall be certified by NSF International to the NSF/ANSI Standard 61.
- F. No maintenance required on the wet-side components in typical potable water application.
- G. No passive mixing system allowed.
- H. Equipment entering the tank shall not adhere to, scratch, or otherwise cause damage to the internal tank coating or put undue stress on the materials of the tank construction. Equipment shall fit through a standard hatch of size 12-inch x 12-inch or larger. UTILITY may prefer to puncture sidewall or ceiling of tank (in place of puncturing the hatchway) to allow motor cable entry into the tank for ease of installation and protection against freezing/ice damage.

- I. The power cable shall be NSF61 & UL- listed submersible pump cable as part of the Mixing System NSF61 certification.
- J. Each submersible mixer shall consist of the following components:
 - 1. Nozzle
 - a. AISI Type 316 Stainless Steel or composite
 - b. Balanced to within 0.5 gram-inches
 - c. Passivated per ASTM A380 to minimize corrosion
 - Shall not create cavitation at any rotational speed
 - 2. Nozzle Housing
 - a. AISI Type 316 Stainless Steel, or composite
 - b. Brush finish to minimize surface corrosion
 - c. Buoyancy mechanism to keep nozzle pointing upright no matter the angle of the tank floor, unless suspended above the floor.
 - d. Chlorine/chloramine resistant rubber foot pads to avoid scratching tank floor
 - e. Integrated power cable and lowering mechanism for simplicity
 - 3. Motor
 - a. AISI Type 304 Stainless Steel Body
 - b. Chlorine/Chloramine resistant NBR rubber seals or ceramic seals
 - c. Fully submersible
 - d. Low power (0.5 HP minimum)
 - 4. Mounting
 - a. Preferred stainless steel 316 or corrosion resistant material
 - b. Three detachable legs if floor mounted, or suspended above the tank floor
 - c. NSF/ANSI Standard 61 certified EPDM rubber, non-skid, non-scratch feet or insulating pad, if floor mounted.
 - d. Attachments secure motor cable away from impeller
 - e. Overall weight of wet-side unit not to exceed 75 lbs. to avoid damaging tank floor
 - f. Overall height of unit not to exceed 5 ft.

2.3 CONTROL SYSTEM

- A. The mixing system shall be provided with an integrated control panel to provide adequate controls to indicate system operation. The integrated control panel shall be suitable for use on a 120 V, single phase and in a NEMA 3R or 4X enclosure. The integrated control panel shall be mounted at a point that is accessible for easy operation and maintenance and as shown on the plans. The integrated control panel shall be able to be integrated with existing SCADA. CONTRACTOR shall wire signals between SCADA and the integrated control panel to control the start/stop functions of the equipment along with monitoring faults and motor amperage. The integrated control panel shall include hand/off/auto controls for all motorized equipment installed during the phase of the project. The “auto” start/stop function shall be controlled by a dry contact relay within the UTILITY’s SCADA. UTILITY shall program the SCADA to properly sequence on equipment, monitor running status

of equipment, report faults or alarms, and shut off equipment in the event of low water level.

- B. The integrated control panel shall include the following on the dead panel:
 - 1. On/Off Safety disconnect switch (disconnect switch required is listed as a separate feature in paragraph 1.2B) recommend that is supplied by the electrical contractor and installed next to the mixer panel.
 - 2. Green LED Pilot lights indicating "Running" and Red LED pilot light for "Fault" status of each equipment.
 - 3. Hand/off/auto H-O-A equipment selector switches for each equipment containing:
 - a. Run
 - b. Hand
 - c. Off
 - 4. Low water inhibits mixer operation relay if tank level drops below operating level.
- C. The integrated control panel shall receive the following dry contact inputs from UTILITY:
 - 1. Remote Start/Stop
- D. The integrated control panel shall output the following through dry contact from UTILITY:
 - 1. Dry contacts to SCADA for HOA in Hand, Auto, Mixer running & Mixer fault
- E. The integrated control panel shall output the following through 4-20 mA analog signals:
 - 1. 4-20ma motor current output to SCADA for monitoring motor status and fault condition.

2.4 MANUFACTURER

- A. Big Wave Technologies (Oceanside, California)
- B. Kasco Marine Certisafe Mixers (Prescott, Wisconsin)
- C. PSI Water Technologies (Milpitas, California)
- D. Or Equivalent

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The CONTRACTOR shall furnish services of a factory-trained installation contractor or crew having experience with installation procedures and operation and maintenance requirements for the type of equipment installed under these specifications. The mixer must be able to be installed through a 24-inch diameter roof opening. Mixer components shall be able to be hoisted, installed, and/or removed by on-site personnel without additional equipment needed, and so that there is no crush hazard or entanglement hazard present, and so that weight of mixer on tank floor does not cause damage to interior coating.
- B. All connections and penetrations of the tank must be installed to create a water-tight connection that will protect the stored potable water from any potential contamination.

POTABLE WATER TANK SUBMERSIBLE MIXING SYSTEM

- C. The mixer, stand, wiring and all component which come in contact with potable water shall be disinfected with sodium hypochlorite prior to installation in the tank. The mixing system shall be installed while the standpipe remains full of potable water.
- D. Electrical service, safety disconnect switch, and circuit breaker shall be installed by:
 - 1. Licensed electrical contractor per arrangement with CONTRACTOR.
- E. The submersible mixer and integrated control panel shall be installed in accordance with approved procedures submitted and as shown, unless otherwise approved in writing from the Manufacturer.
- F. The bottom of the tank shall be cleaned of all accumulated sediment prior to installation of the mixing equipment.

3.2 TRAINING

- A. The CONTRACTOR staff (or their representatives) will instruct designated CLIENT personnel in the safe and proper operation of the system. This training will reference the operations manual provided with the equipment and demonstrate how to check for proper functioning of the equipment.

END OF SECTION

SECTION 16000

ELECTRICAL – WATER TANK

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide all labor, materials, equipment, operations, methods and procedures as specifically noted herein these specifications and as indicated in the Contract Documents, together with all items necessary for or incidental to the completion of the work.
- B. All systems or additions to existing systems indicated in the Contract Documents shall mean all necessary supervision, labor, equipment and materials required to provide complete, properly functioning systems.
- C. All systems shall be adjusted, tested, inspected and turned over to the Owner in perfect working order.
- D. The words "provide", "supply", "supply and install", "install", "furnish" or "furnish and install", as used in DIVISION 16 or as indicated on the Drawings related to DIVISION 16 shall mean a complete and properly functioning Electrical installation performed by the Contractor.
- E. References:
 - 1. Refer to each individual drawing within the Contract Documents in order to coordinate material and equipment locations and electrical requirements.
 - 2. Applicable portions of DIVISION 0 and DIVISION 1 are part of DIVISION 16. Refer to these sections for additional information on bidding requirements, general requirements, Section 01800 for equipment start-up, and product substitution.
- F. Work Specified Herein:
 - 1. Visit and examine the project site and become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed.
 - 2. The following scope of work is a brief generalization of the type and extent of the work specified under DIVISION 16. Detailed requirements are indicated on the Drawings and in related sections of the Specifications. The work specified under DIVISION 16 includes, but is not necessarily limited to the following:
 - a. The work specified under Division 16 is inclusive of the electrical work for this project as indicated on the Drawings and in related sections of the Specifications.
 - b. Provide Electrical Service and Distribution System as indicated on the "Single-Line Diagram", related drawings and schedules, and as specified herein.
- G. The work shall also include, but not be limited to, the furnishing and installing of the following:
 - 1. Underground electrical service to the control panel and electrical equipment.
 - 2. Raceways and fittings.

3. Wires and cables.
 4. Service distribution equipment.
 5. Miscellaneous electrical distribution equipment.
 6. Grounding system.
 7. Connection to existing SCADA telemetry system RTU equipment and connections (equipment provided by Owner).
 8. All required electrical work for the proposed water tank mixing system as shown on the drawings.
- H. Make all required connections to the water tank mixing system and for the electric service and utilities at the water tank.
- I. Request for Information:
1. When there is a conflict or coordination issue, or if additional information is necessary for the contractor to proceed with the intended work, a Request of Information (RFI) form shall be submitted through the General Contractor to the Engineer. The specific issue shall be described in the RFI and shall be sent to the engineer for review and a response provided in an appropriate time period. RFI form shall be available via the General Contractor through the Engineer. This process shall be used as part of the work of this contract. Products FURNISHED but not installed under this section.

1.2 QUALITY ASSURANCE

- A. In general, the workmanship of the electrical installation shall be as described in the N.E.C.A. Electrical Design Guidelines. All methods of construction, details of workmanship, etc., that are not specifically described therein or indicated in the Contract Documents, shall be subject to the control and no exceptions to the Engineer.
- B. Equipment and materials shall be of the quality and manufacture indicated in their respective description within the specifications.
- C. Work determined by the Engineer to be unsatisfactory according to industry standards shall be redone at the Contractor's expense, with no additional compensation.
- D. Safety and care of equipment and electrical installations to remain the responsibility of the subcontractor until final acceptance by owner. Any cost associated due to damages or loss prior to owner acceptance to be covered by subcontractor.

1.3 SUBMITTALS TO THE ENGINEER

- A. Submit Shop Drawings, O&M Documentation, and manufacturer certificates in accordance with Section 01340 The requirements below are in addition to the standards therein.
- B. Submittals required under this section include, but are not limited to the following for each of the locations specified:
 1. Conduit
 2. Wiring and Cables
 3. Lightning arrestor and line surge protection
 4. Mounting hardware and materials
 5. Pullboxes
 6. Control station push buttons and enclosures

7. Expansion fittings
8. Conduit seal fittings
9. Equipment test results
10. Submit all other equipment as required by the Contract
- C. Operations and Maintenance Manual
 1. Requirements
 - a. Provide a complete bill of material for each piece of equipment.
 - b. Provide a preventative maintenance section for all applicable equipment including recommended schedule and spare parts.
 - c. Panels which require customized schematics shall be updated with changes made in the field and submitted on 11" x 17" size drawings. Also internal and front elevation drawings shall be included identifying all equipment.
 - d. All equipment shall include a troubleshooting section with common symptoms and recommended solutions.
 - e. All equipment shall include emergency operations instructions.
- D. Submittals:
 1. Shop Drawings Shall Consist Of:
 - a. Project name and location.
 - b. Contractor's name.
 - c. Index Sheet - Listing the equipment being submitted utilizing equipment designations, or symbols, indicated on the Contract Documents together with the proposed manufacturer, style/ type and catalog number.
 - d. Manufacturer's scale or dimensioned drawings along with standard catalog "cut" sheets.
 - e. Equipment ratings, service clearances and configuration.
 - f. Listing of accessories to be furnished.
 - g. Single-line and schematic diagrams where applicable.
 - h. Refer to related sections of the specifications for special shop drawing requirements for individual equipment types.
 2. Provide samples of such items as lighting fixtures and wiring devices upon request of the Engineer.
 3. Standard manufacturer's catalog cut sheets are acceptable; however, they shall be modified to indicate equipment and options to be provided for this project. Any listed equipment, options, or features which are not to be provided shall be properly indicated in the submittal. Failure to properly indicate project-specific equipment, options, and features will result in the submittal being returned without being reviewed.
 4. Submit test results as listed in Section 3.4

1.4 PRODUCT HANDLING

- A. All materials shall be shipped, stored, handled and installed in such a manner as not to degrade quality, serviceability, or appearance.
- B. 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, such damage shall be repaired at no additional

cost. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through such special tests as directed by the Engineer, or shall be replaced at no additional cost to the Owner.

1.5 DESIGN CRITERIA

- A. Service and Metering
 - 1. The project site location has existing utility company services for power and telephone. There will be no requirements for the scope of work which will impact these existing services. Therefore, there will be no need for coordination and contact with the respective utility company regarding any shutdowns, energizations, modifications, or interface with the present services which shall effect the work of this contract.
- B. Service and Metering
 - 1. The power company serving this project is Rhode Island Energy. The service representative this project is as follows:
 - 2. Contact Person: Jessica Dunbar
 - 3. Contact telephone number: 781-907-3494
 - 4. Service will be obtained at 100A, 60 Hertz, from an existing pole-mounted service transformer located at the site, as shown on the drawings.
 - 5. Coordinate all shutdowns and activations of the services with the power company as part of this work.
- C. Codes, Inspection and Fees
 - 1. All material and installation shall be in accordance with the latest edition of the National Electrical Code and the codes and ordinances of the Town or City of which the work is being performed.
 - 2. Pay all fees required for permits and inspections. All power utilization fees incurred prior to owner's acceptance to be paid by subcontractor.
- D. Tests and Settings
 - 1. Test all systems furnished under DIVISION 16, ELECTRICAL and repair or replace all defective work.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials and equipment used shall be Underwriters Laboratories, Inc. listed.
- B. Refer to Drawing E-1 for specific references to NEMA ratings for equipment specified unless otherwise noted.

2.2 RACEWAYS AND FITTINGS

- A. Rigid steel conduit shall be hot dipped galvanized as manufactured by Republic Steel Corp., Allied Tube and Conduit Corp., Wheeling Pittsburg Steel Corp., or equal.
- B. Conduit hubs shall be as manufactured by Myers Electric Products, Inc., Raco Div., Appleton Electric Co., or equal.
- C. PVC coated rigid steel conduit as manufactured by Rob-Roy "Plasti-Bond", Ocal, or equal.
- D. PVC Schedule 40 shall be extra heavy wall and UL Listed for the use intended. Acceptable Manufacturers: Carlon, Rob-Roy, or equal.

- E. Aluminum conduit shall be rigid, heavy wall aluminum. Acceptable manufacturers: Anaconda, Kaiser, VAW, or equal.
- F. Electrical Metallic Tubing (EMT) shall be constructed of electro-galvanized steel. EMT fittings shall be interlocking compression type of cadmium-plated malleable iron or zinc coated steel, or stainless steel. No die cast, set screw and indenter type fittings shall be used. Acceptable manufactures are Allied, Wheatland or equal.
- G. Flexible Metal Conduit
 - 1. Flexible Metal Conduit shall be constructed of one continuous length of U. L. Approved electro-galvanized, spirally wound steel strip with interlocking convolutions and interior surfaces free from burrs and sharp edges.
 - 2. Flexible metal conduit shall be "liquid-tight" with PVC jacket. Acceptable Manufacturers: Alfex - a division of Southwire, Electri-Flex, Thomas & Betts - a division of ABB, or equivalent.
 - 3. Flexible metal conduit installed in hazardous, NEMA 7, Class I Div 1 areas shall be UL Listed, and shall have a stainless-steel braid covering over a flexible stainless steel inner core. Packing shall be woven cotton braid impregnated with asphalt. Acceptable manufacturer: Crouse-Hinds - a division of Eaton, Killark, Thomas & Betts - a division of ABB -XP Series, or equal.

2.3 WIRES AND CABLE

- A. Wires and cables shall be of annealed, 98 percent conductivity, soft drawn copper. All conductors installed below grade shall be XHHW stranded. All conductors #8 and larger shall be XHHW.
- B. Power wiring shall be 600V, Type XHHW. Type XHHW shall be cross linked polyethylene, as manufactured by Pirelli Cable Corp., Collyer Insulated Wire Company, The Okonite Company, or equal.
- C. Control wiring shall be 600V, Type THHW/THHN No. 14 AWG stranded. Type THHW/THWN shall be cross linked polyethylene, as manufactured by the Pirelli Cable Corp., Collyer Insulated Wire Company, The Okonite Company or equal.
- D. Signal wiring shall be 600V, individual shielded twisted pair, No. 16 AWG stranded with polyethylene jacket. Provide Belden Catalog No. 8719, Alpha Wire & Cable, or equal.
- E. Ground wires shall be THW and color-coded green.
- F. Variable frequency drive (VFD) motor supply cables shall be provided where indicated on Drawings. VFD cables shall be four (4) conductor tinned stranded copper, with cross-linked polyethylene insulation, overall foil (100% coverage) / tinned copper braid (85% coverage) shields, No. 12 AWG tinned copper drain wire, and outer PVC jacket. Cables shall conform to UL specification for 1000 Volt flexible motor supply cable. Acceptable Manufacturers: Belden, Olflex, or equal.
- G. Ethernet wiring shall be Category 6, 4-pair 24 AWG solid bare copper conductor, unshielded, FEP insulated, plenum rated. Acceptable manufacturers shall be Belden, Omni, or equal.
- H. Wire markers shall be "OMNI GRIP" as manufactured by W.H. Brady Company, Panduit Polyolefin heat shrink labels or equal.
- I. All wires and cables specified and installed underground shall be U.L. Listed and Labeled for underground use for all installations.
- J. Power conductors shall be continuously polarized and color coded throughout using

the following scheme:

1. White - All neutral conductors, 208/120V systems
2. Gray - All neutral conductors, 480/277 volt systems.
3. Green - All ground conductors
4. Phase Conductors

<u>208/120V Systems</u>	<u>240/120V Systems</u>	<u>480/277V Systems</u>
Phase A - Black	Phase A - Black/(Red)	Phase A - Brown
Phase B - Red	Phase B - Red/(Blue)	Phase B - Orange
Phase C - Blue		Phase C - Yellow

5. Regardless of conductor size, conductor insulation color shall correspond to the color coding required in this section.
- K. Control Conductors shall be continuously polarized and color coded throughout using the following scheme:
1. 120 Volts – Red
 2. DC Controls – Dark Blue
 3. Intrinsically Safe – Light Blue

2.4 GROUND ROD

- A. 10 foot long by 3/4 inch diameter copper clad steel ground rods shall be provided, arranged and installed as shown on the drawings. Provide all required Cadwelds, grounding clamps and hardware as required for a complete installation per NEC and as shown on the drawings.
- B. Acceptable manufacturers are Erico, AB Chance Co., or equal.

2.5 LIGHTNING AND SURGE PROTECTION

- A. Lightning and surge protection units shall be Square D Model Number SDSA 3650, three phase for 600 VAC phase-to-ground voltage. Provide a separate unit at all locations shown on the drawings. Provide a spare lightning and surge protection unit to the Owner for spare parts.
- B. Lightning and surge protection units shall be Square D Model Number SDSA 1175, single phase for 250 VAC phase-to-ground voltage. Provide a separate unit at all locations shown on the drawings. Provide a spare lightning and surge protection unit to the Owner for spare parts.

2.6 EXPANSION FITTINGS

- A. Expansion fittings shall be watertight expansion type, designed to compensate for conduit movement. Expansion fittings shall be provided to allow movement of 4 inches in both directions for a total of 8 inches. Fittings shall have flexible copper braid bonding jumpers, neoprene sleeve and stainless-steel bands. Acceptable Manufacturer: O.Z./Gedney Type EX, Thomas & Betts, or equal.

2.7 PULLBOXES AND JUNCTION BOXES

- A. Junction boxes shall be cast malleable iron or aluminum type and gasketed type FS series with hubs.

- B. Pullboxes other than explosion proof shall be seamless weld type, galvanized with flush type screw-on covers and no hinges or side clamps all around. Use Myers hubs for conduit termination and entry into pullboxes. Acceptable manufactures are Rittal, Hoffman, or equal.
- C. Explosion-proof pullboxes shall be NEMA 4/7, Class I, Division 1, Group C & D or NEMA 4/7, Class I, Division 2, Group C and D for hazardous rated areas. Provide conduit sealing fittings inside and outside of explosion proof areas for all conduits per NEC. Acceptable manufactures are Appleton, Crouse Hinds, or equal.
- D. Boxes for concealed work shall be used only for concealed installations.

2.8 MOUNTING SUPPORTS AND HARDWARE

- A. Provide 316 stainless steel uni-strut and 4" channel angle supports and stainless-steel mounting plates as shown and required for equipment mounting. All legs for stanchion mounting structures shall be channel angle support, no exceptions.
- B. All bolts, washers and mounting hardware shall also be 316 stainless steel for the entire installation.
- C. Acceptable manufactures are B-Line Systems, Inc., Thomas & Betts-Super Strut, Unistrut, or equal.

2.9 LINK SEAL

- A. Furnish and install link seal fittings at all areas of buildings and structures both above and below grade for conduit entry. Refer to the contract drawings for additional requirements.
- B. Acceptable manufactures are Innerlynx, Crouse Hinds, or equal.

2.10 MOTOR CONNECTIONS

- A. Provide all required flexible conduit liquid tight or explosion proof to meet the NEMA rating as noted on the drawings. Limit lengths to 24" or less. Moved to cable section.

2.11 WIRE IDENTIFICATION

- A. All individual conductors shall be identified using unique numerical tags corresponding to conductor designations indicated on approved shop drawings of schematic diagrams for all terminations. This includes all process- and non-process-related wiring done as part of the work, such as fire alarm panels. Conductors shall be clearly identified at each terminal block, equipment connection and junction. Markings shall utilize the equipment designation and terminal block number in the device higher upstream in the system hierarchy.
- B. For Conductors No. 6 and smaller, color coding shall correspond to the color of the conductor insulation. For color coding of wire larger than No. 6, use self-adhesive, wrap-around type markers. These markers shall be used at all panelboards, junction boxes, disconnect switches, circuit breakers, etc.

2.12 ELECTRICAL EQUIPMENT ENCLOSURE

- A. Provide a free standing heavy-duty 316 stainless-steel weather tight and corrosion resistant pedestal enclosure. The enclosure shall not have any side clips around the edges and the only means of entrance shall be a key lockable handle. Devices

- requiring mechanical coins or quarter turn latches are not acceptable.
- B. Pedestal enclosures shall be made of 12-gauge aluminum with ¼ inch by 2 inch by 2 inch channel support on walls, roof and base. The enclosure shall be sized to house all equipment as shown on the Drawings and shall be located as shown on the Drawings. Final sizing shall be submitted as a shop drawing with all equipment shown to scale and dimensioned for performing a final review. The Contractor is responsible to coordinate and provide the correct sizing at no additional cost to the Owner.
 - C. The enclosure shall be U.L. listed and labeled as a complete assembly. The final sizing of the enclosure based on the supplied equipment to be selected by the contractor shall be the responsibility of the contractor.
 - D. Enclosure shall have full height hinged doors. Doors shall have vault type key lockable operating handles with three-point latch.
 - E. Doors shall be fully gasketed with opening of sufficient size to permit ready removal of any of the equipment installed in the compartments. Number of doors and arrangement shall be based on overall width of enclosure. Support posts shall not interfere with clearance access between doors to equipment. The enclosure shall have an aluminum mounting backboard with ground lug assembly mounted to backboard and enclosure for system grounding.
 - F. Six sets of keys for each lock shall be furnished. Padlocks shall have forged brass case with brass shackle. Locks and keys shall match the present type of the Owner's other locations and shall be keyed alike.
 - G. Pedestal roof shall slant to the rear of the enclosure.
 - H. Drip shield shall extend over door opening.
 - I. All exposed hardware shall be stainless steel.
 - J. The Contractor shall submit a final shop drawing with all equipment shown and dimensioned for final layout of panel and sizing of panel. Coordinate the layout in the field with the Engineer as to allow for door access and avoid interference with other equipment and enclosures.
 - K. Dimensions if shown on the drawings are for reference only. The electrical enclosure shall have sufficient space to mount all equipment with proper clearances and height requirements as required per NEC. The final sizing is the responsibility for the contractor.
 - L. Heat dissipation is required to remove excess heat from within the enclosure for the Power Equipment Enclosure. This has not been shown on the drawings for clarity. Provide a complete system to include thermostat, fan, in-take louver, and out-take louver required to properly cool the enclosure. The system specified below is manufactured by Hoffman/miscellaneous equipment:
 - 1. Cooling Fan Package, Hoffman Catalog #TFP61SS (115 volt, Type 1 washable foam filter, 140 CFM @ 60 HZ, SS grille, composite air plenum, finger guard).
 - 2. Exhaust Grille, Hoffman Catalog #TEP6SS (stainless steel w/ Type 1 washable foam filter).
 - 3. 2-fan shroud kits, (1 on intake and 1 on exhaust), Hoffman Catalog #T103RSS.
 - 4. Line voltage thermostat: Honeywell T631C1103.
 - 5. Fractional 120V Manual Motor Starter: Square-D FG-1P

6. The fan shall be controlled by a thermostat and power shall be obtained from a circuit breaker from the lighting panel within the electrical equipment enclosure.
- M. The enclosures shall be insulated and heated as a factory-installed requirement. Field installations after the fact will not be acceptable. Insulate the inside of all exterior surfaces with 1-inch thick rigid fiberglass insulation board having a maximum thermal conductivity ("k" value) of 0.35 BTU-in/hr-ft²-°F. The insulation shall be finished with manufacturer's standard all service jacket. Coverings containing foil will not be acceptable.
- N. For outdoor installations, heat/sun shields fabricated from 0.125 marine grade aluminum shall be installed on front, back and sides of panel. Holes shall be cut in shield for alarm light and horn. Heat shields shall also have white polyester powder coat finish on all sides. Provide cut-outs in the back of the enclosure to accept VFD aluminum mounting plates. Mounting plates shall be attached to studs on the back of the enclosure and gasketed. VFD enclosures located outside shall be NEMA 12/3R with the VFD heat sinks vented out the back. Consult VFD manufacturer's installation guide for flange mount cut-out dimensions and recommended instructions. The rear sunshield shall have a removable cover with handles to allow access to the VFD heat sinks for cleaning and maintenance. The heat shield shall have studs with wing nuts for attached the removable cover. Seal all penetrations

2.13 BRANCH CIRCUIT BREAKERS

- A. Provide 20 Ampere, 120 Volt circuit breakers where indicated on drawings.
- B. Circuit breakers shall be thermal magnetic and maintain the UL Listing of the equipment being installed. Interrupting short circuit rating shall be equivalent or exceed to equipment housing device.
- C. There are several locations where branch circuit power shall be required to be extended to serve new or existing equipment. The contractor shall be responsible to add additional circuit breakers to this existing equipment and shall meet or exceed all ratings of this equipment.
- D. Where these devices are not available or replaceable the following shall be included as an alternate means of installation:
1. Panelboard Installation - If not available then a 4 circuit sub panel shall be installed and tapped by the tap rule of NEC and installed adjacent to the existing panelboard in order to meet this requirement.
- E. The contractor shall carry the higher cost installation in the final bid price if determination of this requirement cannot be identified.

2.14 CABLE SEALS

- A. Conduit sealing bushings to seal the ends of conduits entering enclosures from below grade shall be OZ Gedney Co., Type CSB Series or equal.

2.15 ELECTRICAL HAND HOLES

- A. Electrical hand holes shall be Composolite as manufactured by Strongwell Corporation or equivalent. Precast concrete hand holes as detailed on the Drawings shall also be acceptable. Hand holes shall be sized per the N.E.C. according to

number and sizes of entering conduits. All hand holes shall be rated for H2O wheel loading. Separate hand holes and conduit systems shall be provided for power, control, and instrumentation systems.

2.16 FINAL AS-BUILT RECORD DRAWINGS

- A. During the ongoing construction the contractor shall maintain a clean set of full size drawings for markup. The drawings shall be red lined and marked up with all appropriately noted changes noting the as-built condition. Upon completion of the project the set of as-built markups shall be provided to the Engineer for final AutoCAD revisions.

2.17 COMPLETE ELECTRICAL DISTRIBUTION EQUIPMENT SUPPLIER

- A. All electrical distribution equipment submitted for this project shall be by a single equipment manufacturer. Multiple suppliers of this equipment shall not be acceptable. The following manufactures shall be acceptable:
 - 1. Square D Company
 - 2. Cutler-Hammer
 - 3. Siemens
 - 4. GE(ABB)

2.18 EXOTHERMIC CONNECTION

- A. The contractor shall be responsible to furnish and install exothermic connections as required and shown on the contract drawings.
- B. The mold shall be new and clean and shall provide all required connection molds for different required types.
- C. All connections shall be industry standards in a complete, continuous, and properly installed connection. Any connections not properly installed as inspected shall be removed and re-formed at the contractor's expense.

PART 3 - INSTALLATION

3.1 RACEWAYS AND FITTINGS

- A. Unless otherwise indicated on the Drawings, install all wiring in the following applicable raceway system:
 - 1. Wiring above 600 volts in indoor dry locations (NEMA 12): Heavywall aluminum conduit. Cable tray (indoor only) and Galvanized heavy duty rigid steel conduit with no exceptions by the Engineer.
 - 2. Wiring 600 volts or less in dry concealed locations (NEMA 12): Galvanized electrical metallic tubing (for raceway sizes up to and including 2" trade size) or galvanized rigid heavy wall steel conduit. Only to be used in above ceiling spaces or within block walls or stud walls.
 - 3. Wiring 600 volts or less in outdoor, above grade locations (NEMA 4X): PVC coated galvanized rigid heavy wall steel conduit with no exceptions by the Engineer.
 - 4. Wiring 600 volts or less in indoor wet locations (NEMA 4X): Rigid heavy wall aluminum conduit. Galvanized rigid heavy wall steel conduit with no exceptions by the Engineer.

5. Wiring 600 volts or less in indoor or outdoor corrosive chemical areas use PVC-coated rigid steel conduit..
6. Wiring 600 volts or less in hazardous locations (NEMA 7 or 9): Galvanized rigid heavy wall steel conduit, PVC galvanized rigid steel conduit, or rigid heavy wall aluminum conduit based on requirements listed previously in this section.
7. Underground Raceways
 - a. All underground raceways shall be Schedule 80 extra heavy wall PVC conduit except for signal conduit raceways which shall be galvanized rigid steel conduit.
 - b. Refer to drawings for specific concrete encasement duct bank details and requirements. All underground duct banks shall be completely concrete encased. Schedule 40 PVC allowed for concrete encased conduit runs other than Signal conduits.
 - c. All PVC conduits shall transition to galvanized ridges steel conduit within 15' of structure or building.
- B. Where conduit extends out from underground or enters a structure/building or utility pole, it shall be installed as galvanized rigid steel conduit. This shall remain galvanized rigid steel to its final destination.
- C. Where conduits are installed concealed within or below concrete slab within the generator building and extend up through the slab galvanized rigid steel conduit sweeps shall be installed at all locations and shall remain galvanized rigid steel conduit for all exposed areas.
- D. No wire shall be pulled until the raceway system is complete in all details.
- E. The ends of all raceways shall be tightly capped to exclude dust and moisture during the construction period. Caps shall be of a UL Listed type specifically used for this purpose. Rags, papers, etc. shall not be used.
- F. Raceways terminating in gasketed enclosures shall be terminated with conduit hubs.
- G. Raceways installed underground shall be encased in concrete and laid on trenches on mats of bank gravel or sand not less than six inches thick and well graded.
- H. Provide long radius rigid steel conduit sweeps at entrances to equipment from underground.
- I. Provide conduit expansion fittings as required. Install per manufacturers recommendation.
- J. Under no circumstances shall conduits penetrate containment walls and floor.
- K. Conduits that originate from slab or from below slab shall have no breaks in conduit for a minimum of 4" above finished floor.

3.2 WIRES AND CABLES

- A. All conductors shall be carefully handled to avoid kinks or damage to insulation.
- B. All feeder circuit wiring is to be installed within conduit and continuous from point to point without any splicing.
- C. Alarm wires shall be uniquely identified at each end with wire markers. A typed list of the numbers used and their function (alarm served) shall be submitted to the Engineer by the Contractor.
- D. All 600 Volt wire insulation shall be tested with a megohm meter after installation. Tests shall be made at not less than 500 Volts. A written test report of the results

shall be submitted to the Engineer by the Contractor.

- E. After installation of service conductors seal conduits with duct seal.
- F. Grouping of Conductors
 - 1. Contractor may group certain wiring with the approval of the Engineer, as follows.
 - a. Power 120V may be grouped with power 120V
 - b. Control 120V may be grouped with control 120V
 - c. Control 24V may be grouped with control 24V
 - d. Instrumentation may be grouped with instrumentation
 - e. Specialty wiring may be grouped with like systems
 - f. Power wiring at 480V shall not be grouped
 - g. Fire alarm system wiring shall not be grouped with other systems

The installation shall be installed in accordance with all requirements of the NEC (including wire ampacity derating factors), manufacturer's requirements, and the Engineer. Excessive grouping which interferes with functionality and reliability will not be allowed. The wiring configuration as shown on the drawings is the baseline requirement for the work.

3.3 GROUNDING

- A. Provide grounding conductors from ground electrodes to equipment as shown on the Drawings.
- B. Do not use conduit as the ground and/or bonding conductor.
- C. Bond ground terminal of receptacles to outlet boxes with #12 AWG green insulated wire.
- D. Ground conduit system and neutral conductor of wiring system with a connection at the main electrical service breaker.
- E. The grounding network shall be connected to metallic water piping system, at two or more locations, with stranded copper, AWG, Green Insulated Conductor of the same size as grounding electrode conductor shown on the drawings or required by the National Electrical Code (NEC).
- F. Make connections to ground rods with an exothermic welding process. Mechanical connections may be made at equipment only.
- G. Ensure that a ground loop is not formed between equipment ground in electrical conduit and grounding electrode conductors directly connected to ground electrodes.
- H. Group and bond ground wires to panel boxes, light fixtures, receptacles, etc., not to system neutral.
- I. Make connection to water pipe with a suitable ground clamp or lug connection. If flanged pipes are encountered, make connection with lug bolted to flange connections.
- J. Bond and ground all conduit systems.

3.4 INSTALLATION OF GROUNDING BUSHINGS

- 1. Provide grounding type insulated bushings on all power conduits regardless of size.
- 2. Provide grounding type insulated bushings on all control conduit and signal conduit regardless of size.

3. Install cable seal bushings in conduits for all outdoor locations and NEMA 4X locations to prevent moisture from entering enclosures and equipment.
4. Install cable seals in all conduits where there is a change in temperature such as transitioning from a room to the attic.
5. Provide a bushing at each conduit termination unless fitting at box where conduit terminates has hubs designed in such a manner to afford equivalent protection to conductors.
6. Any installations not provided with these requirements shall be removed and reinstalled at no additional cost to the Owner.

3.5 MYERS HUBS

1. Myers Hubs shall be of grounding type and installed on junction boxes and enclosures which do not have cast hubs in non-classified areas. All Myers Hubs shall be capable of receiving wire bonding jumper regardless of conduit size.

3.6 EQUIPMENT

- A. The inside of all equipment and enclosures shall be checked for tools and vacuumed cleaned of any debris.
- B. The Contractor shall be responsible to ensure that all connections to motors, distribution equipment, and control panels are tightened to manufactures recommendations.

3.7 TESTS

- A. Branch circuits shall be tested during installation for continuity and identification and shall pass operational tests to determine that all circuits perform the function for which they are designed.
- B. Adjust all settings on protective equipment and verify, check and establish with the power company that the secondary voltage is within 2% of rated voltage.

END OF SECTION

Appendices

Appendix A

RIDOH Preliminary Approval

Certified Mail

October 12, 2022

Tim Cranston, Director of Water
Town of North Kingstown
100 Fairway Drive
North Kingstown, RI 02852

7022 0410 0002 5146 2552

RE: Preliminary Approval, Forge Road and Saunderstown Tank Rehabilitation Project
Town of North Kingstown, PWSID R1559517

Dear Mr. Cranston,

The Rhode Island Department of Health, Center for Drinking Water Quality (DWQ) has reviewed the Application for Approval for the Forge Road and Saunderstown Water Tank Mixing Project, dated April 4, 2022, for the Forge Road and Saunderstown tanks in the Town of North Kingstown, Rhode Island. The first comment letter was sent to The Town of Kingstown on 08/11/2022. Final responses to the comments, revised plans, and revised specifications were received on 09/28/2022.

Our review included an evaluation of the application package relative to the following:

- the *Public Drinking Water Regulations* (the "Regulations"), 216-RICR-50-05-1;
- the *Recommended Standards for Water Works*, issued by the Water Supply Committee of the Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environment Managers (Ten State Standards); and
- applicable American Water Works Association standards.

Upon review of the application/bid specifications, RIDOH hereby issues **Preliminary Approval** for this project, with the following conditions:

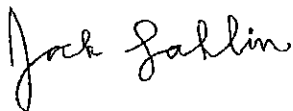
1. At all times, the system shall be in compliance with the Public Drinking Water Supply Act (RIGL 46-13) and the Regulations as promulgated thereunder. Any and all conditions of approval shall have the same force and effect as regulations promulgated under the Act.
2. In accordance with Section 1.5 of the Regulations, all equipment, piping and materials, associated appurtenances, and chemicals shall be designed specifically for use in public water systems and shall conform to ANSI/NSF Standards, particularly Standards 60 and 61. **If any materials or chemicals used deviates from that included in the application, manufacture cut sheets and the NSF 60/61 certifications must be provided to RIDOH for approval prior installations.**
3. All work shall be completed in accordance with the approved specifications. Any revisions to the approved specifications must be submitted to RIDOH for approval. RIDOH may require a new application if the revisions are deemed significant.

4. All work shall be accomplished in a manner to minimize bacterial contamination. Upon completion of the installation, appropriate chlorination, in accordance with AWWA Standards, shall be undertaken to ensure no bacterial contamination. New lines must be disinfected and tested for total coliform. If total coliform is detected, the lines must be disinfected and tested again. water mains shall be disinfected per AWWA C651-14.
5. Prior to placing the tanks into service, two (2) samples to analyze and confirm the absence of total coliform must be taken at least 24 hours apart. Heterotrophic plate count (HPC) analysis must be performed with each of the coliform sampling. One (1) sample must be analyzed to confirm the absence of volatile organic compounds (VOCs). If these samples show the presence of coliform bacteria, HPC greater than 500/mL or detection of VOCs, the tank must be emptied, disinfected, and retested to achieve the above results prior to returning the tank into service. Please note that if changes to the tank are made after the system has been disinfected, RIDOH will require the tank to be disinfected and sampled once again. **All results must be reported to RIDOH on Official State Reporting forms (or electronically uploaded) and in no case shall any tank be placed into service without prior approval from RIDOH.**
6. After the required retention period, any water discharged from the tank shall be dechlorinated/neutralized utilizing sulfur dioxide, sodium bisulfite, sodium sulfite, or sodium thiosulfate. Once the water has been dechlorinated it will be tested for residual chlorine which shall not exceed the RIDEM ambient water quality criteria of 0.019 ppm. Dechlorinated water shall be discharged into an onsite retention facility.
7. Once construction is substantially finalized, a conformance inspection must be completed. The project will not receive final approval until such inspection has occurred and RIDOH is satisfied that the system was constructed in accordance with the approved plans or any subsequent approved revisions. Please contact the undersigned to schedule the conformance inspection.

Please proceed with the construction. Final approval of this project will be granted upon the satisfactory completion of a conformance inspection.

Please contact me at 401-222-7786 or at jack.sahlin@health.ri.gov should you have any questions.

Sincerely,



Jack Sahlin
Environmental Engineer II
Center for Drinking Water Quality

CC: Louis Raggozino, Wright- Pierce
Carlene Newman, RIDOH
Amy Parmenter, RIDOH
Emilie Brace, RIDOH
Christina Miller, RIDOH
Steven Cabral, Crossman Engineering

Appendix B

Tank Inspection Reports



**Town of North Kingstown
80 Boston Neck Road
North Kingstown, RI 02852-5762
RE: North Kingstown, RI
575,000 Gallon STP
June 15, 2020
Mr. Tim Cranston
Water Quality Specialist
(401) 268-1522
Job No. 320255-A**

For additional copies of this report call (270) 826-9000, Ext. 4209

Paint • Repair • Dismantle • Inspect • Reinsulate • Tanks Raised, Lowered, and Moved
New and Used Tanks



Photo shows the tank is secured with fencing. There is no signage on the fence. We recommend posting a **Warning, Tampering With This Facility is a Federal Offense** (US code title 42, section 300i-1) sign and a **No Trespassing** sign.



Photo shows the area around the tank foundation is properly graded and in compliance with **AWWA D100-11; 12.7.1 Height aboveground.**



Photo shows the condition of the foundation. We recommend sealing the foundation with a sealant.



Photo shows the tank has no grounding system. We recommend electrically grounding the tank for lightning protection as required by **OSH Act of 1970 Section 5**.



Photo shows the condition of one (1) of the twelve (12) anchor bolts. **AWWA D100-11; 3.8.1.1 Required anchorage** states, "For ground-supported flat-bottom reservoirs and standpipes, mechanical anchorage shall be provided when the wind or seismic loads exceed the limits for self-anchored tanks." We recommend cleaning the area around the anchor bolts, tightening the anchor nuts, then tack welding the circumference of the nut-to-base plate connections and bolt-to-nut connections to eliminate loosening.



Photo shows the condition of the shell. Currently there is no drain valve. We recommend installing a frost proof drain valve near the shell-to-floor connection, complete with a locking device to prevent unauthorized draining of the tank and a splash pad to direct water away from the foundation.

**Splash pad to be installed by owner.*



Photo shows the condition of the 18" X 24" elliptical primary shell manway. The following is required for the tank to be in compliance with **AWWA D100-11; 7.4.4 Shell manholes** and **OSHA 1910.146(c)(2) Confined spaces**.

We recommend:

Post **Confined Space Entry** sign



Photo shows the condition of the 30" secondary shell manway. The following is required for the tank to be in compliance with **AWWA D100-11; 7.4.4 Shell man-holes** and **OSHA 1910.146(c)(2) Confined spaces**.

We recommend:

Post **Confined Space Entry** sign



Photo shows the 10" overflow pipe system, which appears to be in good condition.



Shell access ladder in above photos is equipped with anti-skid rungs, but is only 13" wide. **OSHA 1910.23(b)(4)** states, "Ladder rungs, steps, and cleats have a minimum clear width of... 16 inches (41 cm) (measured before installation of ladder safety systems) for fixed ladders,..." We recommend installing an **OSHA** compliant shell access ladder complete with standoffs every 10' on center, a cable type ladder safety device, a lockable ladder guard to prevent unauthorized access and posting a **Fall Protection Required** sign at the base of the ladder.



Photo shows more of the condition of the existing shell access ladder. Safe climbing procedure requires a person to climb a ladder with their hands on the side rails of the ladder and not the ladder rungs. **Notice a co/ax is mounted on the ladder side rail, creating a climbing safety hazard.** We recommend removing the co/ax from the ladder, and securing it with standoffs to the tank shell to eliminate this climbing safety hazard.



Photo shows the tank is not equipped with a liquid level indicator. **NFPA 22-2018; 14.1.8* Water-Level Gauge** states, "A water-level gauge of suitable design shall be provided. It shall be carefully installed, adjusted, and properly maintained." We recommend installing a float-type liquid level indicator.



Photos show the tank roof edge is not equipped with a required handrail system for fall protection. **OSHA 1910.28(b)(1)(i)** states, "...the employer must ensure that each employee on a walking-working surface with an unprotected side or edge that is 4 feet (1.2 m) or more above a lower level is protected from falling by one or more of the following: **1910.28(b)(1)(i)(A) Guardrail systems.**" The tank is equipped with 39" high handrails to the left and right of the primary and secondary roof hatches. We recommend extending the handrails around the circumference of the tank roof, complete with an intermediate rail, a toeboard, and a swing gate at the junction of the shell-to-roof access ladder and tank roof.



Roof access ladder in above photo is equipped with anti-skid rungs, but is only 13" wide. **OSHA 1910.23(b)(4)** states, "Ladder rungs, steps, and cleats have a minimum clear width of... 16 inches (41 cm) (measured before installation of ladder safety systems) for fixed ladders,... " We recommend installing an **OSHA** compliant roof access ladder complete with standoffs every 10' on center, and a cable type ladder safety device.



Photo shows the condition of the 24" primary roof hatch. Roof openings on this tank require the following to be in compliance with **AWWA D100-11; 7.4.3 Roof openings** and **OSHA 1910.146(c)(2) Confined spaces**.

We recommend:

Post **Confined Space Entry** sign

We further recommend installing an **OSHA** compliant interior access ladder complete with standoffs every 10' on center, and a cable type ladder safety device at the primary roof hatch.

**In cold climates it's up to the owner's discretion on placement of internal ladders.*



Photo shows the condition of the 30" secondary roof hatch. Roof openings on this tank require the following to be in compliance with **AWWA D100-11; 7.4.3 Roof openings** and **OSHA 1910.146(c)(2) Confined spaces**.

We recommend:

Post **Confined Space Entry** sign
Install lock on secondary hatch

We further recommend installing an **OSHA** compliant interior access ladder complete with standoffs every 10' on center, and a cable type ladder safety device at the secondary roof hatch.

**In cold climates it's up to the owner's discretion on placement of internal ladders.*



Photo shows the existing roof vent, which appears to be in good condition.



Photos show the tank exterior coating system. The overall exterior coating system appears to be in good condition. We recommend pressure washing the tank exterior with biodegradable detergent injection (minimum 3,500 psi at 3.0 gpm), then re-evaluating the tank exterior at next inspection cycle.



Top photo shows the interior roof lap seams, which appear to be in good condition.

Bottom photo shows the interior roof-to-rim angle connection, which appears to be in good condition.

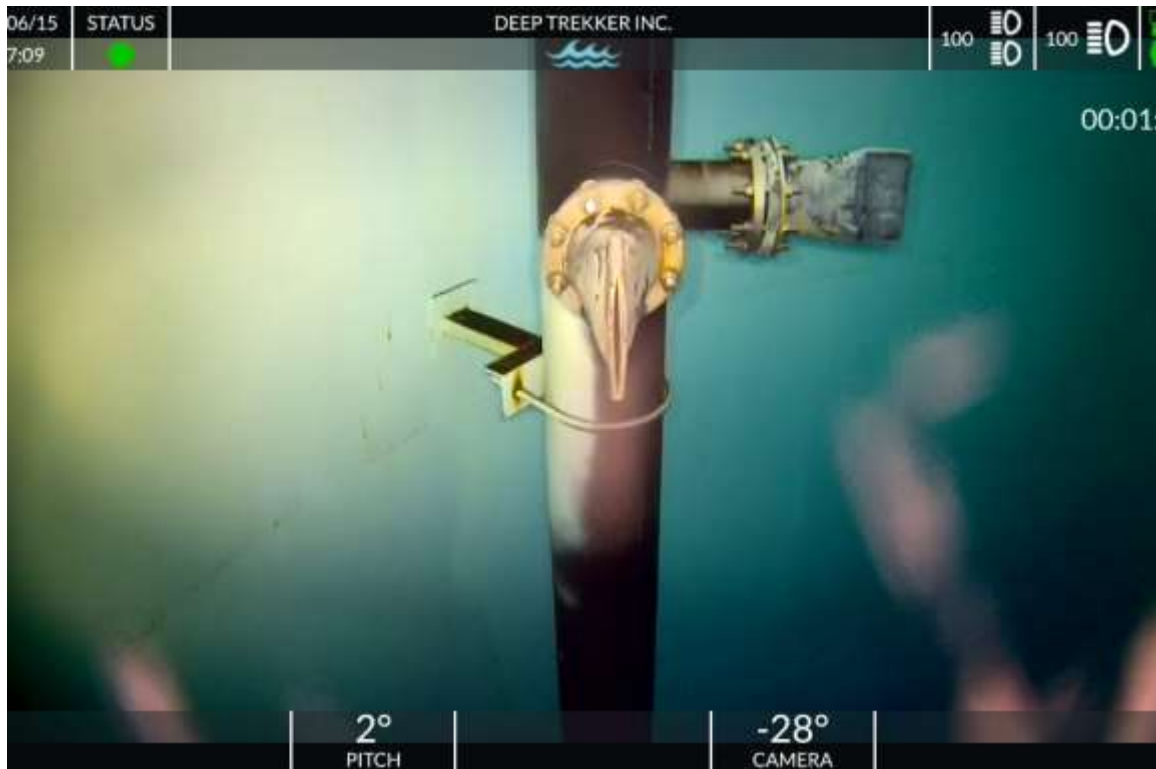


Photo shows the fill pipe on the tank interior, which appears to be in good condition.



Top photo shows the tank interior before performing a robotic in-service interior cleanout.

Bottom photo shows the tank interior after performing a robotic in-service interior cleanout.

We further recommend installing a passive cathodic protection system.



Photos show the tank interior coating system. The overall interior coating system appears to be in good condition. We recommend re-evaluating the tank interior at next inspection cycle.

STANDPIPE INSPECTION REPORT

JOB NO: 320255-A INSPECTOR: Chris Collins (BD)
TANK OWNER: Town of North Kingstown
OWNER'S REPRESENTATIVE: Mr. Tim Cranston
TITLE: Water Quality Specialist
MAILING ADDRESS: 80 Boston Neck Road North Kingstown, RI 02852-5762
PHYSICAL ADDRESS: 80 Boston Neck Road North Kingstown, RI 02852-5762
E-MAIL: gcranston@northkingstown.org
CITY, STATE: North Kingstown, RI ZIP: 02852-5762 COUNTY: Washington County
TELEPHONE: (401) 268-1522 FAX: Not Provided
LOCATION OF TANK: 143 Forge Road, North Kingstown, RI 02852

**Town of North Kingstown
80 Boston Neck Road
North Kingstown, RI 02852-5762
June 15, 2020
Mr. Tim Cranston
Water Quality Specialist
(401) 268-1522**

ORIGINAL CONTRACT NO: Not Provided YEAR BUILT: Not Provided
ORIGINAL MANUFACTURER: Not Provided CAPACITY: 575,000 Gallon
DATE OF LAST INSPECTION: Not Provided TYPE: Potable
DIAMETER: 28'-0" HEIGHT: 125'-0"
OVERFLOW: 10" INLET: Not Provided
TYPE CONSTRUCTION: WELDED: X RIVETED: BOLTED:
ACCOUNT EXECUTIVE: Wendy Mattingly

Testing	Exterior	Interior
Lead	Negative	Negative
Adhesion	A3@10.9	A2@8.7

Mil Thickness Testing								
Roof	16.6	15.9	16.7	14.3	15.3	18.3	14.1	13.1
	14.9	17.0						
Shell 16	9.3	9.2						
Shell 15	13.1	10.3						
Shell 14	17.0	16.0						
Shell 13	16.2	20.5						
Shell 12	17.6	18.9						
Shell 11	12.7	9.2						
Shell 10	13.3	11.8						
Shell 9	15.6	11.2						
Shell 8	16.5	16.0						
Shell 7	13.2	13.7						
Shell 6	13.1	10.1						
Shell 5	13.4	10.0						
Shell 4	14.3	15.4						
Shell 3	13.5	10.7						
Shell 2	14.7	17.3						
Shell 1	11.3	12.7	10.1	10.5	9.0	9.7	10.3	11.0
	13.3	8.1						

Ultrasonic Thickness Testing								
Roof	0.265	0.234	0.231	0.235	0.2236	0.234	0.236	0.233
	0.239	0.241						
Shell 16	0.336	0.339						
Shell 15	0.334	0.329						
Shell 14	0.330	0.311						
Shell 13	0.463	0.451						
Shell 12	0.395	0.411						
Shell 11	0.418	0.381						
Shell 10	0.448	0.477						
Shell 9	0.443	0.436						
Shell 8	0.530	0.526						
Shell 7	0.529	0.528						
Shell 6	0.624	0.620						
Shell 5	0.621	0.609						
Shell 4	0.699	0.714						
Shell 3	0.697	0.724						
Shell 2	0.731	0.745						
Shell 1	0.808	0.790	0.810	0.795	0.817	0.803	0.804	0.815
	0.801	0.805						

Page #	Work Proposed	Critical Deficiency	NON-Critical Deficiency	OSHA	Structural	Preventive Maintenance
2	Post a Warning, Tampering With This Facility is a Federal Offense (US code title 42, section 300i-1) sign.		X			
	Post a No Trespassing sign.		X			
4	Seal the foundation with a sealant.					X
5	Electrically ground the tank.		X	X		
6	Clean the area around the anchor bolts, tighten the anchor nuts to specifications, then tack weld on the circumference of the nut-to-base plate connections and bolt-to-nut connections.					X
7	Install a frost proof drain valve near the shell-to-floor connection, complete with a locking device and a splash pad. <i>Splash pad to be installed by owner.</i>		X			
8	Post Confined Space Entry sign on primary shell manway.			X		
9	Post Confined Space Entry sign on secondary shell manway.			X		
11	Install a compliant exterior shell access ladder complete with standoffs every 10' on center.			X		
	Install a cable type ladder safety device on exterior shell access ladder.			X		
	Install a lockable ladder guard on exterior shell access ladder.					X
	Post Fall Protection Required sign at base of exterior shell access ladder.			X		
12	Remove the co/ax from the exterior shell access ladder and secure it to the tank shell with standoffs.			X		
13	Install a float-type liquid level indicator.		X			
14	Extend the handrails around the circumference of the tank roof, complete with intermediate rail, toeboard and a swing gate at the junction of the shell-to-roof access ladder and tank roof.			X		

Page #	Work Proposed	Critical Deficiency	NON-Critical Deficiency	OSHA	Structural	Preventive Maintenance
15	Install a compliant roof access ladder complete with standoffs every 10' on center.			X		
	Install a cable type ladder safety device on roof access ladder.			X		
16	Post Confined Space Entry sign on primary roof hatch.			X		
	Install a compliant interior access ladder complete with standoffs every 10' on center at the primary roof hatch. <i>In cold climates it's up to the owner's discretion on placement of internal ladders.</i>			X		
	Install a cable type ladder safety device on primary interior access ladder.			X		
17	Post Confined Space Entry sign on secondary roof hatch.			X		
	Install lock on secondary roof hatch.					X
	Install a compliant interior access ladder complete with standoffs every 10' on center at the secondary roof hatch. <i>In cold climates it's up to the owner's discretion on placement of internal ladders.</i>			X		
	Install a cable type ladder safety device on secondary interior access ladder.			X		
19	Pressure wash the tank exterior with biodegradable detergent injection (minimum 3,500 psi at 3.0 gpm), then re-evaluate the tank exterior at next inspection cycle.					X
22	Install a passive cathodic protection system.					X
23	Re-evaluate the tank interior at next inspection cycle.					X



SERVICES COMPLETED:

Post Inspection and Cleaning

CUSTOMER NAME:

Town of North Kingstown Water
Department

ADDRESS:

80 Boston Neck Road
North Kingstown, RI 02852

TANK NAME:

Saunderstown

SIZE:

528,000-Gallon

TYPE OF TANK:

Steel Water Storage Tank

DIMENSIONS:

100'H x 30'D



***INSPECTION AND INTERIOR CLEANING (SEDIMENT REMOVAL) OF THE
SAUNDERSTOWN 528,000-GALLON WELDED STEEL WATER STORAGE
TANK***

***TOWN OF NORTH KINGSTOWN WATER SUPPLY
NORTH KINGSTOWN, RHODE ISLAND***

JUNE 24, 2020

SCOPE:

On June 24, 2020, Underwater Solutions Inc. inspected the Saunderstown 528,000-gallon welded steel potable water storage tank to provide information regarding the overall condition and integrity of this structure and removed the accumulated precipitate from the floor.

The exterior wall, roof and steel components affixed to the exterior of this tank have been re-coated since a previous inspection completed by Underwater Solutions Inc. on October 20, 2008.

EXTERIOR INSPECTION:

The entire exterior of this water storage tank (and components) was inspected to include walls and coating, cellular communication equipment, foundation, anchor bolts, manways, ladder, overflow, roof, vent and hatches.

Walls and Coating

The exterior wall panels and associated welds were inspected and appeared sound and free of obvious fatigue or failure at this time.

The protective coating on these steel panels and welds appeared to have been applied uniformly and was found having good adhesion value, providing good protection for the steel panels and welds.

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A mild to moderate, non-uniform accumulation of mildew throughout the exterior walls and components affixed to the exterior walls has caused declined aesthetics.

RECOMMENDATION(S): It is our recommendation to pressure-wash the exterior wall surfaces, including all components affixed to the exterior walls at 3,500 P.S.I. using a 40° tip and an environmentally approved cleaning agent to remove all soluble/insoluble surface contamination, chalk and mildew from the exterior of the tank, followed by a clean water rinse to remove all cleaning residue in an effort to preserve the adhesion value of the protective coating and improve the aesthetics.

Cellular communication equipment

The cellular communication equipment installed on this tank appeared sound and secure and has caused no obvious damage to the structure of the tank and appears to have no damage to the protective coating at the location of the cellular communication equipment installed on this structure.

RECOMMENDATION(S): None at this time.

Foundation

The exposed surfaces of the 3” tall by 42” wide concrete foundation is not coated and appeared mostly sound at this time.

Tight cracks were observed throughout less than 5% of these exposed concrete surfaces at this time.

These cracks were sounded, and no obvious voiding or spall of the concrete was evident.

RECOMMENDATION(S): It is our recommendation to pressure-wash the exposed foundation surfaces at 5,000-7,000 P.S.I. using an oscillating tip and an environmentally approved cleaning agent to remove all soluble/insoluble surface contamination, followed by a clean water rinse to remove all cleaning residue.

We recommend then to apply a dedicated stripe coat of an elastomeric coating to all cracks having widths ranging from 1/16” to 1/8” wide, and to apply a high-performance adhesive sealant to all cracks having widths greater than 1/8” wide and then to apply two coats of a masonry waterproofing coating to the exposed surfaces of the foundation in an effort to seal the cracks and prevent moisture penetration and to seal and protect the concrete.

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Anchor Bolts

Twelve, 2" diameter steel anchor bolts extend up from the concrete foundation into steel support chairs weld to the lowest row of wall panels. Each anchor bolt has a nut securely installed and appeared sound at this time.

The protective coating applied to each anchor bolt assembly was found having good adhesion value at this time.

RECOMMENDATION(S): None at this time.

Manways

One, 24" by 18" inside diameter manway penetrates the lowest wall panel on the easternmost side of the tank, located approximately 20" above the tank base and is securely installed and free of obvious leakage. The protective coating applied to the exterior of this manway assembly was found having good adhesion value at this time.

One, 38" inside diameter manway penetrates the lowest wall panel on the westernmost side of the tank, located approximately 19" above the tank base and is securely installed and free of obvious leakage. The protective coating applied to the exterior of this manway assembly was found having good adhesion value at this time.

RECOMMENDATION(S): None at this time.

Ladder

A steel ladder extends from 18' above the ground up to the roof supported to the tank wall with eight sets of welded standoffs and has a fall prevention device installed throughout its length, providing safe access and egress.

The protective coating applied to the ladder assembly was found having good adhesion value at this time.

A ladder guard secured with a lock is installed at the base of the ladder, preventing unwanted access.

RECOMMENDATION(S): None at this time

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Overflow

An 8" inside diameter overflow pipe penetrates the top wall panel located approximately 14" below the roof and wall junction and extends through a 90° elbow directing this pipe down, supported to the tank wall with nine welded standoffs and terminates approximately 5" above a concrete splash-pad.

The outlet end of the overflow pipe was free of obvious obstructions and has a flap-valve installed at its end and a non-corrodible metal 4-mesh and 16-mesh screen is installed within the screen retaining flange, however the 16-mesh screen is torn and is dislodged from the retaining flange.

The protective coating applied to the overflow pipe assembly was found having good adhesion value at this time.

RECOMMENDATION(S): It is our recommendation to remove the torn/dislodged screen from the screen retaining flange and to install a replacement, non-corrodible metal screen having 24-mesh within the screen retaining flange in an effort to prevent contaminants from entering the tank.

Roof

The exterior roof panels and associated welds were inspected and appeared sound and free of obvious fatigue or failure at this time.

The protective coating on these steel panels and welds appeared to have been applied uniformly and was found having good adhesion value, providing good protection for the steel panels and welds.

The steel safety railings welded to the outer edge of the roof on the south-easternmost side of the tank were found securely installed and free of obvious fatigue or failure at this time. The protective coating applied to the safety railings was found having good adhesion value at this time.

A steel ladder extends from the roof access ladder to the vent within the center of the roof, supported to the roof with a series of welded steel standoffs, providing good access to and from the vent/center of the roof. The protective coating applied to this ladder was found having good adhesion value at this time.

RECOMMENDATION(S): It is our recommendation to install an OSHA approved fall prevention device throughout the length of this ladder in an effort to provide safe access and egress.

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A series of steel angle iron pedestals are welded to the roof around the circumference of the vent and stand approximately 6" tall. Declined coating film thickness and mild surface corrosion was observed on the surface of each pedestal however no obvious fatigue of the steel was evident.

A mild, non-uniform accumulation of mildew throughout the exterior roof surfaces has caused declined aesthetics.

RECOMMENDATION(S): It is our recommendation to pressure-wash the exterior roof surfaces, including all components affixed to the roof at 3,500 P.S.I. using a 40° tip and an environmentally approved cleaning agent to remove all soluble/insoluble surface contamination, chalk and mildew from the roof, followed by a clean water rinse to remove all cleaning residue in an effort to preserve the adhesion value of the protective coating and improve the aesthetics.

It is also our recommendation to hand/power tool clean the surfaces of each pedestal showing surface corrosion to bare metal to achieve a uniform anchor profile, ensuring all lifted edges of the coating are feathered back tight and to spot-coat these areas of coating fatigue with a prime coat, intermediate coat and finish coat in an effort to halt corrosion, prevent steel fatigue/deterioration, provide good protection for the steel.

We recommend that the products used to complete these repairs be formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations.

Vent

An aluminum frost-proof/vacuum release vent assembly is located within the center of the roof having a 24" inside diameter and stands 47" tall.

A 57" diameter cap prevents the entry of wind driven rain, snow and dust, while an expanded metal (aluminum) screen having 2-mesh is installed around the circumference of the vent, preventing access to the interior of the tank, and a non-corrodible metal screen appearing to have 24-mesh is installed over the vent penetration in the roof, preventing contaminants from entering the tank.

The vacuum release plate located on the underside of the vent was free of obvious obstructions at this time.

RECOMMENDATION(S): None at this time.

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Hatches

One 24" inside diameter hatch provides access to the interior of the tank through the roof and is located on the south-easternmost side of the roof. This hatch was found secured with a lock, preventing unwanted access and was not opened or utilized at this time. The protective coating applied to the exterior of this hatch was found having mostly good adhesion value at this time.

Adhesion loss of the protective coating was observed throughout less than 5% of the hatch exterior. Resulting in exposure of the underlying steel. No obvious fatigue of the steel was evident within these areas of exposure, rather mild corrosion exists at this time.

This hatch has a solid watertight cover that overlaps an elevated trunk, preventing the entry of surface water runoff.

RECOMMENDATION(S): It is our recommendation to hand/power tool clean the exterior surfaces of the hatch showing steel exposure to bare metal to achieve a uniform anchor profile, ensuring all lifted edges of the coating are feathered back tight and to spot-coat these areas of coating fatigue with a prime coat, intermediate coat and finish coat in an effort to halt corrosion, prevent steel fatigue/deterioration, provide good protection for the steel.

We recommend that the products used to complete these repairs be formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations.

The interior of this hatch was observed from within the tank, and the protective coating applied to the interior of this hatch assembly appeared to have good adhesion value.

RECOMMENDATION(S): None at this time.

One, 36" by 36" steel hatch provides access to the interior of the tank through the roof and is located on the south-easternmost side of the roof. This hatch was found secured with a lock and was found in good working condition.

The protective coating applied to the interior and exterior of this steel hatch assembly was found having good adhesion value at this time.

This hatch has a solid watertight cover that overlaps an elevated trunk, preventing the entry of surface water runoff.

RECOMMENDATION(S): None at this time.

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INTERIOR INSPECTION:

The entire interior of this water storage tank (and components) was inspected to include sediment accumulations, floor, manways, piping, walls and coating, overhead, overflow and aesthetic water quality.

The interior floor, wall and overhead surfaces, including the components affixed to the interior of the tank have been re-coated since a previous inspection completed by Underwater Solutions Inc. on October 20, 2008.

Sediment Accumulations

A layer of accumulated precipitate was found throughout the floor ranging from 9"-18" in depth.

Upon completing this inspection, all floor surfaces were vacuumed.

Floor

After removing all accumulated precipitate, the steel floor panels, and associated welds were inspected and appeared sound and free of obvious fatigue or failure at this time.

The protective coating on these steel panels and welds appeared to have been applied uniformly and was found having good adhesion value, providing good protection for the steel panels and welds.

A mild stain/biofilm remains throughout the floor due to the accumulation of precipitate.

Manways

One, 24" by 18" inside diameter manway penetrates the lowest wall panel on the easternmost side of the tank, located approximately 20" above the tank base and is securely installed and free of obvious leakage. The protective coating applied to the interior of this manway assembly was found having good adhesion value at this time.

One, 38" inside diameter manway penetrates the lowest wall panel on the westernmost side of the tank, located approximately 19" above the tank base and is securely installed and free of obvious leakage. The protective coating applied to the interior of this manway assembly was found having good adhesion value at this time.

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RECOMMENDATION(S): None at this time.

Piping

Two pipes were inspected within this potable water storage tank.

The first pipe inspected is a passive water circulation pipe that penetrates the floor located approximately 24" in from the wall having a 12" inside diameter.

This pipe extends up supported to the tank wall with steel standoffs and has a series of effluent check valves located approximately 11" above the floor.

Each rubber check valve and associated grate were free of obvious obstructions at this time.

Three rubber influent check valves extend from this pipe and were free of obvious obstructions at this time. The 12" inside diameter P.V.C. pipe appeared sound, although mild corrosion was observed on the metal components and flanges associated with this pipe no obvious fatigue of these metal surfaces was evident at this time.

RECOMMENDATION(S): It is our recommendation to monitor the metal components and flanges showing corrosion through future scheduled inspections to ensure that fatigue of these metal surfaces does not occur.

It is also our recommendation that the next time this tank is removed from service and de-watered to hand/power tool clean the metal surfaces/components of this pipe showing corrosion to bare metal to remove the corrosion and achieve a uniform anchor profile, ensuring all lifted edges of the coating are feathered back tight and to spot-coat these areas with a prime coat, intermediate coat and finish coat in an effort to halt corrosion, prevent metal fatigue and to provide good protection for the metal components associated with this pipe.

We recommend that the products used to complete these repairs be formulated for immersion (wet contact), have an A.N.S.I./N.S.F.-61 approval for use in structures containing potable water and to be applied in accordance with the product manufacturer's surface preparation and application recommendations.

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The second pipe inspected, penetrates the floor located approximately 26" in from the wall having a 4" inside diameter and is flush within the floor. This pipe was free of obvious obstructions at this time.

The protective coating applied to the exposed surfaces of this pipe appeared to have good adhesion value at this time.

RECOMMENDATION(S): None at this time.

Walls and Coating

The interior walls were inspected beginning at the floor and by spiraling the circumference of the tank.

The interior steel wall panels and associated welds appeared sound and free of obvious fatigue or failure at this time.

The protective coating on these steel panels and welds appeared to have been applied uniformly and was found having good adhesion value, providing good protection for the steel panels and welds.

A mild to moderate stain/biofilm exists throughout the interior walls beginning approximately 6' below overflow level and extends down to the floor.

RECOMMENDATION(S): None at this time.

Overhead

The entire overhead was inspected from the water surface.

The steel overhead panels, welds and supports appeared sound and free of obvious fatigue or failure at this time.

The protective coating on these steel panels, welds and supports appeared to have been applied uniformly and was found having mostly good adhesion value at this time. An isolated area of coating fatigue was observed on one of the supports at the junction of where the roof and walls meet, resulting in exposure of the underlying steel.

No obvious fatigue of the steel was evident within this area of exposure, rather mild corrosion and corrosion staining exists at this time.

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RECOMMENDATION(S): It is our recommendation to monitor the overhead support showing corrosion through future scheduled inspections to ensure that fatigue of the steel does not occur.

It is also our recommendation that the next time this tank is removed from service and de-watered to hand/power tool clean the overhead showing corrosion to bare metal to remove the corrosion and achieve a uniform anchor profile, ensuring all lifted edges of the coating are feathered back tight and to spot-coat this support with a prime coat, intermediate coat and finish coat in an effort to halt corrosion, prevent metal fatigue and to provide good protection for the steel.

We recommend that the products used to complete these repairs be formulated for immersion (wet contact), have an A.N.S.I./N.S.F.-61 approval for use in structures containing potable water and to be applied in accordance with the product manufacturer's surface preparation and application recommendations.

Overflow

The overflow consists of an 8" inside diameter steel pipe penetrating the top wall panel located approximately 14" below the roof and wall junction.

This overflow pipe extends into the tank through a 90° elbow directed up to and penetrates the base of a steel weir box welded to the top wall panel. The steel weir box was free of obvious obstructions at the time of this inspection. The protective coating applied to the steel weir box and steel pipe was found having good adhesion value at this time.

Aesthetic Water Quality

The aesthetic water quality was good allowing unlimited visibility for this inspection.

ADDITIONAL REMARKS/RECOMMENDATIONS:

We recommend that the next time this tank is removed from service and de-watered to pressure-wash the interior floor, wall and components surfaces within this tank at 3,500 P.S.I. using a 40° tip to remove the stain/biofilm from these surfaces. Alternatively, we recommend washing the interior floor, wall and component surfaces using an NSF 60 approved cleaning agent to remove the stain/biofilm from these surfaces, followed by a clean water rinse to remove all cleaning residue.

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We also recommendation installing an N.S.F. approved active mixer within this structure to improve overall water quality, reduce thermal stratification, reduce chemical stratification, and prevent ice cap formation.

CONCLUSION:

It is the opinion of Underwater Solutions Inc. that this welded steel potable water storage tank appeared mostly sound and free of obvious leakage.

As always, we recommend that re-inspection and cleaning of all water storage facilities be performed in accordance with state and federal mandates, A.W.W.A. standards, and completed by an experienced and authorized inspection corporation.



UNDERWATER SOLUTIONS INC.
Christopher A. Cole, Project Manager

This report, the conclusions, recommendations, and comments prepared by Underwater Solutions Inc. are based upon spot examination from readily accessible parts of the tank. Should latent defects or conditions which vary significantly from those described in the report be discovered at a later date, these should be brought to the attention of a qualified individual at that time. These comments and recommendations should be viewed as information to be used by the Owner in determining the proper course of action and not to replace a complete set of specifications. All repairs should be done in accordance with A.W.W.A. and/or other applicable standards.

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Dry film thickness measurements of the protective coating system applied to the readily accessible areas of the exterior of this structure were measured during this inspection.

The dry film thickness of the coating system applied to the exterior wall surfaces was found as follows (beginning with the bottom wall panel and ending at the top wall panel):

<u>Row</u>	<u>Mil Thickness</u>
1	5.0, 7.0
2	10.9
3	8.2
4	12.6
5	12.0
6	18.7
7	12.5
8	11.4
9	11.8
10	9.1
11	7.6, 8.0, 9.2
12	8.4, 9.2, 7.9, 9.3, 10.7
13	12.7, 12.3, 11.6, 10.5, 12.0
14	7.8

The dry film thickness of the coating system applied to the exterior of the easternmost manway was found as follows.

<i>Mil Thickness</i>
6.8

The dry film thickness of the coating system applied to the exterior of the westernmost manway was found as follows.

<i>Mil Thickness</i>
12.2

The dry film thickness of the coating system applied to the exterior of the overflow pipe was found as follows.

<i>Mil Thickness</i>
6.2

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The dry film thickness of the coating system applied to the exterior of the roof was found as follows.

<i>Mil Thickness</i>
6.7, 8.8, 8.5, 8.0, 8.1

The dry film thickness of the coating system applied to the exterior of the 36" by 36" hatch was found as follows.

<i>Mil Thickness</i>
7.5, 4.26, 5.6, 8.5, 5.5

The dry film thickness of the coating system applied to the exterior of the 24" inside diameter hatch was found as follows.

<i>Mil Thickness</i>
6.1, 6.6, 7.3, 7.7, 6.6

The American Water Works Association (AWWA) recommends a dry film thickness of 7.0 to 10.0 mils of coating film thickness be applied to the exterior surfaces of steel water storage tanks to provide adequate protection for steel structures.

Ultrasonic Sonic Metal Thickness measurements were taken in readily accessible locations of the exterior of this structure.

The ultrasonic metal thickness of the exterior wall surfaces was found as follows (beginning with the bottom wall panel and ending at the top wall panel):

<u>Row</u>	<u>Metal Thickness (in)</u>
1	.709
2	.667
3	.625
4	.625
5	.550
6	.525
7	.510
8	.425
9	.393
10	.337
11	.338
12	.411
13	.353
14	.070, .072

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The ultrasonic metal thickness of the exterior of the easternmost manway was found as follows:

<u>Metal Thickness (in)</u>
1.0

The ultrasonic metal thickness of the exterior of the westernmost manway was found as follows:

<u>Metal Thickness (in)</u>
.399

The ultrasonic metal thickness of the exterior of the overflow pipe was found as follows:

<u>Metal Thickness (in)</u>
.336

The ultrasonic metal thickness of the exterior of the roof was found as follows:

<u>Metal Thickness (in)</u>
.082, .070, .078, .076, .050

The ultrasonic metal thickness of the exterior of the 36" by 36" hatch was found as follows:

<u>Metal Thickness (in)</u>
.075, .068, .070, .079, .068

The ultrasonic metal thickness of the exterior of the 24" inside diameter hatch was found as follows:

<u>Metal Thickness (in)</u>
.072, .074, .082, .078, .069

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.



1 *Exterior Walls Having Good Adhesion Value Of The Protective Coating And A Non-Uniform Accumulation Of Mildew*



2 *Exterior Walls Having Good Adhesion Value Of The Protective Coating And A Non-Uniform Accumulation Of Mildew*



3 *Exterior Walls Having Good Adhesion Value Of The Protective Coating And A Non-Uniform Accumulation Of Mildew*



4 *Exterior Walls Having Good Adhesion Value Of The Protective Coating And A Non-Uniform Accumulation Of Mildew*



5 *Exterior Walls Having Good Adhesion Value Of The Protective Coating And A Non-Uniform Accumulation Of Mildew*



6 *Securely Installed Cellular Communication Equipment*



7 ***Securely Installed Cellular Communication Equipment***



8 ***Securely Installed Cellular Communication Equipment***



9 ***Exposed Foundation Having Tight Cracks And Anchor Bolt Assembly Having Good Adhesion Value Of The Protective Coating***



10 ***Exposed Foundation Having Tight Cracks And Anchor Bolt Assembly Having Good Adhesion Value Of The Protective Coating***



11 ***Exposed Foundation Having Tight Cracks And Anchor Bolt Assembly Having Good Adhesion Value Of The Protective Coating***



12 ***Secure Manway***



13 *Secure Manway*



14 *Ladder And Fall Prevention Device*



15 *Ladder Guard Secured With A Lock*



16 *Overflow Pipe Having Good Adhesion Value Of The Protective Coating*



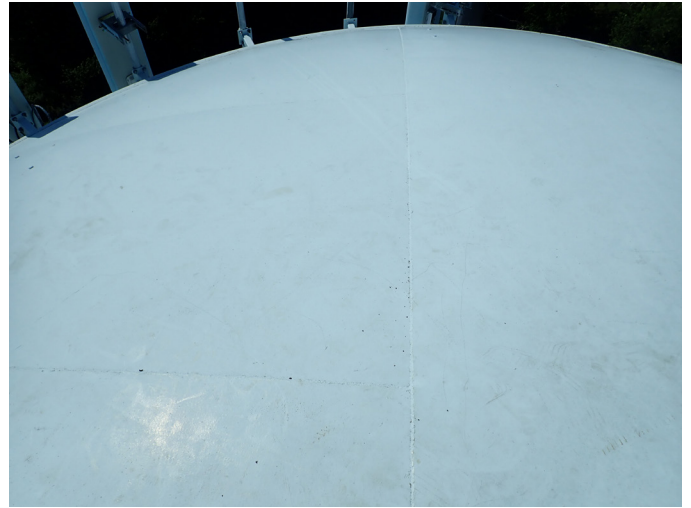
17 *Overflow Pipe Terminating Above A Concrete Splash-Pad And Having A Secure Flap-Valve*



18 *Torn/Dislodged 16-Mesh Overflow Screen*



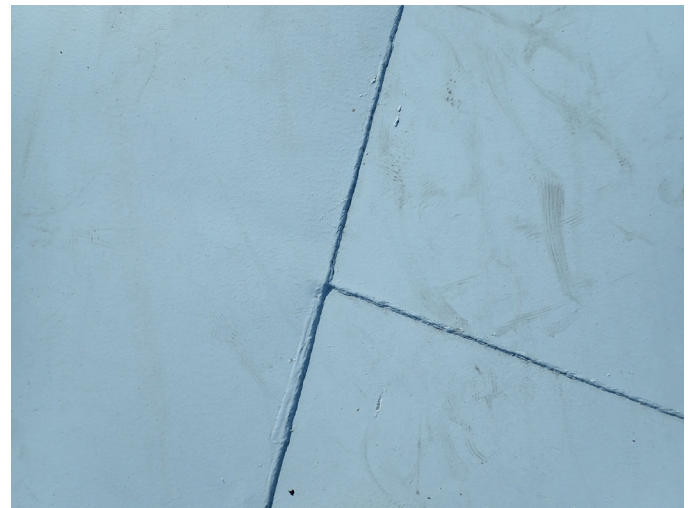
19 *Roof Having Good Adhesion Value Of The Protective Coating And A Non-Uniform Accumulation Of Mildew*



20 *Roof Having Good Adhesion Value Of The Protective Coating And A Non-Uniform Accumulation Of Mildew*



21 *Roof Having Good Adhesion Value Of The Protective Coating And A Non-Uniform Accumulation Of Mildew*



22 *Roof Having Good Adhesion Value Of The Protective Coating And A Non-Uniform Accumulation Of Mildew*



23 *Pedestals Around The Vent Having Surface Corrosion*



24 *Pedestals Around The Vent Having Surface Corrosion*



25 *Pedestals Around The Vent Having Surface Corrosion*



26 *Pedestals Around The Vent Having Surface Corrosion*



27 *Vent Access Ladder Having Good Adhesion Value Of The Protective Coating*



28 *Secure Vent Assembly*



29 *Secure Vent Screen*



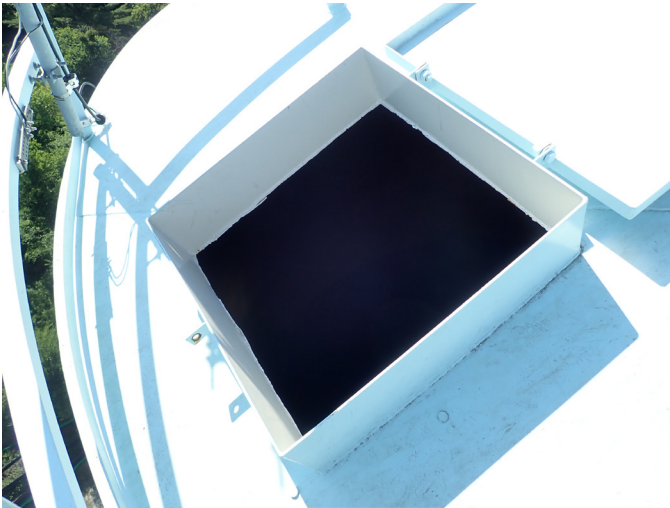
30 *Secure Vent Screen*



31 *Unobstructed Vacuum Release Plate*



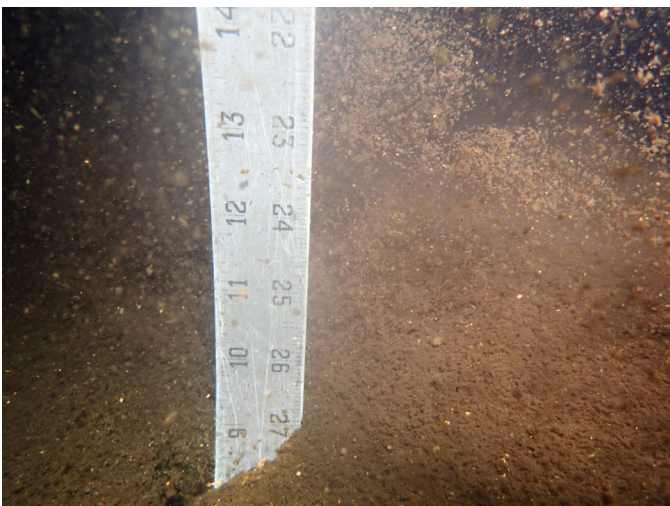
32 *24" Inside Diameter Hatch Closed And Secured With A Lock*



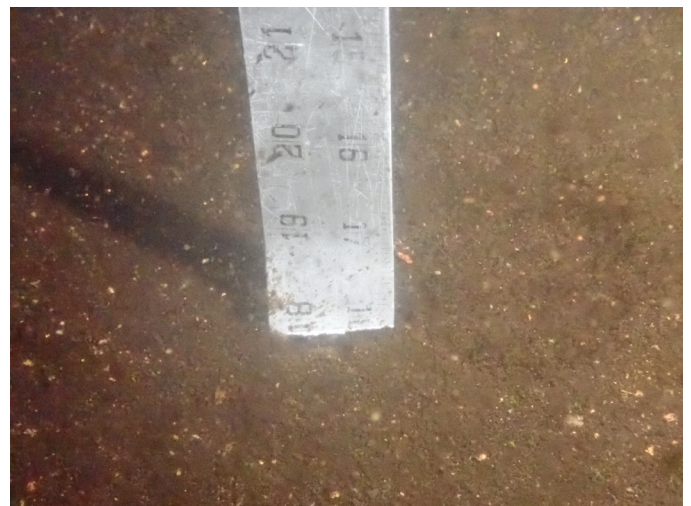
33 *36" By 36" Hatch Open*



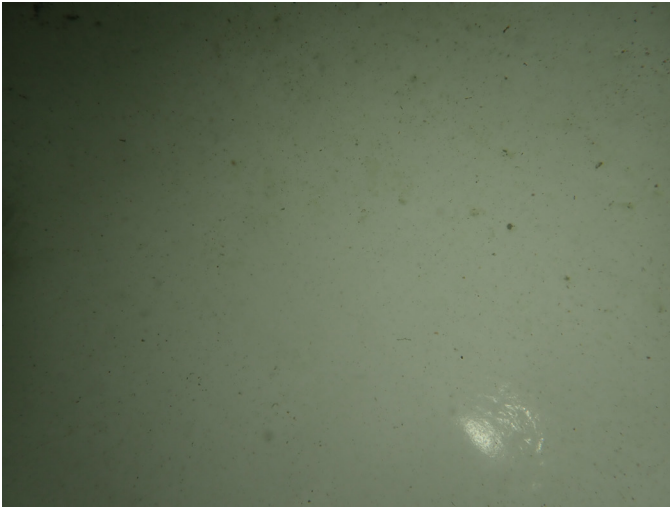
34 *36" By 36" Hatch Closed And Secured With A Lock*



35 *Sediment Depth*



36 *Sediment Depth*



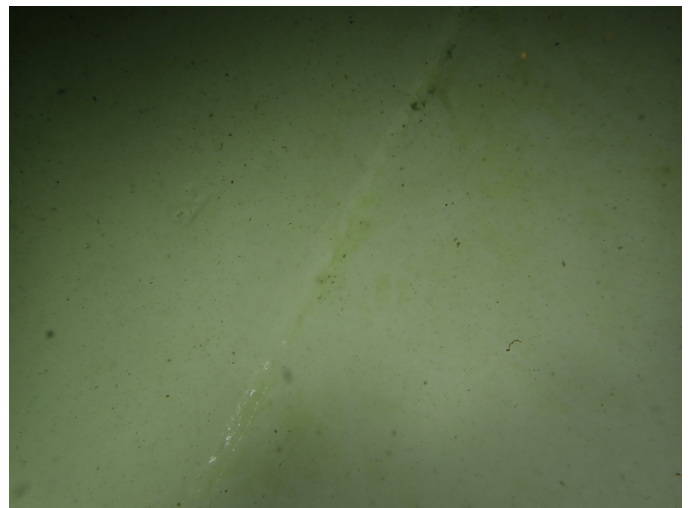
37 *Floor Having Good Adhesion Value Of The Protective Coating And A Mild Stain/Biofilm*



38 *Floor Having Good Adhesion Value Of The Protective Coating And A Mild Stain/Biofilm*



39 *Floor Having Good Adhesion Value Of The Protective Coating And A Mild Stain/Biofilm*



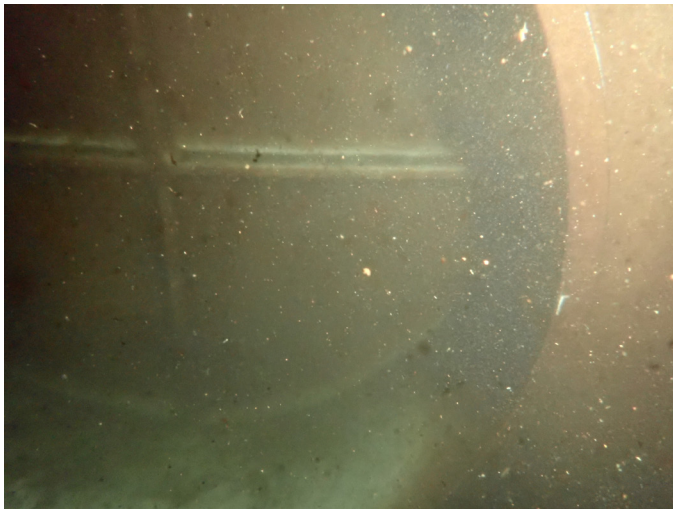
40 *Floor Having Good Adhesion Value Of The Protective Coating And A Mild Stain/Biofilm*



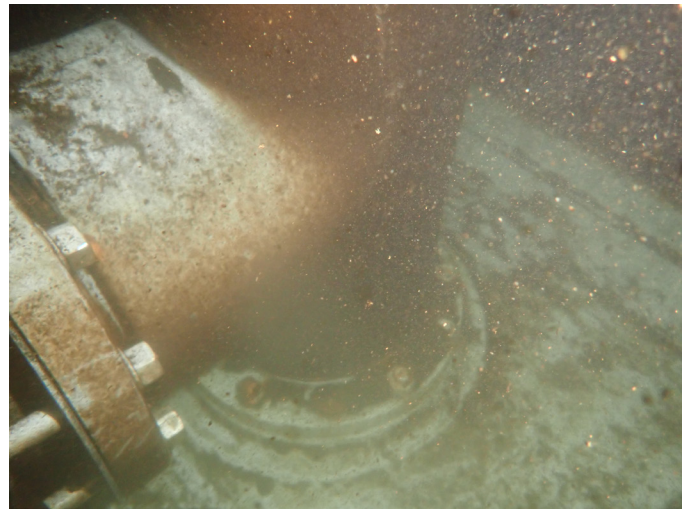
41 *Floor Having Good Adhesion Value Of The Protective Coating And A Mild Stain/Biofilm*



42 *Secure Manway*



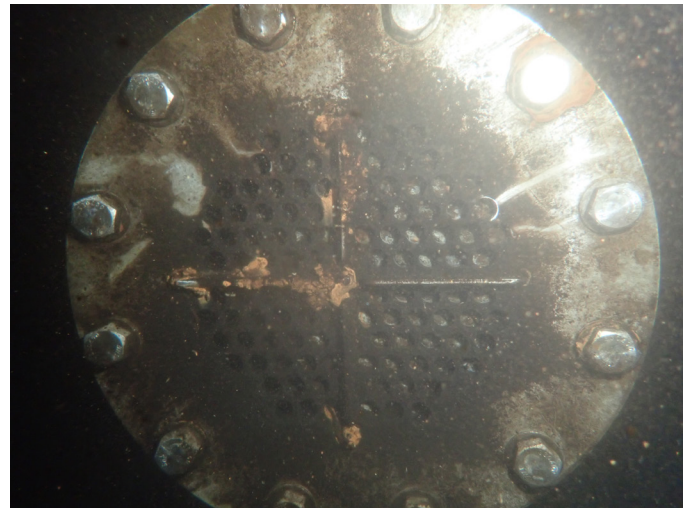
43 *Secure Manway*



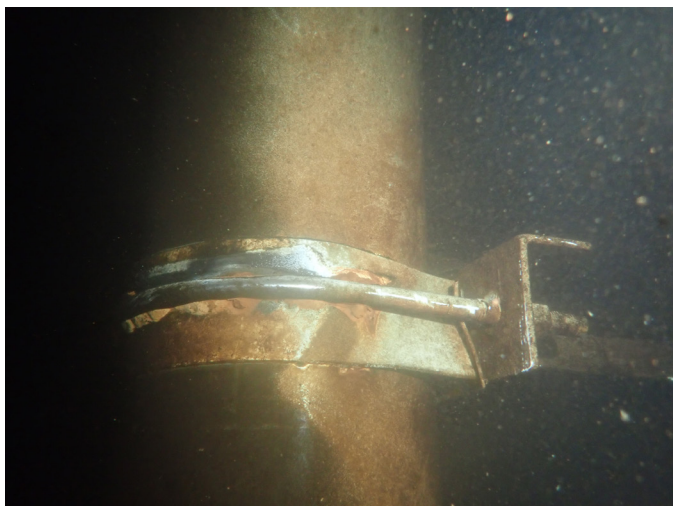
44 *Passive Water Circulation Pipe Penetrating The Floor*



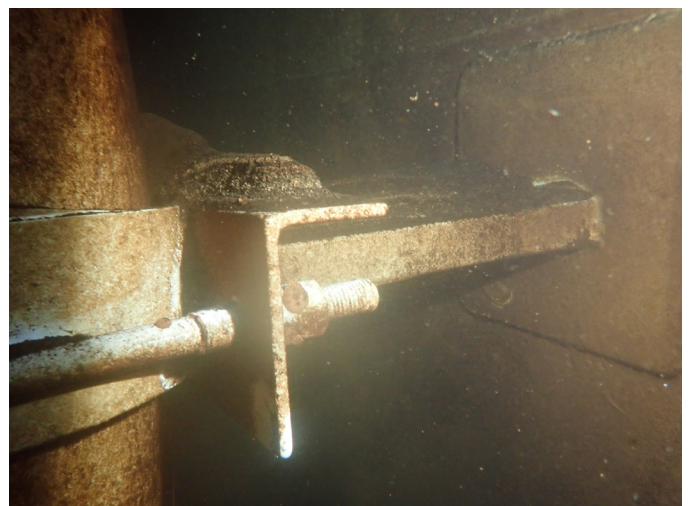
45 *Unobstructed Effluent Grate And Check Valve*



46 *Unobstructed Effluent Grate And Check Valve*



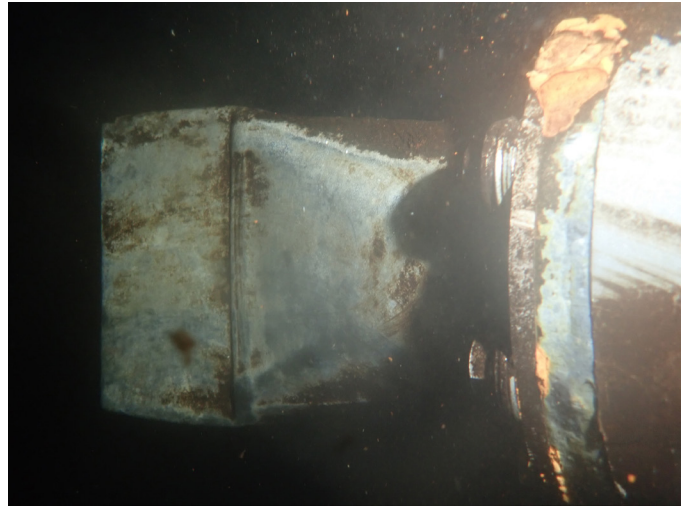
47 *Water Circulation Pipe Secured To The Tank Wall*



48 *Water Circulation Pipe Secured To The Tank Wall*



49 *Unobstructed Rubber Influent Check Valve*



50 *Unobstructed Rubber Influent Check Valve*



51 *Unobstructed Rubber Influent Check Valve*



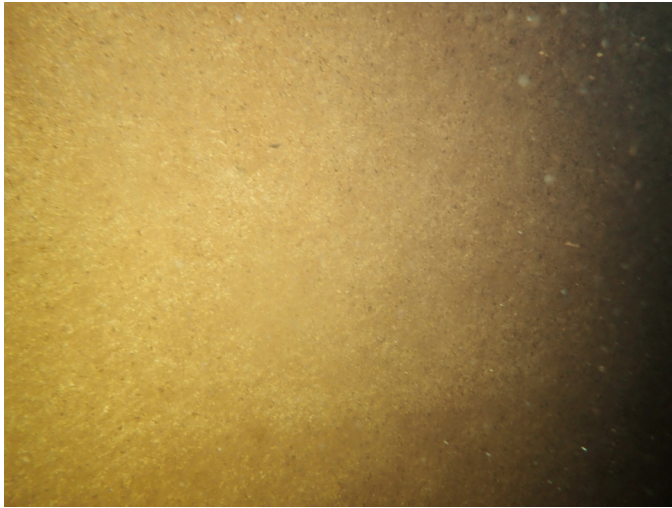
52 *Mild Corrosion On The Metal Components Of The Water Circulation Pipe*



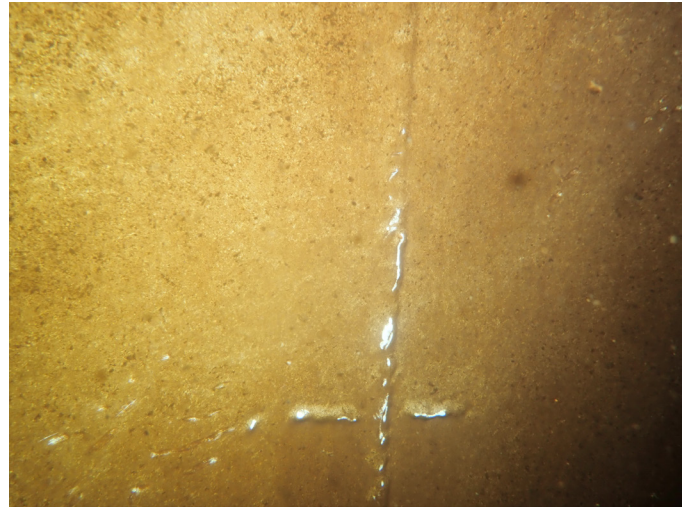
53 *Mild Corrosion On The Metal Components Of The Water Circulation Pipe*



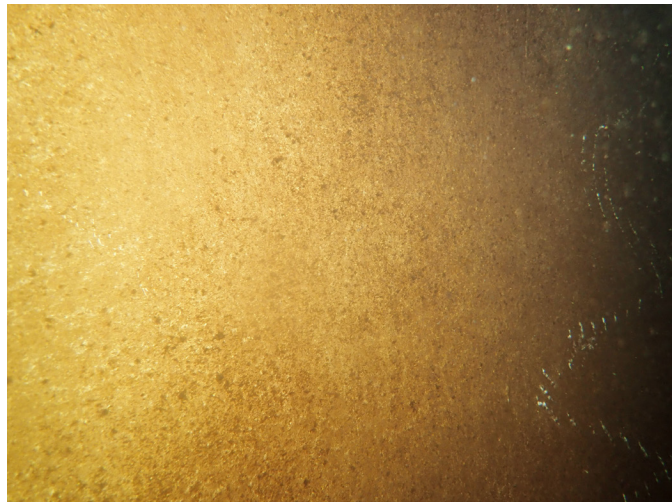
54 *Mild Corrosion On The Metal Components Of The Water Circulation Pipe*



55 *Interior Walls Having Good Adhesion Value Of The Protective Coating And A Mild To Moderate Stain/ Biofilm*



56 *Interior Walls Having Good Adhesion Value Of The Protective Coating And A Mild To Moderate Stain/ Biofilm*



57 *Interior Walls Having Good Adhesion Value Of The Protective Coating And A Mild To Moderate Stain/ Biofilm*



58 *Interior Walls Having Good Adhesion Value Of The Protective Coating And A Mild To Moderate Stain/ Biofilm*



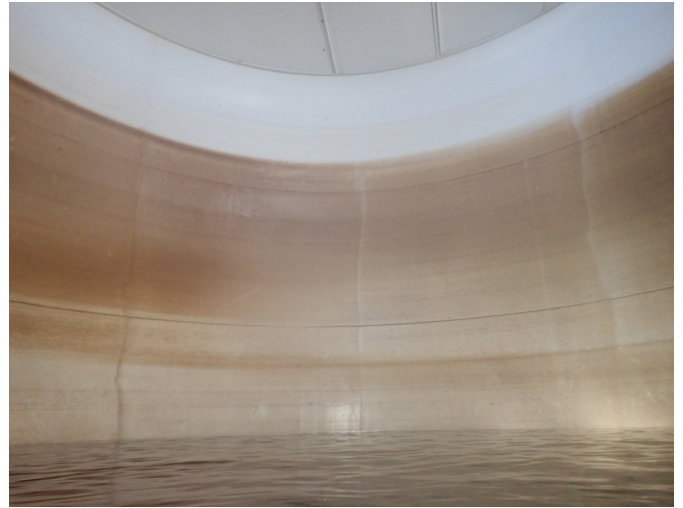
59 *Interior Walls Having Good Adhesion Value Of The Protective Coating And A Mild To Moderate Stain/ Biofilm*



60 *Interior Walls Having Good Adhesion Value Of The Protective Coating And A Mild To Moderate Stain/ Biofilm*



61 *Interior Walls Having Good Adhesion Value Of The Protective Coating And A Mild To Moderate Stain/Biofilm*



62 *Interior Walls Having Good Adhesion Value Of The Protective Coating And A Mild To Moderate Stain/Biofilm*



63 *Interior Walls Having Good Adhesion Value Of The Protective Coating And A Mild To Moderate Stain/Biofilm*



64 *Overhead Support Having Exposed Steel And Corrosion*



65 *Overhead Having Good Adhesion Value Of The Protective Coating*



66 *Overhead Having Good Adhesion Value Of The Protective Coating*



67 *Overhead Having Good Adhesion Value Of The Protective Coating*



68 *Protective Coating Applied To The Interior Of The 24" Inside Diameter Hatch Having Good Adhesion Value*



69 *Unobstructed Vent Penetration*



70 *Unobstructed Overflow Weir Box*



71 *Discharge From Cleaning*



72 *Access Gate Closed And Secured With A Lock*

