



water

CONTRACT AND SPECIFICATIONS

**RIVERHEAD WATER DISTRICT
TOWN OF RIVERHEAD
SUFFOLK COUNTY, NEW YORK**

INSTALLATION OF NEW VARIABLE
FREQUENCY DRIVES AT PLANT NO. 10

SOUND SHORE ROAD, RIVERHEAD

Project No: RDWD 16-02

TOWN SUPERVISOR

Sean Walter

TOWN COUNCIL

John Dunleavy
Jodi Giglio
Timothy Hubbard
James Wooten

TOWN CLERK

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SUPERINTENDENT

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SEPTEMBER 2016

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SECTION 001113 - NOTICE TO BIDDERS

NOTICE TO BIDDERS

RIVERHEAD WATER DISTRICT

TOWN OF RIVERHEAD | SUFFOLK COUNTY, NEW YORK

The Town Board of Riverhead will receive bids for the "Installation of New Variable Frequency Drives at Plant No. 10" for the Riverhead Water District at the Town Clerk's office, Town Hall, 200 Howell Avenue, Riverhead, New York 11901, until **2:05 P.M., on Tuesday, September 27, 2016** at which time and place all bids will be publicly opened and read aloud for:

Installation of New Variable Frequency Drives at Plant No. 10

PROJECT NO. RDWD 16-02

Plans and specifications may be examined on or after Thursday, September 15, 2016 by visiting the Town of Riverhead website: <http://townofriverheadny.gov> and click on "Bid Requests". Plans and specifications are available in electronic format only from the aforementioned website.

Each proposal must be accompanied by a bid bond in the amount of five percent (5%) of the total bid, or a certified check made payable to the TOWN OF RIVERHEAD as assurance that the bid is made in good faith.

The right is reserved to reject any or all bids, to waive any informality, and to accept the lowest responsible bid.

Dated: **September 15, 2016**

BY THE ORDER OF THE TOWN BOARD
TOWN OF RIVERHEAD
SUFFOLK COUNTY, NEW YORK

ACTING AS THE GOVERNING BODY
OF THE RIVERHEAD WATER DISTRICT

TOWN CLERK, TOWN OF RIVERHEAD

END OF SECTION 001113

SECTION 002113 - INFORMATION FOR BIDDERS**BIDS FOR PROJECT**

The Town of Riverhead, at the Town Clerk's office, will receive SEALED PROPOSALS for:

RIVERHEAD WATER DISTRICT**INSTALLATION OF NEW VARIABLE FREQUENCY DRIVES AT PLANT NO. 10
H2M PROJECT NO.: RDWD 16-02****TIME AND PLACE**

Bids are to be submitted in sealed opaque envelopes, and will be received by the Town of Riverhead, at the Town Clerk's office, Town Hall, 200 Howell Avenue, Riverhead, New York, not later than **2:05 P.M.** prevailing time, on **Tuesday, September 27, 2016** at which time and place they will be publicly opened and read aloud. Use of the mails shall be at the Bidder's own risk, and the Bidder shall be responsible for physical delivery of the bid at the time and place set for opening of bids.

BID ENVELOPE

All proposals and either the certified check or bid bond must be placed in a sealed opaque envelope bearing the Bidder's firm name and address and marked, "PROJECT NO.: RDWD 16-02, INSTALLATION OF NEW VARIABLE FREQUENCY DRIVES FOR THE RIVERHEAD WATER DISTRICT, TOWN OF RIVERHEAD, SUFFOLK COUNTY, NEW YORK", but otherwise unmarked.

PLANS AND SPECIFICATIONS

Plans and specifications may be examined on or after Thursday, September 15, 2016 at the Office of the Town Clerk between the hours of 8:30 am and 4:30 pm weekdays, except holidays or by visiting the Town of Riverhead website: <http://townofriverheadny.gov> and click on "Bid Requests".

Plans and specifications are available from the aforementioned Town of Riverhead website only. All contractors who intend to submit a bid package are required to register on the web site.

VERBAL ANSWERS

The Town Board, its agents, servants, employees and the Engineer will not be responsible in any manner for verbal answers to inquiries made regarding the meaning of the plans or the specifications prior to the awarding of the contract.

EXAMINATION OF SITE

Bidders must satisfy themselves by personal examination of the location of the proposed work and of the actual conditions and requirements of the work and shall not, at any time after the submission of a proposal, dispute or complain of such estimate or assert that there was any misunderstanding in regard to the depth or character of excavation to be made or the nature of the work to be done.

PROPOSAL

The Proposal contained herein shall be used in making out bids. Any proposal not in accordance with these instructions or containing bids not asked for may be rejected. While separate prices are required for various items under this contract, it is understood that the contract will be awarded as a whole.

As the estimates of quantities of items stated in the Proposal are approximate only, bidders are required to submit their proposal upon and in the following express conditions, which shall apply and become part of every proposal received.

Bids will be compared by total amounts, said total amount being the sum of the products of the quantities multiplied by the unit price bid for the various items, with due consideration being given to the lump sum prices bid for any contingent or optional items. Unbalanced bids will not be accepted.

Each bidder shall fill out in ink, in both words and figures, in the spaces provided, its unit or lump sum bid, as the case may be, for each item in said Proposal for which it is submitting a bid. If there is any discrepancy between the prices in words and figures, the prices in words shall govern as unit and lump sum prices.

A bid which does not include bids for all items in the Proposal may not be considered valid.

If the contract is not awarded by the Town Board within thirty (30) days after the receipt of bids, the obligation of the bidder under this Proposal may terminate at its option and it shall thereupon be entitled to a refund of its certified check or release of its bid bond furnished by it as security with its proposal.

BID BOND OR CERTIFIED CHECK

Each proposal from a Contractor shall be accompanied by a bid bond or certified check on a solvent bank of the STATE OF NEW YORK, in the amount of five percent (5%) of the total bid. Such check shall be made payable to TOWN OF RIVERHEAD, RIVERHEAD, NEW YORK, and the amount thereof shall be the measure of liquidated damages which the Town may sustain by failure, neglect or refusal of the bidder to execute and deliver the contract, should the contract be awarded to it. The checks of all unsuccessful bidders will be returned upon the rejection of bids and the awarding of the contract; also, the check of the successful bidder will be returned upon the execution of the contract and the furnishing of the required bond.

NAME OF BIDDER

Each bidder must state, in its proposal, its full name and business address, and the full name of every person, firm or corporation, interested in same, and the address of every person or firm, or president and secretary of every corporation, interested with it.

QUALIFICATIONS OF BIDDERS

- (1) The Town Board reserves the right to waive any informalities in, or reject any and all bids. The Board reserves the right to reject any and all bids which do not conform to the Proposal.
- (2) All bidders must prove to the satisfaction of the Town Board that they are reputable, reliable and responsible, and that they possess the necessary qualifications (financial, labor, equipment and otherwise) to complete successfully the proposed work.
- (3) In determining the qualifications of a bidder, the Town Board will consider its record in the performance of any contracts entered into by it for the work contemplated or of similar nature, may make such investigation as it deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Board all such information and data for this purpose as the Town Board may request.

(4) The Town Board shall be the sole judge of the qualifications of the bidders and of the merits thereof and reserves the right to reject any bid if the record of the bidder in the performance of contracts, payment of bills and meeting of obligations to subcontractors, material men or employees is not satisfactory to the Town Board, or if the evidence submitted by, or the investigation of, such bidders fails to satisfy the Town Board that it is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein.

PERFORMANCE AND MAINTENANCE BOND

The Contractor shall furnish a Performance Bond, Labor and Materials Bond, and a one (1) year Maintenance Bond each in an amount equal to one hundred (100%) percent of the total contract price as security for its faithful performance of this contract, for the payment of all persons performing labor or furnishing materials in connection with this contract. Such bonds shall also cover any penalties, interest charges and assessments levied by any governmental unit for failure to comply with laws and/or regulations governing public work. The Maintenance Bond shall be an assurance that all work and materials provided under this contract shall be maintained for a minimum period of one (1) year. The Maintenance Bond shall be furnished following final completion, and payment under the contract. The contractor shall be required to furnish all guarantees and warranties of manufacturers of products in connection with this contract, but no manufacturer's limitation of time shall act to limit the responsibility of the contractor or its surety hereunder.

The surety must be licensed in the State of New York and have a BEST A rating, or the surety shall present information satisfactory to the TOWN/DISTRICT to permit the TOWN/DISTRICT to accept the bond.

At the time of submission of bonds or at any time thereafter, the TOWN/DISTRICT may evaluate the surety or sureties proposed, and demand a change of surety if it determines that the financial position of such surety does not provide for a proper protection of the interests of the TOWN/DISTRICT. The TOWN/DISTRICT shall be guided by its legal counsel, and insurance industry consultants in determining proper sureties for TOWN/DISTRICT public works contracts. If the TOWN/DISTRICT notifies the contractor in writing that a surety is unacceptable for any reason, then the contractor shall replace the surety and the bond in question within five (5) business days with a surety and bond deemed suitable by the said TOWN/DISTRICT. The premiums charged for all such bonds shall be a cost of the contractor and not the TOWN/DISTRICT. Upon notice to change surety being forwarded to a contractor, no further payments shall be made until a new bond in proper form naming an acceptable surety is provided.

SIGNATURE OF CONTRACTOR

The bidder to whom a contract may be awarded shall attend at the office of the Town Board, with the sureties offered by it, within ten (10) days, weekends and holidays excepted, after date of notification of the acceptance of its proposal, and there sign the contract in quadripartite for the work and furnish approved security for its performance.

In case of failure to do so, the bidder shall be considered as having abandoned the same, and the check accompanying its proposal shall be forfeited to the Town Board, or the penalty of the bid bond shall be invoked.

CONTRACTOR'S INSURANCE

The Contractor shall not commence any work until it has obtained and had approved by the Town all of the insurance specified and required by the Contract.

The Contractor shall not permit any subcontractor to commence any operation on the site until satisfactory proof of carriage of the above required insurance has been posted with, and approved by, the Town Board.

RESPONSIBILITY OF BIDDER

Attention is hereby particularly directed to the provisions of the contract whereby the Contractor will be responsible for any loss or damage that may happen to the work or any part thereof during its progress; and also whereby the Contractor shall make good any defects or faults that may occur during the progress of the work or within twelve (12) months after date of the Engineer's approval of the final payment request.

LABOR LAW

The Contractor shall pay not less than the minimum hourly wage rates on this contract as established in accordance with Section 220 of the Labor Law, as shown on the Wage Schedule and Prevailing Rate Schedule, either shown on the following pages or the current prevailing rates paid at the time of construction. This project has been registered with the New York State Department of Labor. Bidders are required to visit <http://www.labor.state.ny.us> wage schedules and updates and enter the corresponding project number to view the original prevailing wage schedule. The Contractor shall agree to accept the Wage Rates and shall not pay less than the minimum hourly wage rates furnished. No contractor or subcontractor listed on the New York State Department of Labor Debarment List will be permitted to work on this project. Inclusion of any contractor on this list represents an immediate forfeiture of bid and is cause to reject bid.

OSHA 10-HOUR CERTIFICATION

On all Public Works projects with a value of \$250,000 or greater, all laborers, workers, and mechanics working on site shall be certified as successfully completing the OSHA 10-Hour Construction Safety and Health Course. Certificates of completion of an approved OSHA 10-hour course shall be provided to the Engineer/Owner for all workers proposed to be on-site prior to the start of construction.

COMPLETION OF WORK

Work is required to be completed to the satisfaction of the Engineer, and in substantial accordance with the Specifications hereunto annexed and the Plans therein referred to and the Change Orders amended to the Contract.

RESPONSIBILITY OF CONTRACTOR

Attention is hereby particularly directed to the provisions of the contract whereby the Contractor will be responsible for any loss or damage that may happen to the work or any part thereof during its progress; and also whereby the Contractor shall make good any defects or faults that may occur during the progress of the work or within twelve (12) months after its completion and acceptance. Any progress payments made by the Town during the completion of this contract by the Contractor shall not be a waiver of the foregoing provision.

TOWN BOARD
TOWN OF RIVERHEAD
SUFFOLK COUNTY, NEW YORK

END OF SECTION 002113

SECTION 004105 - BIDDER'S DECLARATION

TO THE TOWN BOARD

RIVERHEAD WATER DISTRICT

For the furnishing and installing of materials for all work included under contract as follows:

Made this ____ day of _____, 20____, by _____

BIDDER'S DECLARATION:

The party named as Bidder declares that the only person or persons interested in this bid or proposal as principal or principals is or are named herein; and that no other person than herein named has any interest in this proposal or in the contract proposed to be taken; that this bid or proposal is made without any connections with any other person or persons making a bid or proposal for the same purpose; that the bid or proposal is in all respects fair and without collusion or fraud; that it has examined the site of the work, the Contract and Specifications and the Plans therein referred to; and has read the Notice to Bidders, Information for Bidders and General Conditions hereto attached; and it proposes and agrees, if this proposal is accepted, it will contract in the form as approved to perform all the work mentioned in said Contract and Specifications; and it will accept in full payment therefore the following sums to wit:

END OF SECTION 004105

SECTION 004116 - PROPOSAL

Gentlemen:

The undersigned hereby offers to furnish all labor, equipment, materials and appurtenances for **Installation of New Variable Frequency Drives at Plant No. 10**, all in accordance with the plans and specifications prepared by H2M architects + engineers for the following lump sum prices:

ITEM 1 - INSTALL TWO NEW VARIABLE FREQUENCY DRIVES AT PLANT No. 10	
For the installation of two (2) new Variable Frequency Drive (VFDs) including all incidentals required to complete the work in accordance with the plans and these specifications.	
LUMP SUM: _____	(\$ _____)
DOLLARS	

THE TOWN OF RIVERHEAD/RIVERHEAD WATER DISTRICT RESERVES THE RIGHT TO AWARD THIS CONTRACT BASED ON EITHER THE TOTAL BID OR ANY COMBINATION OF ITEMS. THE TOWN/DISTRICT RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS.

WITHIN TEN (10) DAYS WEEKENDS AND LEGAL HOLIDAYS EXCEPTED) AFTER ACCEPTANCE OF THIS BID BY THE TOWN/DISTRICT, THE BIDDER SHALL EXECUTE THE CONTRACT. THE BIDDER SHALL FURNISH THE REQUIRED BONDS AND INSURANCES TO THE WATER DISTRICT'S ATTORNEY WITHIN THE SAME TIME FRAME.

SCHEDULE OF WORK

ALL CONTRACT WORK INCLUDED WITHIN EACH PHASE SHALL BE COMPLETED WITHIN SIXTY (60) CONSECUTIVE CALENDAR DAYS AFTER DATE OF NOTICE TO PROCEED.

FAILURE OF THE CONTRACTOR TO COMPLETE ALL WORK WITHIN THE SPECIFIED TIME PERIOD WILL SUBJECT HIM TO LIQUIDATED DAMAGES AS SET FORTH IN THE CONTRACT, IN THE SUM OF FIVE HUNDRED DOLLARS (\$500.00) PER DAY, COMMENCING WITH THE 61ST DAY AS SET FORTH IN THE NOTICE TO PROCEED.

SPECIFIC DAMAGES WILL BE ASSESSED AND DEDUCTED FROM AMOUNTS OTHERWISE DUE THE CONTRACTOR FOR ADDITIONAL INSPECTION AND CONTRACT MANAGEMENT TIME REQUIRED BEYOND THE COMPLETION PERIODS ESTABLISHED. SUCH DEDUCTION SHALL BE IN ACCORDANCE WITH THE BILLING RATES AND FEES ESTABLISHED BETWEEN H2M AND THE RIVERHEAD WATER DISTRICT.

THE BIDDER REPRESENTS HERewith THAT HE IS AWARE OF THE WORKING CONDITIONS, HAS CAREFULLY REVIEWED THE PROPOSAL AND SPECIFICATIONS, HAS CHECKED AND CERTIFIES THE ACCURACY OF THE BID.

THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE DISTRICT TO MINIMIZE DISTURBANCES TO DISTRICT OPERATIONS.

THE UNDERSIGNED HEREBY ACKNOWLEDGES RECEIPT OF THE FOLLOWING ADDENDA (IF ANY):

ADDENDUM NO.

DATED

_____	_____
_____	_____
_____	_____

TELEPHONE NUMBER WHERE THE CONTRACTOR OR A COMPETENT REPRESENTATIVE CAN ACCEPT A TELEPHONE MESSAGE AND PROVIDE A REASONABLE REPLY AS SOON AS POSSIBLE, WITHIN 24 HOURS OF BEING CONTACTED.

DAY: _____ NIGHT: _____

EMERGENCY: _____ FAX: _____

EMAIL: _____

BIDDER:

BIDDER'S ADDRESS:

SIGNED BY: _____ TITLE: _____

PRINT NAME: _____ DATE: _____

FEDERAL I.D. NO. OR
SOCIAL SECURITY NO.: _____

END OF SECTION 004116

SECTION 004313 - BID SECURITY

Enclose a certified check or bid bond for five percent (5%) of the bid total as stipulated in the foregoing "Information for Bidders".

The Bidder hereby agrees to appear with its sureties at the office of the Town of Riverhead, Town Clerk's office within ten (10) days (weekends and legal holidays excepted) after due notice from the Town Board that the contract has been awarded to it and is ready for signature; such notice to be given in writing within thirty (30) days of opening of the bids and, on the signing of such contract by the Bidder, to furnish the indemnifying bonds as provided in the General Conditions.

The Bidder hereby further agrees that in the event of its failure or refusal to enter into a contract in accordance with this bid within ten (10) days (weekends and legal holidays excepted) after due notice from the Town Board that the Contract has been awarded to it and is ready for signature, as given in accordance with the Information for Bidders and/or its failure to execute and deliver the bond for the full amount of the Contract price, as provided in said Information for Bidders, the Bidder's check or bid bond which is herewith deposited with the Town Board shall (at the option of said Board) become due and payable as ascertained and liquidated damages for such default; otherwise, said check or bid bond will be returned to the undersigned.

The full names and residences of all persons and parties interested in the foregoing bid as principals are as follows:

<u>NAME</u>	<u>ADDRESS</u>
_____	_____
_____	_____
_____	_____

NAME OF BIDDER: _____

BUSINESS ADDRESS OF BIDDER: _____

Telephone number where the bidder or a competent representative can accept a telephone message and provide a reasonable reply as soon as possible, but no later than twenty four (24) hours:

DAY: _____ EVENING: _____

DATED AT: _____ THE _____ DAY OF _____, 20_____

END OF SECTION 004313

SECTION 004355 - INDEMNITY, LIMITATION OF LIABILITY

1.0 - INDEMNITY

The Contractor and all subcontractors performing work in connection with this Contract shall HOLD HARMLESS, INDEMNIFY and DEFEND the Owner and Engineer, their consultants and each of their officers, agents and employees from any liability, claims, losses or damage including reasonable costs of defense arising out of or alleged to arise from the Contractor's or subcontractor's negligence in the performance of the work described in the Contract Documents, but not including liability that may be due to the sole negligence of the Owner, the Engineer or their officers, agents and employees.

2.0 - LIMITATION OF LIABILITY

The Contractor and all subcontractors agree to limit the liability of the Owner and the Engineer due to the Engineer's professional negligent errors or omissions such that the total aggregate liability of the Engineer to those named shall not exceed Fifty Thousand Dollars (\$50,000) or five percent (5%) of the Contract award amount, whichever is greater.

3.0 - NO CLAIM FOR DELAY

The Contractor and all subcontractors agree to HOLD HARMLESS from any and all claims for loss or damages of any nature against the Owner or Engineer for delays in commencement, performance or completion of the Contract, regardless of whether said delays are, or may be, caused by the Owner, Engineer or any governmental agency.

END OF SECTION 004355

SECTION 004519 - NON-COLLUSIVE BIDDING CERTIFICATE

NON-COLLUSIVE BIDDING CERTIFICATE

Pursuant to Section 103-D of the General Municipal Law, the Contractor makes the following statement under penalty of perjury, and by submission of this bid or proposal, the Bidder certifies that:

(a) this bid or proposal has been independently arrived at without collusion with any other bidder or with any competitor or potential competitor; (b) this bid or proposal has not been knowingly disclosed and will not be knowingly disclosed prior to the opening of the bids or proposals for this project to any other bidder, competitor or potential competitor; (c) no attempt has been or will be made to induce any other person, partnership or corporation to submit or not to submit a bid or proposal; (d) the person signing this bid or proposal certified that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the Bidder as well as to the person signing in its behalf; (e) attached hereto (if a corporate bidder) is a certified copy of resolution authorizing the execution of this certificate by the signatory of the bid or proposal on behalf of the corporate bidder.

Resolved that

(Name of Corporation)

be authorized to sign and submit the bid or proposal of this corporation for the following project:

Installation of New Variable Frequency Drives at Plant No. 10
(Name of Project)

and to include in such bid or proposal the certificate as to non-collusion required by Section 103-D of the General Municipal Law as the act and deed of said corporation; and for any inaccuracies or misstatements in such certificate, this corporate bidder shall be liable under the penalties of perjury.

The foregoing is a true and correct copy of the resolution adopted by _____

at a meeting of its Board of Directors held on the _____ day of _____, 20____

(Seal of the Corporation)

Secretary:

Respectfully submitted,

FIRM NAME: _____

FIRM ADDRESS:

SIGNED BY: _____

TITLE: _____

END OF SECTION 004519

SECTION 004550 - QUALIFICATION OF BIDDERS

**RIVERHEAD WATER DISTRICT
SUFFOLK COUNTY, NEW YORK**

The District may make such investigation as the District deems necessary to determine the responsibility of any Bidder or to determine the ability of any Bidder to perform the Work. Bidders shall furnish to the District all information and data required by the District, including complete financial data, within the time and in the form and manner required by the District. The District reserves the right to reject any bid if the evidence required by the District is not submitted as required or if the evidence submitted by or the investigation of any Bidder fails to satisfy the District that the Bidder is responsible, or is able or qualified to carry out the obligations of the Contract or to complete the Work as contemplated. At the discretion of the District, any bidder may be required to complete and submit the enclosed New York State Vendor Responsibility Questionnaire to assist in determining the bidder's qualifications.

The following is a list showing the name of the Owner, Location, Date of Construction, General Description of Work, Amount of the Contract and Contract Period for projects of similar nature in size, construction method and construction procedure, which have been completed by the undersigned as the prime contractor, and which have been in operation for a period of not less than one year, (minimum of five such projects).

PROJECT NO. 1

Owner:

Contact Name and Phone Number: _____

Location:

General Description:

Contract Amount: _____

Contract Period: _____

PROJECT NO. 2

Owner:

Contact Name and Phone Number: _____

Location:

General Description:

Contract Amount: _____

Contract Period: _____

PROJECT NO. 3

Owner: _____

Contact Name and Phone Number: _____

Location: _____

General Description: _____

Contract Amount: _____

Contract Period: _____

PROJECT NO. 4

Owner: _____

Contact Name and Phone Number: _____

Location: _____

General Description: _____

Contract Amount: _____

Contract Period: _____

PROJECT NO. 5

Owner: _____

Contact Name and Phone Number: _____

Location: _____

General Description: _____

Contract Amount: _____

Contract Period: _____

The following is a list of the major areas of construction work under this contract to be performed by subcontractors to the bidder, showing the Type of Work and the name of the Owner, Location and Date of Construction for work of similar nature in size, construction method and construction procedure, which have been completed by the undersigned, and which have been in operation for a period of not less than one year, (minimum of five such projects).

Subcontractor Name:

Type of Work:

<u>Owner</u>	<u>Contact Name</u>	<u>Phone Number</u>	<u>Location</u>	<u>Contract Amount</u>
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Subcontractor Name:

Type of Work:

<u>Owner</u>	<u>Contact Name</u>	<u>Phone Number</u>	<u>Location</u>	<u>Contract Amount</u>
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Subcontractor Name:

Type of Work:

<u>Owner</u>	<u>Contact Name</u>	<u>Phone Number</u>	<u>Location</u>	<u>Contract Amount</u>
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Subcontractor Name:

Type of Work:

<u>Owner</u>	<u>Contact Name</u>	<u>Phone Number</u>	<u>Location</u>	<u>Contract Amount</u>
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The Riverhead Water District reserves the right to reject any and all bids which do not include a completed qualifications section and/or do not meet the necessary qualifications criteria, for both prime contractor and subcontractors, as described within this qualifications section, for construction work to be performed and completed as required by the contract documents.

BIDDER

FIRM NAME: _____

ADDRESS: _____

PREPARED BY: _____

SIGNED BY: _____

TITLE: _____

END OF SECTION 004550

SECTION 004555 - CONTRACTOR'S RESPONSIBILITY

It is the Contractor's responsibility to inform the Engineer in advance when a situation arises that forces the Contractor to cancel work for a given day. For example, if the Contractor informs the Engineer that he will be on the job on a certain day and then has to cancel the appointment because he cannot obtain certain materials or equipment, it is the Contractor's responsibility to inform the Engineer of these latest developments and to let him know that construction observation services will not be needed for that day.

In the event that the Engineer is not given ample warning of such a cancellation and, as a result, unnecessary time is spent sending field personnel out to the project site to observe the previously scheduled construction, sufficient funds will be deducted from monies due the Contractor to reimburse the Engineer for his wasted time.

By the same token, sufficient funds will be deducted from monies due the Contractor to reimburse the Engineer for any services rendered in the field or in the office regarding work that had to be performed a second time due to substandard work on the part of the Contractor on the original work.

END OF SECTION 004555

SECTION 006295 - IRANIAN INVESTMENT ACTIVITIES CERTIFICATION

IRANIAN INVESTMENT ACTIVITIES CERTIFICATION

(To be completed by the Bidder and submitted with the bid)

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of section 165-a of the state finance law.

Dated: _____ 2016

(Name of corporation or partnership)

(Individual)

(Officer stating title) (Partner)

END OF SECTION 006295

SECTION 005209 - CONTRACT

CONTRACT IN QUADRUPLICATE FOR _____
AT TOWN OF RIVERHEAD, SUFFOLK COUNTY, NEW YORK, dated _____, 20__, BY AND
BETWEEN THE TOWN BOARD OF THE TOWN OF RIVERHEAD, SUFFOLK COUNTY, NEW YORK,
acting for and in behalf of the RIVERHEAD WATER DISTRICT (herein called the TOWN DISTRICT), and
_____ (herein called the CONTRACTOR).

WITNESSETH, that the TOWN DISTRICT and the CONTRACTOR, in consideration of the
premises and of the mutual covenants, considerations and agreements herein contained, agree as
follows:

This Contract is hereby awarded to the CONTRACTOR for the work and material called for under
his bid in the Proposal section of the Contract and designated as Items: _____

for the sum of: _____

_____ (\$ _____)

for the unit and/or lump sum price(s) as listed in the Proposal herein.

1. CONTRACT DOCUMENTS AND DEFINITIONS

The Notice to Bidders, Information for Bidders, Proposal, General Conditions, Contract, Specifications and Plans, together with any Addenda, shall form part of this Contract, and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The titles, headings, headlines and marginal notes contained herein are solely to facilitate reference to the various provisions of the contract documents and in no way affect, limit or cast light upon the interpretation of the provisions to which they refer. Whenever the term "contract documents" is used, it shall mean and include this Contract, the Plans, Specifications, any Addenda, and the Notice to Bidders, Information for Bidders, General Conditions and Proposal. In case of any conflict or inconsistency between the provisions of the Contract and those of the Specifications, the provisions of the Contract shall govern.

WORK: The term WORK, as used herein, refers to all of the work proposed to be accomplished at the site of the project and all such other work as is in any manner required to accomplish the completed project, and includes all plant, labor, materials, supplies, equipment and other facilities and acts necessary or proper for or incidental to the carrying out and completion of the terms of this Contract. The term WORK PERFORMED shall be construed to include material delivered to and suitably stored at the site of the project.

EXTRA WORK: The term EXTRA WORK, as used herein, refers to and includes all work required by the TOWN DISTRICT which, in the judgment of the Engineer, with the Town's approval, involves changes in or additions to work required by the Plans, Specifications and any Addenda in their present form.

SUBCONTRACTOR: The term SUBCONTRACTOR, as used herein, shall mean any person, firm or corporation applying labor and material for work at the site of the project, but not including the parties to this Contract.

ENGINEER: In the performance of the work, the TOWN DISTRICT shall be represented by its Consulting Engineer H2M architects + engineers (herein called the ENGINEER).

NOTICE: The term NOTICE, as used herein, shall mean and include written notice. Written notice shall be deemed to have been duly served when delivered to, or at the last known business address of, the person, firm or corporation for whom intended or to his, their, or its duly authorized agents, representatives or officers, or when enclosed in a postage prepaid wrapper or envelope addressed to such person, firm, or corporation at his, their, or its last known business address and deposited in a United States Mail Box.

DIRECTED, REQUIRED, APPROVED, ACCEPTABLE: Whenever they refer to the work, or its performance, "directed", "required", "permitted", "ordered", "designated", "prescribed", and words of like import shall imply the direction, requirement, permission, order, designation or prescription of the Engineer, and "approved", "satisfied", or "satisfactory", "in the judgment of", and words of like import, shall mean approved or acceptable to, or satisfactory to, in the judgment of the Engineer.

2. SCOPE OF THE WORK

The Contractor will furnish all plant, labor, material, supplies, equipment and other facilities and things necessary or proper for or incidental to, the work contemplated by this Contract as required by, and in strict accordance with, the applicable Plans, Specifications and Addenda prepared by the Engineer and/or required by and in strict accordance with, such changes as are ordered and approved pursuant to this Contract, and will perform all other obligations imposed on him by the Contract.

3. COMPENSATION TO BE PAID TO THE CONTRACTOR

A. Agreed Prices: It is understood and agreed that the Contractor will accept as payment in full the summation of products, of the actual quantities in place upon the completion of the work, as determined by the Engineer's measurements by the unit prices bid, no allowance being made for anticipated profit or for reason of variations from the estimated quantities set forth in the Proposal.

B. Extra Work and/or Changes: The TOWN DISTRICT may, at any time, by a written order, and without notice to the sureties, require the performance of such extra work or changes in the work as it may find necessary or desirable. The amount of compensation to be paid to the Contractor for any extra work, as so ordered, shall be determined as follows:

- (1) By such applicable unit prices, if any, as set forth in the contract; or
- (2) If no such unit prices are set forth, then by unit prices or by a lump sum mutually agreed upon by the TOWN DISTRICT and the Contractor; or
- (3) If no such unit prices are set forth, and if the parties cannot agree upon unit prices or a lump sum, then by actual net cost in money to the Contractor of the materials, permits, wages, or applied labor, premium for Workers' Compensation Insurance, payroll taxes required by law, rental for plant and equipment used (excluding small tools) to which total cost will be added 20 percent as full compensation for all other items of profit, costs and expenses, including administration, overhead, superintendence, insurance, insurance other than Workers' Compensation Insurance, material used in temporary structures, allowances made by the Contractor to subcontractors, additional premiums upon the Performance Bond of the Contractor and the use of small tools.

4. TIME OF ESSENCE

Inasmuch as the provisions of this Contract relating to the time for performance and completion of the work are for the purpose of enabling the TOWN DISTRICT to proceed with the construction of a public improvement, in accordance with a predetermined program, such provisions are of the essence of this Contract.

5. COMMENCEMENT OF WORK

The Contractor agrees that he will commence work within ten (10) consecutive calendar days after signing this Contract, and that the day he commences work shall constitute the first of the consecutive calendar days allowed for completion of the work.

6. TIME FOR COMPLETION

The time for completion of this Contract shall be within the number of calendar days stated in the Bid Proposal and the date of such completion shall be the date of the certificate of completion hereinafter specified.

The TOWN DISTRICT reserves the right to order the Contractor to suspend operations when, in the opinion of the Engineer, improper weather conditions make such action advisable, and to order the Contractor to resume operations when weather and ground conditions permit. The days during which such suspension of work is in force are not chargeable against the specified completion time.

7. LIQUIDATED DAMAGES FOR DELAY

The time limit being essential to and of the essence of this Contract, the Contractor hereby agrees that the TOWN DISTRICT shall be, and is hereby authorized to deduct and retain out of the money which may be due or may become due to said Contractor under this agreement, the sum of FIVE HUNDRED DOLLARS (\$500.00) per day, which amount is hereby agreed upon, fixed and determined by the parties hereto as the LIQUIDATED DAMAGES, including overhead charges, services, inspector's wages, and interest on the money invested, that the TOWN DISTRICT will suffer by reason of such default, for each and every day during which the aforesaid work may be incomplete over and beyond the time herein stipulated for its completion, provided, however, that the TOWN DISTRICT shall have the right to extend the time for the completion of said work.

8. EXTENSIONS OF TIME - NO WAIVER

If the Contractor shall be delayed in the completion of his work by reason of unforeseeable causes beyond his control and without his fault or negligence, including but not restricted to Acts of God or of any public enemy, acts or neglect of the TOWN DISTRICT, acts or neglect of any other Contractor, fires, floods, epidemics, quarantine restrictions, strikes, riots, civil commotion or freight embargoes, the period herein above specified for completion of his work shall be extended by such time as shall be fixed by the TOWN DISTRICT.

No such extension of time shall be considered a waiver by the TOWN DISTRICT of its right to terminate the Contract for abandonment or delay by the Contractor as hereinafter provided or relieve the Contractor from full responsibility for performance of his obligations hereunder.

9. CONTRACT SECURITY

A. The Contractor shall furnish a Performance Bond in an amount equal to one hundred percent (100%) of the total contract price as security for the faithful performance of this Contract, and for the payment of all persons performing labor or furnishing materials in connection with this Contract.

B. Additional or Substitute Bond - If, at any time, the TOWN DISTRICT shall be or become dissatisfied with any surety or sureties, then upon the Performance Bond, or if, for any other reason, such bond shall cease to be adequate security to the TOWN DISTRICT, the Contractor shall, within five (5) days after notice from the TOWN DISTRICT, substitute an acceptable bond in such form and sum, and signed by such other surety as may be satisfactory to the TOWN DISTRICT. The premiums on such bonds shall be paid by the Contractor. No further payments shall be deemed due, nor shall be made until the new surety shall have been qualified.

C. Prior to release of the Performance Bond, the Contractor shall deliver to the TOWN DISTRICT a Maintenance Bond equal to one hundred percent (100%) of the total Contract price, including all extras. This Maintenance Bond shall remain in full force and effect for a period of one (1) year after the date of the Engineer's approval of the final payment request and such bond, which shall be executed by the Contractor and issued by a reliable, solvent surety company authorized to do business in the State of New York shall guarantee to the TOWN DISTRICT that the Contractor shall promptly remedy any defects or faults that may occur within twelve (12) months after completion and acceptance of the work performed by the Contractor pursuant to this Contract.

10. CONTRACTOR'S INSURANCE

The Contractor shall not commence any work until he has obtained and had approved by the TOWN DISTRICT all of the insurance required under this Contract, as enumerated herein:

Compensation Insurance

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Public Liability and Property Damage Insurance

Contractor's Protective Liability and Property Damage Insurance

Owner's (TOWN DISTRICT) and Engineer's Protective Public Liability and Property Damage Insurance

Automobile Public Liability and Property Damage Insurance

The Contractor shall not permit any subcontractor to commence any operation on the site until satisfactory proof of carriage of the above required insurance has been posted with, and approved by, the TOWN DISTRICT.

A. Compensation Insurance - The Contractor shall take out and maintain, during the life of this Contract, Workers' Compensation Insurance for all of his employees employed at the site of the project, and in any case of any of the work being sublet, the Contractor shall require the subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees, unless such employees are covered by the protection afforded by the Contractor.

B. Public Liability and Property Damage Insurance - The Contractor shall take out and maintain during the life of this Contract such Public Liability and Property Damage Insurance as shall protect him and any subcontractor performing work covered by this Contract for claims for damages for personal injury, including accidental death, as well as from claims for property damage which may arise from operations under this Contract, whether such operations be by himself or by any subcontractor, or by any one directly or indirectly employed by either of them, and the amounts of such insurance shall be as follows:

- (1) Public Liability Insurance in the amount not less than FIVE HUNDRED THOUSAND DOLLARS (\$500,000.) for bodily injuries, including wrongful death to any one person, and subject to the same limit for each person in an amount not less than ONE MILLION DOLLARS (\$1,000,000.) on account of one accident.
- (2) Property Damage Insurance in an amount not less than ONE HUNDRED THOUSAND DOLLARS (\$100,000.) for damages on account of any one accident and in an amount of not less than TWO HUNDRED THOUSAND DOLLARS (\$200,000.) for damages on account of all accidents.

C. Liability and Property Damage Insurance - The above policies for public liability and property damage insurance must be so written as to include Contractor's Protective Liability and Property Damage Insurance to protect the Contractor against claims arising from the operations of any subcontractor.

D. Owner's Protective Public Liability and Property Damage Insurance - (TOWN DISTRICT, and/or TOWN BOARD, TOWN OF RIVERHEAD as OWNER and/or H2M architects + engineers as ENGINEERS) - The Contractor shall furnish to the TOWN DISTRICT with respect to the operations he or any of his subcontractors perform, a regular Protective Public Liability Insurance Policy for and in behalf of the TOWN DISTRICT and/or TOWN BOARD, TOWN OF RIVERHEAD as OWNER and/or H2M architects + engineers, as ENGINEERS, providing for a limit of not less than FIVE HUNDRED THOUSAND DOLLARS (\$500,000.) for all damages arising out of bodily injuries to, or death of, one person and subject to that limit for each person, a total limit of ONE MILLION DOLLARS (\$1,000,000.) for all damages arising out of bodily injuries to, or death of, two or more persons in any one accident; and regular Protective Property Damage Insurance providing for a limit of not less than ONE HUNDRED

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THOUSAND DOLLARS (\$100,000.) for all damages arising out of injury to, or destruction of, property in any one accident and subject to that limit per accident a total (or aggregate) limit of TWO HUNDRED THOUSAND DOLLARS (\$200,000.) for all damages arising out of injury to, or destruction of property during the policy period. The insurance must fully cover the legal liability of the TOWN DISTRICT and/or TOWN BOARD, TOWN OF RIVERHEAD as OWNER and/or H2M architects + engineers, as ENGINEERS. The coverage provided under this policy must not be affected if the TOWN DISTRICT performs work in connection with the project either for, or in cooperation with, the Contractor or as an aid thereto, whether the same be a part of the Contract or separate therefrom, by means of its own employees or agents, or if the TOWN DISTRICT directs or supervises the work to be performed by the Contractor.

E. Automobile Public Liability and Property Damage Insurance - The Contractor shall take out and maintain during the life of the Contract such automobile public liability and property damage insurance as shall protect him and any subcontractor performing work covered by this Contract from claims for damages for personal injury, including accidental death as well as from claims for property damage which may arise from operations under this Contract, whether such operations be by himself or by any subcontractor, or by any one directly or indirectly employed by either of them and the amounts of such insurance shall be as follows:

- (1) Automobile Public Liability Insurance in an amount not less than FIVE HUNDRED THOUSAND DOLLARS (\$500,000.) for bodily injuries, including wrong-ful death by any one person, and subject to the same limit for each person in an amount not less than ONE MILLION DOLLARS (\$1,000,000.) on account of one accident.
- (2) Automobile Property Damage Insurance in an amount of not less than ONE HUNDRED THOUSAND DOLLARS (\$100,000.) for damages on account of any one accident and in an amount of not less than TWO HUNDRED THOUSAND DOLLARS (\$200,000.) for damages on account of all accidents.

11. PROOF OF CARRIAGE OF INSURANCE

The Contractor shall furnish the TOWN DISTRICT with certificates of each insurer insuring the Contractor or any subcontractor under this Contract, except with respect to subdivision D. of paragraph 10. In respect to this paragraph, the Contractor shall furnish the TOWN DISTRICT with the original insurance policy and a copy to the Engineer.

Both certificates, as furnished, and the insurance policy, as required, shall bear the policy numbers, the expiration date of the policy and the limit or limits of liability thereunder. Both the certificates and the policy shall be further endorsed to provide the TOWN DISTRICT and Engineer with any notice of cancellation at least ten (10) days prior to the actual date of such cancellation.

12. COMPLIANCE WITH LABOR AND PENAL LAWS

The Contractor hereby expressly agrees to comply with all the provisions of the Labor Law and any and all amendments thereto, insofar as the same are applicable to this Contract. The Labor Laws, as amended, provide that no laborer, worker or mechanic in the employ of the Contractor, subcontractor or other person doing or contracting to do the whole or a part of the work contemplated by this Contract, shall be permitted or required to work more than eight (8) hours in any one calendar day, except in cases of extraordinary emergency caused by fire, flood, or danger to life or property; that no such person shall be employed more than eight (8) hours in any day or more than five (5) days in any week, except in such emergency; that the wages to be paid for a legal day's work as hereinbefore defined, to laborers, workers, or mechanics upon the work called for under this Contract, or for any materials used upon or in connection therewith shall not be less than the prevailing rate for a day's work in the same trade or

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occupation in the locality within the State where such work is to be done and each laborer, worker, or mechanic employed by the Contractor, subcontractor, or other person about or upon the work shall be paid the wages herein provided; that employees engaged in the construction outside the limits of cities and villages are no longer exempt from the provisions of the Labor Laws which required the payment of the prevailing rate of wages and the eight (8) hour day.

Section 220A of the Labor Law, as amended by Chapter 472 of the Laws of 1932, provides that before payment is made by or on behalf of the State or any City, County, Town or Village or other civil division of the State, of any sums due on account of a contract for a public improvement, it is the duty of the Comptroller or the financial officer of the Municipal Corporation to require the Contractor and each and every subcontractor to file a certified statement in writing, in satisfactory form, certifying to the amounts then due and owing to any and all laborers for daily or weekly wages on account of labor performed upon the work of the Contract, setting forth therein the names of the persons whose wages are unpaid and the amount due each, respectively.

Section 220B of the Labor Law, as amended, provides that any interested person who shall have previously filed a protest in writing objecting to the payment to any Contractor or subcontractor to the extent of the amount or amounts due or to become due to him for daily or weekly wages for labor performed on the public improvement for which the Contract was entered into, or if, for any other reason, it may be deemed advisable, the Comptroller of the State or other financial officer of the Municipal Corporation may deduct from the whole amount of any payment on account thereof the sum or sums admitted by any Contractor or subcontractor in such statement or statements so filed to be due and owing by him on account of labor performed and may withhold the amount so deducted for the benefit of the laborers for daily or weekly wages, whose wages are unpaid as shown by the verified statements filed by any Contractor or subcontractor and may pay directly to any person the amount or amounts so shown to be due for such wages.

Section 220C of the Labor Law, as amended, provides the penalty for making of a false oath or verification.

Section 220D of the Labor Law provides that the advertised specifications for every Contract for the construction, reconstruction, maintenance and/or repair of highways to which the State, County, Town and/or Village is a party shall contain the provision stating the minimum rate of hourly wage that can be paid, as shall be designated by the Industrial Commissioner, to the laborers employed in the performance of the Contract, either by the Contractor, subcontractor or other person doing or contracting to do the whole or part of the work contemplated by the Contract, and the Contract shall contain a stipulation that such laborers shall be paid not less than such hourly minimum rate of wage. Any person or corporation that willfully pays after entering into such Contract less than such stipulated minimum hourly wage scale shall be guilty of a misdemeanor and, upon conviction, shall be punished for a first offense by a fine of Five Hundred Dollars (\$500.) or by imprisonment for not more than thirty (30) days, or by both fine and imprisonment for a second offense by a fine of One Thousand Dollars (\$1,000.) and, in addition thereto, the Contract on which the violation has occurred shall be forfeited; and no such person or corporation shall be entitled to receive any sum or nor shall any officer, agent or employee of the State pay the same or authorize its payment from the funds under his charge or control to any person or corporation for work done upon any contract, on which the Contractor has been convicted of second offense in violation of the provisions of this Section.

The minimum wage rates established by the Industrial Commissioner, State of New York, for this Contract, are as set forth in the INFORMATION FOR BIDDERS.

All excavation shall be done in compliance with Article 36 of the General Business Law and notices given as provided by GBL Section 761.

13. PAYMENT OF EMPLOYEES

The Contractor and each of his subcontractors shall pay each of his employees engaged in work on this project under this Contract in full (less deductions made mandatory by law) in cash and not less often than once each week.

14. ESTIMATES AND PAYMENTS

A. Monthly: At the end of each calendar month during the progress of the work, the Contractor shall submit a payment requisition to the Engineer. The Engineer will review the requisition and prepare a payment request based on the estimated amount of work performed and the quantity of materials furnished, based on the prices set forth in the Proposal. In consideration of the work done and the materials furnished, the TOWN DISTRICT will pay or cause to be paid to the Contractor the amount estimated by the Engineer as due him less a sum equal to five percent (5%) of such amount and less such additional amount as may be necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged. The making of any such estimate or payment made thereon shall not be taken or construed as an acceptance by the Engineer or the TOWN DISTRICT of any work so estimated and paid for. The amount of the monthly estimate remaining unpaid will be retained by the TOWN DISTRICT as a guarantee that the Contractor will faithfully and completely fulfill all obligations imposed by the Contract and Specifications, and against any damages incurred by the TOWN DISTRICT by reason of any failure on the part of the Contractor to fulfill all conditions and obligations herein contained. All partial payments are subject to correction in any subsequent payment. The retained amounts shall be paid as set forth in the following subsection B.

B. Final: Thirty (30) days after the Contractor shall have substantially completed the work required of it under the Contract the Engineer will prepare an approval of Final Payment Request. Thereafter the TOWN DISTRICT will pay to the Contractor the remaining amount of the Contract balance less a sum equal to two (2) times the value of any remaining items to be completed and less an amount necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged. As the remaining items of work are satisfactorily completed or corrected, the TOWN DISTRICT shall promptly pay, upon receipt of a requisition for these items less an amount necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged. Any claims, liens and judgments referred to in this section shall pertain to the project and shall be filed in accordance with the terms of the applicable Contract and/or applicable laws.

C. In order to secure the performance of the covenant of the Contractor, prior to release of the Performance Bond, the Contractor shall deliver to the TOWN DISTRICT a Maintenance Bond equal to one hundred percent (100%) of the total Contract price, including all extras. This Maintenance Bond shall remain in full force and effect for a period of one (1) year after the date of the Engineer's approval of the Final Payment Request and such bond, which shall be executed by the Contractor and issued by a reliable, solvent surety company authorized to do business in the State of New York shall guarantee to the TOWN DISTRICT that the Contractor shall promptly remedy any defects or faults that may occur within twelve (12) months after completion and acceptance of the work performed by the Contractor pursuant to this Contract.

D. Measurements for Payment: The Engineer shall make due measurement of the work done during the progress of the work and his estimate shall be final and conclusive evidence of the amounts of work performed by the Contractor under, and by virtue of, this agreement, and shall be taken as the full measure of compensation to be received by the Contractor. When requested by the Contractor, the Engineer shall measure, re-measure or re-estimate any portion of the work; but the expense of such re-measurement or re-estimating shall, unless material error be proved, be paid for by the Contractor.

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E. Should all work not be completed and final payment request not submitted within one (1) year after the punch list has been issued, the TOWN DISTRICT will be under no obligation to make final payment.

15. FUEL SURCHARGES

The Town/District will not pay any type of fuel surcharge. Any fuel surcharges added will be deleted from any payments made to the vendor.

16. ACCEPTANCE OF FINAL PAYMENT CONSTITUTES RELEASE

The acceptance by the Contractor of the final payment shall be, and shall operate as a release to the TOWN DISTRICT from all claims and all liabilities to the Contractor for all things done or furnished in connection with this work, and for every act and neglect of the TOWN DISTRICT and other relating to, or arising out of, this work, excepting the Contractor's claims for interest upon the final payment, if these payments be improperly delayed. No payment, however, final or otherwise, shall operate to release the Contractor or his sureties from any obligations under this Contract or the Performance Bond.

17. CONSTRUCTION REPORTS

The Contractor shall submit to the Engineer prior to the commencing of any work under this Contract a detailed schedule and plan of operation, indicating the manner in which the Contractor proposes to prosecute the work, and a time schedule therefore. Such schedules are not intended to bind the Contractor to a predetermined plan or procedure, but rather to enable the Engineer to coordinate the work of the Contractor with work required of and to be performed by others.

The Contractor shall furnish the Engineer with periodic estimates for partial payments as required elsewhere in the contract documents and, in addition thereto, will furnish the Engineer with a detailed estimate for final payment. Prior to being eligible to receive final payment under this Contract, the Contractor shall furnish the Engineer with substantial proof that all bills for services rendered and materials supplied have been paid. The enumeration of the above reports in no way relieves the Contractor of his responsibility under existing Federal or State laws of filing such other reports with agencies other than the TOWN DISTRICT as may be required by such existing laws or regulations.

18. INSPECTION AND TESTS

All material and workmanship shall be subject to inspection, examination and test by the Engineer and other representatives of the TOWN DISTRICT at any time during the construction and at any and all places where manufacturing of materials used and/or construction is carried on.

Without additional charge, the Contractor shall furnish promptly all reasonable facilities, labor and materials necessary to make tests so required safe and convenient.

If, at any time, before final acceptance of the entire work, the Engineer, with the TOWN DISTRICT's approval, considers necessary or advisable an examination of any portion of the work already completed, by removing or tearing out the same, the Contractor shall, upon request, furnish promptly all necessary facilities, labor and materials for such examination. If such work is found to be defective in any material respect, due to the fault of the Contractor or any subcontractor, or if any work shall be covered over without the approval or consent of the Engineer, with the TOWN DISTRICT's approval, whether or not the same shall be defective, the Contractor shall be liable for the expenses of such examination and of satisfactory reconstruction.

If, however, such approval and consent shall have been given, and such work is found to meet the requirements of this Contract, the Contractor shall be recompensed for the expense of such

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examination and reconstruction in the manner herein provided for the payment of costs of extra work pursuant to a Change Order signed by the TOWN DISTRICT and the Contractor.

The selection of laboratories and/or agencies for the inspection and tests of supplies, materials or equipment shall be subject to the approval of the Engineer. Satisfactory documentary evidence that the material has passed the required inspection and test must be furnished the Engineer prior to the incorporation of the material in the work.

Any rejected work shall be removed from the site of the project completely at the expense of the Contractor.

19. PLANS AND SPECIFICATIONS - INTERPRETATIONS

The Contractor shall keep at the site of the work one (1) copy of the Plans and Specifications signed and identified by the Engineer. Anything shown on the Plans and not mentioned in the Specifications or mentioned in the Specifications and not shown on the Plans shall have the same effect as if shown or mentioned respectively in both. In case of any conflict or inconsistency between the Plans and Specifications, the Plans shall govern. Any discrepancy between the figures and drawings shall be submitted to the Engineer, whose decision therein shall be conclusive.

20. SUBSURFACE CONDITIONS FOUND DIFFERENT

Should the Contractor encounter subsurface conditions at the site materially differing from those shown on the Plans or indicated in the Specifications, he shall immediately give notice to the Engineer of such conditions before they are disturbed; the Engineer shall thereupon promptly investigate the conditions and if he finds that they materially differ from those shown on the Plans or indicated in the Specifications, he shall at once make such changes in the Plans and/or Specifications as he may find necessary.

Any increase or decrease of cost resulting from such changes will be adjusted in the manner provided herein for adjustment as to extra and/or additional work and changes shall be by Change Order executed by the TOWN DISTRICT and Contractor.

21. CONTRACTOR'S TITLE TO MATERIALS

No material or supplies for the work shall be purchased by the Contractor or by any subcontractor subject to any chattel mortgage or under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials and supplies used by him in the work.

22. SUPERINTENDENCE BY CONTRACTOR

At the site of the work the Contractor shall employ a Construction Superintendent or Foreman who shall have full authority to act for the Contractor. It is understood that such representative shall be acceptable to the Engineer and shall be one who can be continued in that capacity for the particular job involved unless he ceases to be on the Contractor's payroll.

23. PROTECTION OF WORK, PERSONS AND PROPERTY

Precaution shall be exercised at all times for the proper protection of all persons, property and work. The safety provisions of applicable laws, building and construction codes shall be observed. Machinery equipment and all hazards shall be guarded or eliminated in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable law. The

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Contractor shall furnish entirely at his own expense any and all additional safety measures deemed necessary by the TOWN DISTRICT or its Engineer to adequately safeguard the traveling public. The Contractor shall give notice to the owners of all utilities which may serve the area and request their assistance in predetermining the location and depth of the various pipes, conduits, manholes and other underground facilities.

The Contractor shall, at all hours of the day, safely guard and protect his own work and adjacent property from any damage and shall replace or make good any such damage, loss or injury unless such be caused directly by errors contained in the contract documents, or by the TOWN DISTRICT or its duly authorized representatives.

The Contractor shall provide and maintain such watchers, barriers, lights, flares and other signals, at his own expense, as will effectively prevent any accident in consequence of his work for which the TOWN DISTRICT might be liable. The Contractor shall be liable for all injury or damage caused by his act or neglect, or that of his employees.

24. PATENT RIGHTS

As part of his obligation hereunder and without any additional compensation, the Contractor will pay for any patent fees or royalties required in respect to the work or any part thereof and will fully indemnify the TOWN DISTRICT for any loss on account of any infringement of any patent rights, unless prior to his use in the work of a particular process or a product of a particular manufacturer, he notifies the TOWN DISTRICT in writing that such process or product is an infringement of a patent.

25. REPRESENTATIONS OF CONTRACTOR

The Contractor represents and warrants:

A. That he is financially solvent and that he is experienced in and competent to perform the type of work involved under this Contract and able to furnish the plan, materials, supplies and/or equipment to be furnished for the work; and

B. That he is familiar with all Federal, State and Municipal Laws, ordinances and regulations which may in any way affect the work of those employed hereunder, including but not limited to any special acts relating to the work; and

C. That such work required by these contract documents as is to be done by him can be satisfactorily constructed and used for the purpose for which it is intended and that such construction will not injure any person or damage any property; and

D. That he has carefully examined the Plans, Specifications, and the site of the work, and that from his own investigation he has satisfied himself as to the nature and location of the work, the character, location, quality and quantity of surface and subsurface materials, structures and utilities likely to be encountered, the character of equipment, and other facilities needed for the performance of the work, the general local conditions which may in any way affect the work or its performance.

26. AUTHORITY OF THE ENGINEER

In the performance of the work, the Contractor shall abide by all orders and directions and requirements of the Engineer and shall perform all work to the satisfaction of the Engineer, at such time and places, by such methods, and in such manner and sequence as he may require. The Engineer shall determine the amount, quality, acceptability and fitness of all parts of the work, shall interpret the plans, specifications, contract documents and any extra work orders and shall decide all other questions in connection with the work. Upon request, the Engineer shall confirm in writing any oral orders, directions,

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requirements or determinations. The enumeration herein or else-where in the contract documents of particular instances in which the opinion, judgment, discretion or determination of the Engineer shall control, or in which work shall be performed to his satisfaction or subject to his approval, or inspection, shall not imply that only matters similar to those enumerated shall be so governed and so performed, but without exception all the work shall be governed and so performed. Nothing herein shall be construed to give the Contractor a claim for extra work unless prior thereto an appropriate Change Order has been executed by the TOWN DISTRICT and Contractor for such work.

27. SURVEYS

The Contractor shall provide all layouts, measurements, lines, and grades necessary for the execution of the work, and will furnish the necessary stakes and spikes for laying out such lines and grades and the unskilled labor necessary to place same and/or assist in measuring.

28. CHANGES AND ALTERATIONS

The TOWN DISTRICT reserves the right to make alterations in the location, line, grade, plans, form or dimensions of the work, or any part thereof, either before or after the commencement of the construction. If such alterations diminish the amount of work to be done, no claim for damages or anticipated profits will be warranted on the work which may be dispensed with. If such alterations increase the amount of work, such increases shall be paid for according to the quantity of work actually done and at the unit prices for such work as contained in the schedule of prices.

If such alterations decrease the amount of work, such decreases shall be a credit to the TOWN DISTRICT based on the quantity of work not performed as agreed to by the TOWN DISTRICT and the Contractor and at the unit prices for such work as contained in the Schedule of Prices.

29. CORRECTION OF WORK

All work and all materials, whether incorporated into the work or not, all processes of manufacture and all methods of construction shall be, at all times and places, subject to the inspection of the Engineer who shall be the final judge of quality, materials, processes of manufacture and methods of construction suitable for the purpose for which they are used. Should they fail to meet his approval they shall be forthwith reconstructed, made good and replaced and/or corrected as the case may be, by the Contractor at his own expense. Rejected materials shall immediately be removed from the site.

If, in the opinion of the Engineer, it is not desirable to replace any defective or damaged materials or to reconstruct or correct any portion of the work injured or not performed in accordance with the contract documents, the compensation to be paid to the Contractor hereunder shall be reduced by such amount as, in the judgment of the Engineer, shall be equitable.

The Contractor expressly warrants that his work shall be free from any defects in materials or workmanship, and agrees to correct any defects, settlements, or shrinkages which may appear within one (1) year following the date of the final payment request. Neither the acceptance of the completed work nor payment therefor shall operate to release the Contractor or his sureties from any obligations under or upon this Contract or the Performance Bond.

30. WEATHER CONDITIONS

The Contractor will and will cause his subcontractors to protect carefully his and their work and materials against damage or injury from the weather. If any work or materials shall have been damaged

SECTION 005209 – CONTRACT

or injured by reason of the failure on the part of the Contractor or any of his subcontractors to protect his, or their work, such work and materials shall be removed and replaced at the expense of the Contractor.

31. THE TOWN DISTRICT'S RIGHT TO WITHHOLD PAYMENTS

The TOWN DISTRICT may withhold from the Contractor so much of any approved payments due him as may, in the judgment of the TOWN DISTRICT, be necessary:

- A. To assure the payment of just claims then due and unpaid of any persons supplying labor or materials for the work;
- B. To protect the TOWN DISTRICT from loss due to defective work not remedied; or
- C. To protect the TOWN DISTRICT from loss due to injury to persons or damage to the work or property of other contractors or subcontractors or others, caused by the act or neglect of the Contractor or any of his subcontractors. The TOWN DISTRICT shall have the right, as agent for the Contractor, to apply any such amount so withheld in such manner as the TOWN DISTRICT may deem proper to satisfy such claims or to secure such protection. Such application of such money shall be deemed payments for the account of the Contractor.

32. THE TOWN DISTRICT'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

If:

- A. The Contractor shall file for any form of bankruptcy relief or make an assignment for the benefit of creditors; or
- B. A receiver or liquidator shall be appointed for the Contractor for any of his property and shall not be dismissed within twenty (20) days after such appointment, or the proceedings in connection therewith shall not be stayed on appeal within the said twenty (20) days; or
- C. The Contractor shall violate any provision of this Contract; or
- D. The Contractor shall fail or refuse to regard laws, ordinances, regulations, or the instructions of the Engineer and/or the TOWN DISTRICT;

then, and in any such event, the TOWN DISTRICT without prejudice to any other rights or remedy it may have, and after seven (7) days written notice to the Contractor and Contractor's Surety may terminate the employment of the Contractor and take possession of the premises and all material, tools and appliances therein, and complete the work by contract or otherwise, as the TOWN DISTRICT solely may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished.

If the unpaid balance of the compensation to be paid the Contractor hereunder shall exceed the expense of so completing the work (including compensation for additional managerial, engineering, administration, legal, testing and observation services and any damages for delay), such excess shall be paid to Contractor.

If the expense shall exceed the unpaid balance, the Contractor and his sureties shall be liable to the TOWN DISTRICT for such excess.

33. CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

If the work shall be stopped by order of the Court or any public authority, Federal or State agency, for a period of three (3) months through no act or fault of the Contractor or any of his agents, servants, employees, materialmen, or subcontractors, the Contractor may, upon ten (10) days notice to the TOWN DISTRICT, discontinue his performance of the work and/or terminate the Contract.

Upon termination by the Contractor the TOWN DISTRICT may take possession of the work and complete the work by Contract or otherwise, as the TOWN DISTRICT solely may deem expedient.

If the Contract is terminated by the Contractor, the liability of the TOWN DISTRICT to the Contractor shall be for all work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment, including reasonable profit and damages.

34. RESPONSIBILITY OF WORK

The Contractor agrees to be responsible for the entire work embraced in this Contract until its completion and final acceptance, and that any unfaithful or imperfect work that may become damaged from any cause, either by act or commission or omission to properly guard and protect the work that may be discovered at any time before the completion and acceptance shall be removed and replaced by good and satisfactory work without any charge to the TOWN DISTRICT and that such removal and replacement will be performed immediately on the requirement of the Engineer, notwithstanding the fact that it may have been overlooked by the proper inspector, and partial payment made thereon. It is fully understood by the Contractor that the inspection of the work shall not relieve him of any obligation to do sound and reliable work as herein prescribed, and that any omission to disapprove of any work by the Engineer at or before the time of a partial payment or other estimate shall not be construed to be an acceptance of any defective work.

35. USES OF PREMISES AND REMOVAL OF DEBRIS

The Contractor expressly undertakes at his own expense:

- A. To take every precaution against injury to persons or damages to property;
- B. To store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work or the work of any of his subcontractors, or other contractors;
- C. To place upon any of the completed work only such superimposed loads as are consistent with the safety of that portion of the work;
- D. To frequently clean up all refuse, rubbish, scrap materials and debris caused by the operations to the end that at all times the site of the work shall present a neat and orderly and workmanlike appearance;
- E. Before the Engineer's approval of the Final Payment Request, to remove all surplus material, temporary structures, plants of any description and debris of any and every nature resulting from his operations and to put the site in a neat and orderly condition.

36. POWER OF THE CONTRACTOR TO ACT IN AN EMERGENCY

In case of an emergency which threatens loss or injury to property and/or safety to life, the Contractor will be permitted to act as he sees fit without previous instructions from the TOWN DISTRICT. He shall notify the TOWN DISTRICT thereof immediately thereafter and any compensation claimed by

SECTION 005209 – CONTRACT

the Contractor due to extra work made necessary because of his acts in such emergency shall be submitted to the TOWN DISTRICT for approval and Change Order executed by the TOWN DISTRICT and the Contractor.

Where the Contractor has not taken action but has notified the Engineer of an emergency indicating injury to persons or damage to adjoining property or to the work being accomplished under this Contract, then upon authorization from the Engineer to prevent such threatened injury or damage, he shall act as instructed by the Engineer. The amount of reimbursement claimed by the Contractor on account of any such action shall be determined in the manner provided herein for the payment of extra work and shall be incorporated into a Change Order executed by the TOWN DISTRICT and Contractor.

37. SUITS AT LAW

The Contractor shall indemnify and save harmless the TOWN DISTRICT from and against all suits, claims, demands or actions for any injury sustained or alleged to be sustained by any party or parties in connection with the construction of the work or any part thereof, or any commission or omission of the Contractor, his employees or agents or any subcontractors and in case any such action shall be brought against the TOWN DISTRICT, the Contractor shall immediately take care of and defend the same at his own cost and expense.

38. PROVISIONS REQUIRED BY 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, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

39. SUBLETTING, SUCCESSOR AND ASSIGNS

The Contractor shall not sublet any part of the work under this Contract, nor assign any money due him hereunder without first obtaining the written consent of the TOWN DISTRICT. This Contract shall inure to the benefit of and shall be binding upon the parties hereunder and upon their respective successors and assigns, but neither party shall assign or transfer his interest herein in whole or in part without consent of the other.

SECTION 005209 – CONTRACT

ACKNOWLEDGMENT OF CONTRACTOR, IF A CORPORATION

STATE OF NEW YORK)
) ss:
COUNTY OF)

On this ___ day of _____, 20__, before me personally came and appeared _____, to me known, who by me being duly sworn, did depose and say that he resides at _____ that he is the _____ of _____, the Corporation described in and which executed the foregoing instrument, that he knows the seal of said corporation, that one of the seals affixed to said instrument is such seal, that it was so affixed by order of the Directors of said Corporation, and that he signed his name thereto by like order.

NOTARY PUBLIC

SECTION 005209 – CONTRACT

ACKNOWLEDGMENT OF CONTRACTOR, IF A PARTNERSHIP

STATE OF NEW YORK)
) ss:
COUNTY OF)

On this ___ day of _____, 20__, before me personally came and appeared _____,
to me known, and known to me to be one of the members of the firm of _____,
described in and who executed the foregoing instrument, and he acknowledged to me that he executed
the same as and for the act and deed of said form.

NOTARY PUBLIC

END OF SECTION 005209

SECTION 007200 – GENERAL CONDITIONS**1. GENERAL CONDITIONS**

The "General Conditions" are hereby made a part of these specifications and are attached herein.

Where any article of the General Conditions is supplemented hereby, the provisions of such article shall remain in effect. All the supplemental provisions shall be considered as added thereto. Where any such article is amended, voided or superseded thereby, the provisions of such article not so specifically amended, voided or superseded shall remain in effect.

Work, materials, plant, labor and other requirements of the General Conditions shall be furnished by the contractor. No direct payment shall be made for these General Conditions, and payment shall be deemed to be included in the Contract price or various items of the entire Contract.

2. CONTRACT DOCUMENTS

The Contract Documents include, but are not limited to, the General Conditions, General Specifications, Detailed Specifications, Plans, Proposal Form, Contract and other sections as either cited on the Index page(s) or actually included in the bound documents.

Each section of the Contract Documents is intended to be complementary to the other sections. It is intended that they include all items of labor and materials and everything required and necessary to complete the work, even though some items of work or materials may not be particularly mentioned in every section or may have been inadvertently omitted from the Drawings or Specifications or both.

3. APPROVAL OF SUBCONTRACTORS AND MATERIALS

Prior to commencing any work under this Contract, the contractor shall submit to the Engineer for approval a list of all the subcontractors and material suppliers it proposes to use for this Contract. No subcontractor or material supplier will be permitted to deliver materials or perform any work on this Contract until it has been approved by the Engineer.

4. INTERPRETATION OF DRAWINGS, ETC.

In the event of discrepancies between the Drawings and the Specifications, the following order shall be given preference when making interpretations:

- a. Addenda (later dates to take precedence over earlier dates).
- b. Drawings (schedules or notes to take precedence over other data shown on Drawings).
- c. Technical Specifications
- d. General Conditions

On all Plans, Drawings, etc., the figure dimensions shall govern in the case of discrepancy between the scales and figures.

The contractor shall take no advantage of any error or omission in the Plans, or of any discrepancy between the Plans and Specifications, and the Engineer shall make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the Specifications and of the Plans as construed by him, and his decision shall be final.

All work that may be called for in the Specifications and not shown on the Plans, or shown on the Plans and not called for in the Specifications, shall be furnished and executed by the contractor as if designated in both. Should any work or material be required which is not denoted in the Plans and Specifications, either directly or indirectly, but which is, nevertheless, necessary for the proper carrying out of the intent

thereof, it is understood and agreed that the same is implied and required, and that the contractor shall perform such work and furnish such materials as if they were completely delineated and described.

5. ADDITIONAL WORK

Additional work, if required to be performed under this Contract, will be in accordance with the applicable paragraphs of the Contract. The Engineer shall be the sole judge as to whether such work was intended as part of the Contract or is in addition thereto.

6. SAFETY PROVISIONS

The contractor shall take every precaution and shall provide such equipment and facilities as are necessary or required for the safety of its employees. In case of an accident, first aid shall be administered to any who may be injured in the progress of the work. In addition, the contractor shall also be prepared for the removal to the hospital for treatment of any employee either seriously injured or ill.

7. SANITARY REGULATIONS

In addition to compliance with the Occupational Safety and Health Act, the contractor shall erect and maintain necessary sanitary conveniences for the use of employees on the work. Such conveniences shall be properly secluded from observation, and their use shall be strictly enforced. Such sanitary conveniences shall be constructed in compliance with all laws, ordinances or regulations governing these facilities. The contents of same shall be removed with sufficient frequency to prevent nuisance, and disposed of to the satisfaction of the Engineer.

The contractor shall obey and enforce such other sanitary regulations and orders and shall take such precautions against infectious diseases as may be deemed necessary. In case any infectious diseases occur among its employees, it shall arrange for the immediate removal of the patient from the work and his isolation from all persons connected with the work.

8. RESPONSIBILITY OF ENGINEER AND CONTRACTOR DURING CONSTRUCTION

By means of the on-site observations of the work in progress, the Engineer will endeavor to provide protection for the Owner against defects and deficiencies in the contractor's work, but the furnishing of such services shall not include construction review of the contractor's construction means, methods, techniques, sequences or procedures, or of any safety precautions and programs in connection with the work.

The contractor is responsible for complete conformance to the Plans and Specifications, proper construction procedures, coordination with subcontractors, other contractors and utilities, and safe working conditions for its employees.

9. LABOR

All contractors and subcontractors employed upon the work shall and will be required to conform to the Labor Laws of the State of New York and the various acts amendatory and supplementary thereto; and to all other laws, ordinances and legal requirements applicable thereto. All contractors and subcontractors shall submit original copies of certified payroll records for each period worked at the site. In addition all contractors and subcontractors shall provide a completed Affidavit of Labor Form 220 and Riverhead Town Wage Disclaimer Form for each payroll week prior to issuance of any partial or final payment.

All labor shall be performed in the best and most workmanlike manner by mechanics skilled in their respective trades. The standards of the work required throughout shall be of such grade as will bring results of the first class only.

10. CLAIMS OR PROTESTS

If the contractor considers any work required of him to be outside the requirements of the Contract, or considers any record or ruling of the Engineers or Inspectors as unfair, he shall ask for written instructions or decisions immediately, and then file a written protest with the Owner against the same within five days thereafter, or be considered as having accepted the record or ruling.

11. NOTIFICATION, INTERFERENCE AND INJURY TO UTILITIES

The contractor shall cooperate in every way with the utility companies. All excavation shall be done in compliance with Article 36 of the General Business Law and notices given as provided by GBL, Section 761.

All conduits, water mains and gas mains encountered in the construction shall be properly and safely taken care of by the contractor, who shall, upon encountering same, notify the public corporation to whom they belong, in order that they may be changed in such a manner as not to interfere with the final construction.

In case any damage shall result to any service pipe for water or gas, or any private or public sewer or conduit by reason of negligence on the part of the contractor, he shall, without delay and at his own expense, repair same to the satisfaction of the Engineer, and in case such repairs are not made promptly or satisfactorily, the Owner may have the repairs made by another contractor or otherwise, and deduct the cost of same from any monies due or to become due the contractor.

12. INFRINGEMENT OF PATENTS

The contractor further agrees to hold himself responsible for any claims made against the Owner for any infringement of patents by the use of patented articles in any one phase of construction of the work and the completion of same, or any process connected with the work agreed to be performed under this Contract, or of any materials used upon said work and to save harmless and indemnify the Owner from all costs, expenses and damages which the Owner shall be obliged to pay by reason of any infringement or patents used in the construction and completion of the work.

13. DAMAGES

All damage, direct or indirect, of whatever nature resulting from either the performance of, or resulting to the work under, this Contract during its progress from whatever cause, shall be borne and sustained by the contractor, and all work shall be solely at his risk until the date of the final payment request.

14. GUARANTEE/WARRANTY

This contractor shall guarantee and warrant his work and that of his subcontractors against defects in workmanship and/or materials for a period of one (1) year from the date of final payment request by the Engineer, except as otherwise specified. Upon written notification from the Engineer, the contractor shall repair, replace or reconstruct such defects to the satisfaction of the Engineer at no cost to the Owner.

15. STANDARDIZATION

The general items specified with the Technical Specifications indicate specific manufacturers and/or catalog numbers etc., for the purpose of standardization within the District in order to minimize the stockpiling of replacement parts.

END OF SECTION 007305

SECTION 007343 - WAGE RATES

H2M

SECTION 007343 - WAGE RATES

END OF SECTION 007343

SECTION 011100 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 BRIEF PURPOSE OF PROJECT / GENERAL

- A. The purpose of the project is to install two (2) new Variable Frequency Drives (VFDs) to power the (2) existing 900 GPM Booster Pumps at Plant No. 10.
- B. All work shown and specified in the Contract Documents shall be the work of this Construction Contract. The Owner does not anticipate awarding other prime contracts for the project as shown.
- C. This Section provides an abbreviated summary of the work for the Construction Contract associated with the Owner's program to construct the project.

1.02 NOMENCLATURE

- A. Where the terms "Engineer/Architect", "Architect/Engineer", "Engineer", or "Architect" are used throughout these Contract Documents, they shall mean the firm of H2M architects + engineers as may be abbreviated by H2M or H2M Group.
- B. The terms "Contractor" and/or "Prime Contractor" where used shall refer to the individual or company who has entered into an agreement with the Owner to perform the work contained within these Contract Documents. The lack of word capitalization shall be incidental.

1.03 ABBREVIATED SUMMARY OF WORK

- A. Furnish all labor, equipment, materials, tools, means, methods, and incidentals necessary to complete the Work as required by the Contract Documents for this Construction Contract. Each Contractor shall coordinate, through the Owner/Engineer, the work of their contract with the work by others.
- B. This following abbreviated summary is provided in order to briefly describe the work covered by the Contract Documents for this Construction Contract. It is not all inclusive of the work under the Contract.
- C. The work includes, but is not limited to, the following:
 - 1. Demolition of two existing motor starter and components.
 - 2. Replace two existing Reduced Voltage Soft Starters (RVSS) with two new Variable Frequency Drives and associated controls to be installed within exiting starter cabinet.
 - 3. Interfacing with existing booster pump controls.
 - 4. Testing, programming and adjusting of all electrical systems.
 - 5. Startup participation for the various equipment and systems of the project. Provide complete service to troubleshoot and assist manufacturer service representatives in obtaining a completely functional installation. Provide systems and equipment training for Owner personnel.
 - 6. Project closeout submittals.
- D. All other work shown and specified in the Contract Documents.

1.04 PARTIAL LISTING OF OVERALL CONTRACT REQUIREMENTS

- A. The Contract Documents detail the work included in the Contract. Related requirements and conditions covered by the Contract Documents include, but is not limited to, the following:
 - 1. Debris removal and daily and final cleaning up.

2. Maintain the Owner's ability to operate the facility at all times during the construction period.
3. Facilities to be used during the contract period that are to be used by the Owner or his representatives and others involved with constructing the project.
4. Product and equipment storage and handling requirements.
5. Starting and adjusting of the equipment and systems required under the project.
6. Site safety in accordance with all applicable federal, state, and local regulations.
7. Project submittals, meetings, testing services, schedules, shop drawings, closeout procedures and documents, manuals, as-built drawings, and final commissioning of the work shall be provided as required by the Contract.

1.05 OWNER SUPPLIED PRODUCTS AND UTILITIES

- A. The Owner will not be supplying equipment, labor, or tools for the project.
- B. The Owner will pay for electricity usage. The restrictions on electrical usage shall be as follows:
 1. Power tool usage during specified working hours will only be permitted.
 2. Power to the Contractor's trailer will be permitted.
- C. The Owner reserves the right to stop paying for electrical usage at any time if, in the opinion of the Owner/Engineer, the Contractor causes excessive electrical charges or does not conserve electricity to the maximum extent possible in the opinion of the Engineer. All Contractors shall conserve electricity during the course of construction.

1.06 EXISTING CONDITIONS

- A. The Drawings show certain information that has been obtained by the Owner regarding various structures and utilities that exist at the location of the project both below and at grade.
- B. The Owner and the Engineer expressly disclaims all responsibility for the accuracy or completeness of the information given on the Drawings with regard to existing facilities.
- C. In the case where the Contractor discovers an obstruction not indicated on the Drawings or not described via specification reference, then the Contractor shall immediately notify the Engineer of the obstructions' existence.
- D. The Engineer will determine if the obstruction is to be relocated or removed.
- E. Compensation for this extra work will be paid for in accordance with the provisions in the Contract for "Extra Work".

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 011100

SECTION 011400 - WORK RESTRICTIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Site access and control of areas outside of site.
- B. Contractor use of the premises.
- C. Contractor storage, parking and deliveries.
- D. Work hours, employee conduct and miscellaneous employee requirements.
- E. Contract requirements related to maintaining Owner's current operations and excess inspection required.

1.02 SITE ACCESS AND CONTROL

- A. The Contractor shall use the designated entrance to the site as shown on the drawings. If no site entrance is designated, the Contractor shall use an entrance designated by the Owner's Construction Representative.
- B. The Contractor is to maintain the entrance area clear of materials, vehicles and any other obstacle or debris. Failure to do so will result in a minimum back charge of \$750 per occurrence.
- C. The area around the site is a residential neighborhood. The Owner intends to be a good neighbor. The Contractor shall not close any road for any period in time. The Contractor shall take whatever measures are necessary to not cause any inconvenience to the area's residents.
- D. The Contractor is responsible to employ methods to prevent construction materials and/or debris from leaving the site. The Contractor is responsible to routinely monitor the areas surrounding the site during the day as well as at the end of the work-day and to immediately clean up any area to its previous condition.
- E. The Contractor shall employ methods to prevent the transmission of dirt from vehicles driving on exposed areas of the site from reaching the surrounding roadways. The Contractor will be responsible to immediately clean the roadway, should the measures being taken by the Contractor not satisfactorily control the transmission of any dirt to the roadway.
- F. Any damages to areas outside the site, spills of soil, liquid, or any other material shall immediately be repaired, cleaned and restored to its previous condition.
- G. The Contractors shall comply with all state and local requirements for allowable weight limits of vehicles on all roads.
- H. The Owner reserves the right to back charge the Contractor for all costs associated with maintaining the grounds as well as maintaining areas outside the site, which may be disturbed by the Contractor should the Contractor fail to maintain or repair the aforementioned in a condition acceptable to the Owner.
- I. Keep all existing driveways, roads, and parking areas free and clear of materials and equipment. Do not unreasonably encumber the work area with materials and equipment.

- J. Immediately remove excess excavated material or relocate to areas on the site requiring placement of fill. Do not stockpile excess material.
- K. The Contractor is responsible for cleaning up the work area. Failure to maintain a clean work site daily, will result in others performing the work and the Contractor being back charged for the cleaning cost plus construction administration fees.

1.03 CONTRACTOR USE OF THE PREMISES

- A. Premises, for the purpose of this Contract, shall mean the site, buildings and other structures located within the property line or in any temporary or permanent construction easements identified on the plans.
- B. The Contractor shall use and manage the premises and the associated construction activities as follows:
 - 1. To not hinder the Owner's ability to operate their facilities.
 - 2. To allow other Prime Contractors to install their work and complete their contractual obligations in the time period specified.
 - 3. To allow for stockpiling of construction material and debris without any significant hardship, as defined by the Owner's Construction Representative, on the Owner or other contractors.
 - 4. To allow for the stockpiling of excavated soil and imported fill, when called for, without any significant hardship, as defined by the Owner's Construction Representative, on the Owner or other contractors.
 - 5. To allow utility companies to install their work.
 - 6. To allow for the delivery of equipment and materials by independent trucking companies by leaving enough space for backing in and out of areas.
 - 7. To allow for the safe, unimpeded travel way of the Owners vehicles, Owner's Construction Representative's vehicles, Engineer's vehicles, construction vehicles and heavy construction equipment about the entire site.
- C. Contractor shall maintain the premises in a safe condition throughout the construction period. Compliance with OSHA regulations and site safety shall be the responsibility of the Contractor as it relates to work of the Contract. The posting of all applicable OSHA safety signs shall be the responsibility of the Contractor.
- D. The Contractor shall provide temporary handrails, as required, for their work or for work put in place by their Contract that will require temporary handrails. Construction of temporary handrails shall be in accordance with OSHA Standards.
- E. The Contractor shall be responsible for protecting Owner's property. All existing buildings, structures, shrubs, trees, lawn fixtures, sculptures and misc. equipment shall be protected at all times. Any removals or relocation of said objects, if allowed shall be as directed by Owner's Construction Representative.
- F. The Contractor shall protect all of the physical structures, property and improvements upon the site from damage by their Work and shall immediately repair or replace damage caused by construction operations, employees or equipment employed by the Contractor. All labor, materials and equipment and outside contractors that are employed by the Owner to repair damage caused by the Contractor shall be billed to the Contractor directly or withheld from money due the Contractor for work already completed.
- G. Confine operations to permit others working on the site easy access to all areas of Work.

- H. Keep all existing operations areas, driveways, roads, and parking areas free and clear of materials and equipment. Do not unreasonably encumber the site with materials and equipment. Confine stockpiling of excess excavated material, materials and equipment to areas designated by the Owner's construction representative. Locate storage sheds and trailers to areas designated in the plan or by the Owner's Construction Representative.
- I. Immediately remove excess excavated material or relocate to areas on the site requiring placement of fill. Do not stockpile excess material on the site.
- J. The Contractor is responsible for cleaning up their own materials and debris. Failure to maintain a clean work site daily, will result in other performing the work and The Contractor being back charged for the cleaning cost plus construction administration fees.

1.04 CONTRACTOR STORAGE, PARKING AND DELIVERIES

- A. Contractor must provide exterior storage containers when required. Final location of storage container shall be determined by the Owner.
- B. Do not unreasonably encumber the premises with materials and equipment. Do not store material in existing buildings. Store all equipment and materials to allow the Owner's employees to operate and conduct their business safely.
- C. Confine premise storage areas to locations designated by the Owner. Immediately repair or replace damaged facilities to the satisfaction of the Owner and to a condition that existed before the damage occurred as determined by preconstruction photographs, or if photographs are unavailable, to that deemed by the Owner.
- D. No storage materials will be permitted within the buildings at any time during construction.
- E. Storage of chemicals and painting shall be outside the existing or new structures and shall follow manufacturer's guidelines.
- F. Compressed gas containers shall be properly stored and secured per OSHA, to the satisfaction of the Owner. Failure to do so will result in a **[\$250]** back charge, per occurrence.
- G. Contractor shall provide minimum of 48 hours advance written notice to the Owner's Construction Representative for deliveries of materials, site visits by inspectors, manufacturer's representatives or any other occasion that impacts the use of the site. Contractor shall be responsible for any costs that are incurred by the owner, for failure to meet previously agreed upon appointments or work schedules.
- H. Deliveries sent to the Owner will not be signed for or unloaded by the Owner. They will be directed to the construction site and if no employee is on site, the delivery will be rejected, at the contractor's expense.
- I. Night deliveries of equipment (past the designated quitting time) will not be permitted. Do not schedule trucking companies to deliver equipment or wait for the job site to open. Delivery trucks shall not obstruct the site entrance, shall not sit within the neighborhood causing an obstruction or perceived nuisance, nor be left idling on or off the site for any period of time.
- J. Parking shall be in the designated areas of the site only. All automotive type vehicles are to be locked when parked or unattended to prevent unauthorized use. Do not leave vehicles or equipment unattended with the motor running or the ignition key in place. Any vehicles or trucks in non-designated areas may be towed at contractor's expense.

1.05 WORK HOURS, EMPLOYEE CONDUCT AND MISCELLANEOUS EMPLOYEE REQUIREMENTS

- A. The Contractor will be permitted to schedule working days and hours as specified in the General Terms and Conditions, if no times are specified therein then the work hours shall be Monday - Friday 8:00 am - 4:00 pm.
- B. Employees are to act in a professional manner. Any employee using inappropriate language or who is disruptive to the work environment will be banned from the site.
- C. Proper work attire is required. Shirts are to be worn at all times and no short pants are permitted.
- D. Employees shall not converse with local residents or Owner's employees.
- E. Any employee found under the influence of any drug or alcohol will be banned from the site.

1.06 CONTRACT REQUIREMENTS RELATED TO MAINTAINING OWNER'S CURRENT OPERATIONS AND EXCESS INSPECTION REQUIRED

- A. The Contractor shall schedule working days and hours as specified. The Contractor shall pay all excess costs for inspection services provided by the Owner/Engineer for working beyond the times specified.
- B. The hourly rate paid for inspection services beyond normal working hours shall be at a maximum billing rate of **[\$180]** per hour, which shall be used to compute the overtime hourly charge.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 011400

SECTION 012500 - PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes the requirements for substitution of specified products during construction.
- B. *The Engineer will consider requests for substitutions only within **seven (7)** days from the date of the Notice to Proceed.*
- C. Only products not specifically named in the bid are eligible for substitution in accordance with the requirements contained herein these specifications.
- D. Products named by the Bidder, at the time of bid, shall be furnished and installed and substitutions will not be considered by the Owner/Engineer for those products named in the bid.

1.02 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standard, select any product meeting that standard.
- B. For products specified by naming several products or manufacturers, select any one of the products or manufacturers named which complies with the Specifications.
- C. Where products are not named, then submit products that meet the specifications.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

- A. Name - The Drawings and Specifications list acceptable manufacturers, commercial names, trademarks, brands and other product, material and equipment designations. Such names are provided to establish the required type, quality and other salient requirements of procurement.
- B. Equals - An item equal to that named or described on the Drawings or in the Specifications may be provided by Contractor if accepted by the Engineer.
- C. A request for product substitution constitutes a representation that the Contractor:
 - 1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
 - 2. Shall provide the same warranty for the Substitution as for the specified Product.
 - 3. Shall coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner, including extra charges by material suppliers and vendors.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Shall reimburse the Owner and the Engineer for review or redesign services associated with re-approval by authorities.
 - 6. Shall reimburse the Owner for all additional engineering services claimed by the Engineer for extra services associated with the review of the Contractor's substituted item since it could not have been originally included in the Engineer's professional engineering services agreement. Reimbursement shall be based on the man-hours expended, at current billing rates.

- D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- E. Substitution Submittal Procedure:
1. The Contractor shall submit the REQUEST FOR SUBSTITUTION FORM for consideration including all required information.
 2. The Contractor shall use the form included within this Section.
 3. All forms shall be type written.
 4. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.
- F. The burden to prove product equivalence rests on the Contractor.
- G. The Engineer will notify Contractor in writing of decision to accept or reject request and at that time the Contractor can make a formal submittal in accordance with the requirements contained in Section 013300.
- H. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

PART 3 - EXECUTION

NOT USED

This space left intentionally blank.

REQUEST FOR SUBSTITUTION FORM

Project: Installation of New Variable Frequency Drives at Plant No. 10 Substitution Request Number: _____

Contractor: _____

Address: _____

To: _____ Date: _____

H2M Project Number: RDWD 16-02 Owner: Riverhead Water District

Contract Name: _____ Contract No.: _____

Specification
Title: _____

Section: _____ Page: _____ Article/Paragraph: _____

Drawing
No(s): _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____

Trade Name: _____ Phone #: (____) _____

Installer: _____ Address: _____

Phone #: (____) _____

History: ___New product ___2-5 years old ___5-10 years old ___More than 10 years old

Differences between proposed substitution and specified product:

___Point-by-point comparative data attached

Reason for not providing specified item (Attach separate sheet if necessary):

Typical Similar Installation:

Project: _____

Engineer / Architect: _____

Address: _____

Owner: _____

Date Installed: _____

Submit complete installation list on separate sheets.

Proposed substitution affects other parts of Work: No Yes

Explain: _____

Gross Savings to Owner for accepting substitution: \$ _____

Proposed substitution changes Contract Time: No Yes

Add / deduct (circle): _____ days

Supporting data attached for evaluation of the proposed substitution:

Product Data Photos Drawings Tests Reports Samples

Other (explain): _____

Attached data includes description, specifications, drawings, photographs, performance and test data adequate for evaluation of request; applicable portions of data are clearly identified.

Attached data also includes a description of changes to Contract Documents that proposed substitution will require for its proper installation.

The undersigned certifies that the following paragraphs, unless modified by attachments, are correct:

1. Proposed Substitution has been fully checked and coordinated with Contract Documents.
2. Proposed Substitution does not affect dimensions shown on Drawings.
3. Proposed Substitution does not require revisions to any other Prime Contractor's work.
4. The undersigned will pay for changes to building design, including Architectural and Engineering design, detailing, and construction costs caused by requested Substitution.
5. Proposed Substitution will have no adverse affect on other trades, construction schedule, or specified warranty requirements.
6. Maintenance and service parts will be locally available for proposed substitution.
7. The undersigned further states that the function, appearance, and quality of proposed Substitution are equivalent or superior to specified item.

This request for product substitution also constitutes a representation that I, as the Contractor:

1. Has investigated proposed Product and determined that it meets or exceeds the quality of the specified Product.
2. Shall provide the same warranty for the Substitution as for the specified Product.
3. Shall coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner, including extra charges by other Prime Contractors, material suppliers, and vendors.
4. Waives claims for additional costs or time extension that may subsequently become apparent.
5. Shall reimburse the Owner and the Engineer for review or redesign services associated with re-approval by authorities.
6. Shall reimburse the Owner for all additional engineering services claimed by the Engineer for extra services associated with the review of the Contractor's substituted item since it could not have been originally included in the Engineer's professional engineering services agreement. Reimbursement shall be based on the man-hours expended, at current billing rates.

Contractor's Authorized Representative (Typewritten): _____

Authorized Signature: _____

Date: _____

END OF SECTION 012500

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work under this Section specifies the procedures used to process partial payments and the Final Payment Request.

1.02 TIME FOR COMPLETION

- A. Inasmuch as the provisions of the Contract relating to the time for performance and completion of the Work are for the purposes of enabling the Owner to proceed with the construction of a public improvement in accordance with a predetermined program, and inasmuch as failure to complete the Work within the period herein specified may result in damage or loss to the Owner, time is of the essence of the Contract.
- B. Time for completion of the Work shall be in accordance with that stipulated in the Contract Documents.
- C. The date for completion will be calculated from the date shown on the Notice to Proceed. The Contractor shall execute the Work with diligence from day to day, and complete it within the time fixed.
- D. For the purpose of defining the date of substantial completion, the Project will be considered complete when all Work covered by the Contract has been performed and all installations and equipment have been tested and are ready for permanent use. Removal of the Contractor's equipment and other minor adjustments which do not prevent use of the Project will not be a factor in establishing the date of substantial completion.
- E. Notwithstanding the foregoing, the Engineer will establish the date of substantial completion when the project is accepted and ready for operation, and no large or major items of work are as yet outstanding. At such time, the Engineer will issue a punch list, itemizing the items of work remaining. The punch list will include "minor" items only, as defined solely by the Engineer. Any prior punch lists, which include "major" or significant items, as defined by the Engineer, shall not be a criterion in establishing the date of substantial completion.

1.03 PARTIAL COMPENSATION

- A. At the Owner's discretion, the Contractor may receive compensation for materials and products delivered to the site yet not installed providing:
 - 1. A canceled check or paid bill from the supplier is submitted to the Engineer indicating that the Contractor has paid the supplier for the material or equipment.
 - 2. The material or piece of equipment is properly stored and protected from the elements and/or vandalism in accordance with the manufacturer's written requirements for long term storage.
 - 3. A certificate of insurance is provided for the material or piece of equipment in the event of a fire, vandalism, theft, etc.
 - 4. A bill of material is delivered to the Engineer at the time of delivery itemizing the subject material or equipment. Payment will be made for on-site material and/or equipment in the amount of 80% of the gross amount of the paid invoice. This payment will be subject to the normal retainage of the partial estimate.
 - 5. The Engineer has agreed to the pre-purchasing of the materials.
- B. The Contractor may not receive compensation for materials and products stored in the Contractor's yard or shop unless permitted by the Owner.

1.04 APPLICATIONS FOR PAYMENT

- A. The Contractor shall review the percentage of work completed during the payment period with the Engineer, based on the bid items in the proposal. The Engineer shall make the final decision on the percentage of work completed.
- B. The form of application for payment shall be AIA Document G702, application and certificate for payment supported by AIA Document G703, Continuation Sheet.
- C. Submit one (1) copy of each payment application, completed, signed and notarized.
- D. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- E. The payment application shall include a Contractor Invoice and an Owner Claim Voucher.
- F. Provide completed Labor Affidavit Form for each pay period included in the certified payroll reports for each payment application for both the contractor and any subcontractor(s).
- G. Submit payment application to Engineer no later than the first day of each month. Payments received after the first day of each month shall be reviewed and processed after the first day of the following month. Only one application for payment will be reviewed and processed each month.
- H. Submit certified payroll receipts for all workers and subcontractors. Payroll receipts shall be submitted with every application for payment. All payroll receipts shall be certified correct and notarized by a Notary in the State of New York. Application for Payment will not be processed unless all payroll receipts are received.
- I. Contractor shall pay all workers and have all subcontractors pay all workers the prevailing New York State Wage Rates.
- J. Owner may conduct on-site interviews with all workers to verify payments of prevailing wage rates are enforced.
- K. The Engineer shall submit the documentation along with an Engineer's Payment Report to the Owner for payment.
- L. Retainage in the amount of 5% will be held from each partial payment. Retainage will only be released upon full completion of the project and will be included in the final payment.

1.05 ACCEPTANCE OF FINAL PAYMENT REQUEST

- A. The Contractor shall be conclusively deemed to have accepted the Final Payment Request as a correct statement of the total liability of the Owner and of the compensation paid and to be paid to the Contractor by the Owner unless within seven (7) days after delivery of his copy of the Final Payment Request to him, the Contractor shall return such copy to the Owner together with a statement of his objections to such request and of any claim for damages or compensation in excess of the amounts shown on the Request. The acceptance by the Contractor of the Final Payment Request approved by the Owner shall constitute a release and shall discharge the Owner from all further claims by the Contractor arising out of or relating to the Contract, including but not limited to, a release from all impact costs.

1.06 SCOPE OF PAYMENTS

- A. The Contractor shall receive and accept the compensation as herein provided, in full payment for furnishing all materials, labor, tools, and equipment and for performing all work contemplated and embraced under the Contract, also for all loss or damage arising out of the nature of the Work or from the action of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered during the prosecution of the Work, and for all risks of every description connected with the prosecution of the Work, until its final acceptance by the Owner, also for all expenses incurred by, or in consequence of, the suspension or discontinuance of the said prosecution of the Work as herein specified, and for all actual or alleged infringements of patent, trademark, or copyright, and for completing the Work and the whole hereof, in an acceptable manner, according to the Plans, Specifications, and other Contract Documents. The payment of any partial or final estimate shall in no way or in no degree prejudice or affect the obligation of the Contractor, at his own cost and expense, to renew or replace all defects and imperfections, or damages. The Engineer shall be the judge, and the said Contractor shall be liable to the Owner for failure so to do.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Work of this Section includes:
 - 1. Requests for Interpretation or for information
 - 2. Administration of subcontracts
 - 3. Communication and coordination requirements
 - 4. Qualifications of Contractor's job site superintendent

1.02 REQUEST FOR INTERPRETATION OR INFORMATION

- A. The Contractor shall use the Request for Interpretation/Information Form included within this Section when the Contractor feels that additional information is needed to perform the work of the Contract.
- B. The Engineer may not respond to any requests unless the form is used.
- C. The Engineer's verbal response(s) to the Contractor's formal requests, if provided, shall not constitute an official response and if acted upon by the Contractor are done so at the Contractor's own risk and liability and shall not be subject to claims for additional compensation.
- D. A signed facsimile or emailed image of the form will be accepted.
- E. The Engineer will respond in writing to the request as soon as possible.

1.03 SUBCONTRACTOR ADMINISTRATION AND COORDINATION

- A. Terms and conditions of the Contract shall be binding upon each subcontractor.
- B. Furnish each subcontractor and major equipment vendor at least one (1) copy of the Plans and Technical Specifications.
- C. Provide at least one (1) copy of each approved shop drawing to each subcontractor whose work may depend upon the contents of the shop drawing submittal. The Owner reserves the right to stop all work, without claims for delay, until such time as appropriate subcontractors are furnished with appropriate shop drawings.
- D. The Contractor shall sequence and schedule the work of subcontractors. Coordinate construction and administration activities of subcontractors. The Engineer and Owner will not accept telephone calls, facsimiles or office visits from any subcontractors on the project. Subcontractor and vendor questions and clarifications shall be directed to the Engineer by the Contractor.
- E. The Contractor's on-site project superintendent shall inspect all the work of all of his/her subcontractors, as it is being constructed. The Contractor's subcontractor shall not be permitted to do any work on the site without the Contractor's job site superintendent also being there to inspect the work as it is being performed.

1.04 UTILITY COORDINATION

- A. Comply with the requirements of 16 NYCRR Part 753 - Protection of Underground Facilities. Submit a letter stating the case number.

- B. Comply with the utility coordination requirements contained in the General Conditions.

1.05 PUBLIC/PRIVATE UTILITIES

- A. Notify all public and private utilities in accordance with Article 20, Section 322-a of the New York State General Business Law for location and markout of existing utilities in the vicinity of the work.
- B. Repair all utilities damaged during the Work to the standards and approval of the respective utility at no cost to the Owner.

1.06 SPECIFIC COORDINATION REQUIREMENTS

- A. Sequence and schedule work so as not to interfere with the work by others. Coordinate the work of this Contract with the work by others. In case of conflicts due to improper coordination by the Contractor, the Owner/Engineer's resolution will be final. No compensation will be awarded for extra work required to resolve conflicts.
- B. Coordinate space requirements, supports, and installation of mechanical, electrical and plumbing work which may be indicated diagrammatically on the Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practicable. Place runs parallel with building lines. Utilize spaces efficiently to maximize accessibility for other installations, maintenance, and to facilitate repairs.
- C. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of all fixtures and outlets with finish elements and work by all other trades.

1.07 CONTRACTOR'S JOB SITE SUPERINTENDENT

- A. Each Contractor shall name the job site superintendent within five (5) days of the Notice To Proceed. A letter to the Engineer shall be provided.
- B. He/She shall have the authority to sequence and schedule the work, and to staff the project, so as not to interfere with the work by others and to complete the work daily within the time so required.
- C. Each Superintendent shall have a minimum of five (5) years of experience as a job site superintendent for projects of equal size and complexity.
- D. The superintendent may be a foreman or crew supervisor.
- E. Each superintendent shall be qualified to perform the duties so required to successfully complete the work in accordance with the Contract Documents.

THIS SPACE LEFT INTENTIONALLY BLANK.

REQUEST FOR INTERPRETATION/INFORMATION (RFI)

OWNER'S NAME: Riverhead Water District

PROJECT NAME & CONTRACT DESIGNATION: Installation of New Variable Frequency Drives at
Plant No. 10

CONSTRUCTION CONTRACT NO.: RDWD 16-02

Product, Item, or System:	
Request Date:	RFI No.:
Specification Section:	Paragraph Ref:
Contract Drawing Reference(s):	
Describe Request:	
Signed:	See Contractor's Attachments for Additional Description for Information
Owner/Engineer Response:	
Engineer (Printed):	See Engineer's Attachments for Additional Information
Engineer's Signature & Date	<i>Response Accepted By Contractor Contractor's Signature & Date</i>
The Work shall be carried out in accordance with these supplemental instructions without change in Contract amount or Contract time for completion. Prior to proceeding with these instructions, indicate your acceptance of these instructions by signing where indicated and returning this form to the Engineer.	

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 013100

SECTION 013300 - SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies the requirements for making submissions for the project. Electronic submissions will be required unless expressly noted otherwise.

1.02 IDENTIFICATION OF SUBMITTALS

- A. Each and every submission shall be provided by the Contractor and shall be accompanied by a SUBMISSION TRANSMITTAL FORM. The Contractor shall use the specimen form made a part of this Section. *Submittals not containing the form will be returned to the Contractor un-reviewed.* The Engineer will not review project submissions until such time as the form is completed in its entirety. Identify each submittal and resubmittal using the form.
- B. Each individual submittal shall be identified with a 'submission log number' as specified here in this example: 033000.01-1
 1. The Section number for which the submittal applies, followed by a period, shall be indicated, "033000."
 2. The submittal within the Section shall be indicated by the next grouping "01". For instance and in this example, the concrete design mix may be submission "01", the waterstop catalog cut may be "02", and so on. Submittals shall be sequentially numbered within the Specification Section, i.e. 01, 02, etc.
 3. The number of times the submission was made shall be preceded by a dash and a numerical suffix as follows: "-1". In this example, the concrete design mix is being submitted for the first time. Use the number "1" for the first time it is being submitted.
 4. Subsequent submissions of the concrete design mix shall utilize the original number and a sequential numeric suffix, i.e. "2" for a resubmission, "3" for the second resubmission, and so on. Substitute the new number for the original "1".

1.03 TIMING OF SUBMITTALS

- A. Make submittals far enough in advance of scheduled dates of installation to provide time for reviews, for securing necessary approvals, for possible revisions and re-submittals, and for placing orders and securing delivery. The Engineer will review submittals in a manner as expedient as possible, and will generally send a written response to the Contractor within seven (7) calendar days of receipt of submittals.
- B. Submissions may be returned reviewed, unreviewed, rejected, returned conditioned upon submission of related items, or for other reasons set forth in the Contract Documents.
- C. Make submissions well in advance as the returning, rejecting or disapproval of submissions or other similar circumstances are possible and are deemed "avoidable delays". Costs for these delays or those attributed to Contractor's tardiness in making submittals shall be borne by the Contractor.
- D. All submittals requiring Engineer's review (except operations manuals) as required under the technical specifications of these documents shall be submitted within **TEN (10)** consecutive calendar days after the date of the Notice to Proceed. An amount of **\$250** per calendar day shall be deducted from payment due the Contractor for each day that an outstanding submittal exists, said amount being the cost associated with the Engineer's review.
- E. Operation and maintenance manuals shall be submitted at least **FORTY FIVE (45)** consecutive calendar days prior to scheduled startup of the unit or system.

- F. If material or equipment is installed before it has been deemed to be in general compliance with the Contract Documents, as determined by the Engineer, the Contractor shall be liable for its removal and replacement at no extra charge and without an increase in contract time.

1.04 DESTINATION OF SUBMITTALS

- A. Each submission of documents shall be accompanied by a transmittal form containing the name of the project, the contract name, the Engineer's project manager, a submittal ID number, and a description of content for the submitted items.
- B. A copy of the TRANSMITTAL FORM shall also be provided to the Engineer's inspector at the job site.
- C. Electronic submittals shall be transmitted through the Newforma® Project Center website or by email, pending instruction by the Engineer. H2M architects + engineers is using a project information application called Newforma® Project Center. One of its components is Newforma Info Exchange, a web application that facilitates sending and sharing transmittals, and file sharing.
- D. As an external team member on this project the Contractor will be required to access the H2M architects + engineers/Newforma Info Exchange website for information related to the project, including file transfers, RFI, Submittals, Action Items, and project Calendar information. The Contractor will have access to this website using any internet-capable computer running Internet Explorer or Firefox. All data transmitted through the H2M architects + engineers/Newforma Info Exchange website is encrypted and logged. Further instructions will be provided to the Contractor after the contract is awarded.
- E. Other submissions, such as material samples or other items as instructed by the Engineer, shall be sent to the Engineer's office as follows:
 - H2M architects + engineers**
 - 538 Broad Hollow Road - 4th Floor East**
 - Melville, New York 11747**
 - Attention: H2M Project Manager**

1.05 CLARITY OF SUBMITTALS

- A. All printed materials shall be neat, clean, professionally drafted by hand or by computer, clear, legible, and of such quality that they can be easily reproduced by normal photocopying.
- B. All electronic submittals shall be produced with a minimum resolution of 300 dpi.
- C. Binders of information shall be separated into groups, subsystems, or similar equipment/function. Copies not conforming to this paragraph will be returned to the Contractor without the Engineer's review.

1.06 CONTRACTOR'S REPRESENTATION

- A. By making a submission, the Contractor represents that he has determined and verified all field measurements and dimensions, field construction criteria, site and building constraints in terms of limitations in moving equipment into an enclosed space, materials, catalog and model numbers and similar data and that he has checked and coordinated each submission with other work at or adjacent to the project site in accordance with the requirements contained in Section 013100 - Project Management and Coordination and the Contract Documents.

- B. Every SUBMISSION TRANSMITTAL FORM shall contain the Contractor's approval stamp and date showing that the submittal has been approved by the Contractor. The Engineer will not review submittals that have not yet been reviewed and approved by the Contractor.

1.07 ENGINEER/ARCHITECT'S REVIEW

- A. Engineer will review and comment on each submission conforming to the requirements of this Section.
1. Engineer's review will be for conformance with the design concept of the project and will be confined to general arrangement and compliance with the Contract Documents only, and will not be for the purpose of checking dimensions, weights, clearances, fittings, laying lengths, tolerances, interference's, for coordinating the work by others or subcontractors.
 2. The Engineer's review of a separate item, or portion of a system, does not represent a review of an assembly or system in which the item functions.
- B. The Engineer will mark submittals as follows:
1. NO EXCEPTION TAKEN (A) - No corrections, no marks. The content of this submittal has been reviewed by the Engineer and been found to be in general compliance with the Contract Documents. No further submission of this submittal is required and the information contained in the submittal may be built into the work in accordance with the Contract Documents.
 2. MAKE CORRECTIONS NOTED (B) - Minor amount of corrections. The content of this submittal has been reviewed by the Engineer and has been found in general to be in compliance with the Contract Documents. The notations made on the submittal by the Engineer shall be incorporated into the work in accordance with the terms and conditions of the Contract Documents. No further submission of this submittal is required.
 3. AMEND AND RESUBMIT (C) - The content of this submittal has been reviewed by the Engineer and this review has determined that additional data and/or modification to the submitted data or other changes are required to bring the work represented in this submittal into compliance with the Contract Documents. This submittal shall be reviewed and revised in accordance with the Engineer's comments and resubmitted to the Engineer for review. The information contained on the resubmittal shall not be incorporated into the work until the submittal is returned to the Contractor marked "NO EXCEPTION TAKEN" or "MAKE CORRECTIONS NOTED".
 4. REJECTED (D) - The content of this submittal has been reviewed by the Engineer and has been determined not to be in accordance with the requirements contained in the Contract Document and requires too many corrections or other justifiable reason. The submittal shall be corrected and resubmitted or a submittal of an alternate shall be provided. No items are to be fabricated under this mark.
 5. SUBMIT SPECIFIED ITEM (E) - The content of this submittal has been reviewed by the Engineer and this review has indicated that the work displayed in the submittal is not in compliance with the Contract Documents. The Contractor shall submit another submittal for this portion of the work, which complies with the Contract Documents.
 6. RECEIVED (R) - This submittal is accepted on the project and filed for record purposes only, in accordance with the terms and conditions of the Contract Documents. Documents marked "RECEIVED" will not be returned.
- C. No payment will be made on any item for which a submission is required if such submission:
1. has not been made,
 2. has been made but was not stamped "No Exceptions Taken" by Engineer,
 3. has been made and stamped "Make Corrections Noted", but contractor has not complied with Engineer's notes marked on the submittal,

4. has been made and stamped "No Exceptions Taken", but item provided does not conform to the shop drawing nor to the Contract Documents.
- D. Submittals not required by these specifications will not be recognized or processed.
- E. Provide an 8-inch by 10-inch space for the Engineer's review stamp.

1.08 RESUBMISSIONS

- A. Prepare new and additional submissions, make required corrections, and resubmit corrected copies until found in compliance with the Contract Documents.
- B. On, or with, re-submittals, clearly describe revisions and changes made, other than the corrections requested by Engineer, which did not appear on the previous submissions.

1.09 CONTRACTOR'S RESPONSIBILITIES

- A. Engineer's review of submittals shall not relieve the Contractor of his/her responsibility for any deviation from the requirements of the Contract Documents nor relieve the Contractor from responsibility for errors or omissions in the submittals.
- B. No portion of the work requiring a submission shall be commenced until the Engineer has found the submission in general compliance with the Contract Documents.
- C. The Contractor shall provide written notification of any specification or drawing deviation.

1.10 EXCESS COSTS FOR ENGINEERING/ARCHITECTURAL SERVICES

- A. The Owner will charge to the Contractor, and will deduct from the partial and final payments due the Contractor, all excess engineering and architectural expenses incurred by the Owner for extra services (work) conducted or undertaken by the Engineer as stipulated below:
 1. Services and other similar charges because of the Contractor's errors, omissions, or failures to conform to the requirements of the Contract Documents as related to administrative charges associated with non-compliance with the requirements for making project submissions.
 2. Services and other similar charges required to examine and evaluate any changes or alternates proposed by the Contractor and which may vary from the Contract Documents.
 3. Services and other similar charges as a result of the Contractor's proposed substitution of materials, equipment or products which require a redesign of any portion of the project, as contained in the Contract Documents at the time of bid.
 4. Services and other similar charges as a result of the Contractor's proposed substitution of products which require an engineering and/or architectural evaluation, beyond the time stipulated in Section 012500, to determine if the substituted product is equal to that specified.
 5. Services and other similar charges as a result of changes by the Contractor to dimensions, weights, sizes, voltages, phase, horsepower, materials of construction, and similar physical or operating characteristics of the product furnished which require redesign of the project in any way.
 6. Services and other similar charges for the review of resubmissions of shop drawings that have been marked as "No Exceptions Taken" or "Make Corrections Noted".
 7. Services and other similar charges for the review of shop drawings submitted more than two (2) times for the same product or portion of the work.

1.11 SUBCONTRACTOR LIST

- A. The Contractor shall submit, on AIA Form G705, within TEN (10) calendar days after the date of the Notice to Proceed, a list of all subcontractors, including the names of the major subcontractors that were submitted at the time of the bid.

1.12 MATERIAL SAFETY DATA SHEETS (MSDS)

- A. Comply with "Right to Know" requirements of Chapter 551 of Laws of New York, 1980, concerning notification of the use of toxic substances.
- B. Any product or substance used by the Contractor or its subcontractors which is listed in Subpart Z of OSHA Part 1910 Title 29 of the Code of Federal Regulations entitled "Toxic and Hazardous Substances" shall be identified to the Owner/Engineer by the Contractor's submission of a standard Material Safety Data Sheet (MSDS) in accordance with "Right To Know" requirements.
- C. Products will not be permitted to be kept on site without a MSDS.

1.13 SHOP DRAWINGS

- A. Submit shop drawings for all fabricated work, for all manufactured items and for items specifically required by the specifications.
- B. Submit each shop and layout drawing to Engineer in the form of one (1) quality reproducible transparency and two (2) prints.
 - 1. After the submittal has been reviewed by the Engineer, the transparency will be annotated, prints will be made for Engineer's and Owner's use, records, and distribution.
 - 2. Engineer will return the transparency to the Contractor.
 - 3. Send one print to the Owner as specified above.
- C. Submit one (1) electronic copy of each standard drawing, catalog cut, or other material. All shop drawings or submittals that are not in the standard 8-1/2" x 11" format shall be submitted both electronically and in paper. Samples shall be delivered directly to the office of the Engineer. The Engineer will return an electronic copy of each submittal once reviewed.
- D. Subcontractors shall submit shop drawings directly to the Contractor for checking. Thoroughly check subcontractors' shop drawings for measurements, sizes of members, details, materials, and conformance with the Contract Documents.
 - 1. Return submittals which are found to be inaccurate or in error.
 - 2. Do not submit to the Engineer until all corrections have been made.
- E. Clearly show the relationship of the various parts of the project and where the information provided on the submission depends upon field measurements and existing conditions.
- F. The Contractor shall make all measurements, confirm existing conditions, and include them on the shop drawings before making a submission to the Engineer.
- G. Submissions for a single item, or group of related items shall be complete.
- H. When submitting manufacturers' catalogs, pamphlets or other data sheets, in lieu of prepared shop drawings, clearly mark the items being submitted for review.
- I. If the shop drawings contain any departures from the contract requirements, specifically describe them in the letter of transmittal.

1.14 SAMPLES

- A. Where required, or where requested by the Engineer, submit sample or test specimens of materials to be used or offered for use.
 - 1. Samples shall be representative, in all respects, of the material offered or intended, shall be supplied in such quantities and sizes as may be required for proper examination and tests, and shall be delivered to Engineer, prepaid, along with identification as to their sources and types of grades.
 - 2. Submit samples well in advance of anticipated use to permit the making of tests or examinations.
- B. Samples will be checked for conformance with the design and for compliance with the Contract Documents.
- C. Work shall be in accordance with the approved sample. The use of materials or equipment for which samples are requested or required to be submitted is not permitted until such time that the Engineer has completed his review.

1.15 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation. Provide manufacturer's instructions with shop drawings.

1.16 CERTIFICATIONS

- A. Submit certifications of compliance indicated in the Contract Documents.
- B. Certifications shall be complete and exact, they shall be properly authenticated by the written signature, in ink, of an owner, officer or duly authorized representative of the person, firm or organization issuing such certification and they shall guarantee that the materials or equipment are in complete conformance with the requirements of these specifications.

1.17 COLORS AND PATTERNS

- A. Unless the precise color and pattern are specified, whenever a choice of color or pattern is available in a specified product, submit accurate color and pattern charts for Engineer's and Owner's review and selection.

1.18 MANUFACTURER'S SERVICE CENTER

- A. The product of a manufacturer who does not maintain an adequate nearby service center and a sufficient stock of spare parts are subject to rejection by Engineer solely on that basis.
- B. With each submission, submit information on manufacturer's facilities and give complete details of his service policies and capabilities, and a general idea of the stock of spare parts available. Submit this information in the form of a certification. Also include names, addresses and telephone numbers of at least three of the service center's present customers who are in the area of the project.

1.19 TEST RESULTS AND INSTALLATION

- A. Whenever field startup services are specified, the Contractor shall obtain from the manufacturer and submit to the Engineer Manufacturer Startup Reports (MSR's). The report shall detail the results of the field visit and all special conditions resulting from the startup.
- B. Whenever field or factory tests are required on materials, equipment and systems, such tests shall be performed and the test results submitted to Engineer in the form of a MSR.
- C. Do not deliver to the project or incorporate into the work any materials or equipment for which Engineer has not completed his review and found same to be in general conformance with the Contract Documents.
- D. Submit MSR's within thirty (30) calendar days after the date of the startup or factory test.

1.20 SPARE PARTS LIST

- A. Prepare a list of all spare parts specified to be provided in other Sections. Compile the total list for the purposes of reviewing actual spare parts delivered versus spare parts specified to be provided. The list shall reference the Section, model number, and quantity to be provided.

1.21 WAIVER OF CERTAIN SUBMITTAL REQUIREMENTS

- A. Unless otherwise specified, the requirement to submit data and samples for products specified for approval will be waived for products specified by brand name if the specifically named products are furnished for the work. In such cases, the Contractor shall submit two (2) copies of required Product Data directly to the Engineer's field representative for information and verification during its incorporation into the work. The SUBMISSION TRANSMITTAL FORM shall always be used.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 013300

SECTION 014100 - REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Codes
- B. Governing agencies
- C. Permits

1.02 CODES

- A. Comply with the requirements of the various codes referred to in these Specifications. Such codes shall be the date of the latest revision in effect at the time of receiving bids.
- B. If there is a conflict between local, state, and/or Federal regulatory requirements, seek a consultation with the State Department of Labor. Resolve conflicts to the satisfaction of the State Department of Labor prior to commencing work.
- C. Electrical Work: Conform to the requirements of the National Electrical Code (NEC) unless otherwise shown or specified. The Owner will be the sole judge of the interpretation of these rules and requirements.

1.03 GOVERNING AGENCIES

- A. All work shall conform to and be performed in strict accordance with all governing agencies such as, but not limited to:
 - 1. Occupational Safety and Health Act - OSHA
 - 2. State Department of Environmental Conservation
 - 3. State Building Code
 - 4. State Fire Code
 - 5. National Fire Protection Association - NFPA
 - 6. National Electrical Code
 - 7. New York State Energy Code
 - 8. Town Codes, Rules, Laws and Ordinances
 - 9. Electric Utility

1.04 PERMITS AND INSPECTIONS

- A. Representatives of the Owner shall have access to the work for inspection purposes. The Contractor shall provide facilities suitable to the Owner to facilitate inspections of the installed work.
- B. Obtain and pay for all permits, fees, licenses, certificates, inspections and other use charges required in connection with the work.

1.05 LISTINGS

- A. Equipment and materials for which Underwriters' Laboratories, Inc. (UL) provides product listing service, shall be listed and bear the listing mark. Alternately, ETL Testing Laboratories, Inc. Product Safety Testing Listing is acceptable if the listed product has been tested to the applicable UL Standard.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 014100

SECTION 016100 - BASIC PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes the general requirements for products that are to be furnished, installed, or otherwise incorporated into the project.

1.02 QUALITY ASSURANCE APPLIES TO ALL PRODUCTS

- A. In addition to the Contractor's warranties and guarantees on materials and equipment required under the General Conditions of the Contract and the Technical Specifications contained hereinafter, the Contractor shall also be responsible for all materials, equipment, and products that have or is planned to be incorporated into the work.
 - 1. The Contractor shall be responsible for the finished work and that it accurately and completely complies with these Contract Documents.
 - 2. The Contractor shall be responsible for work performed by subcontractors, equipment suppliers, and material vendors.
 - 3. The Contractor shall be satisfied as to the product's performance before it is ordered for installation. At the Contractor's option, he/she shall have tested each product to determine compliance with these specifications.
- B. The Engineer may check all or any portion of the work and the Contractor shall afford all necessary assistance to the Engineer in carrying out such checks.
 - 1. Such checking by the Engineer shall not relieve the Contractor of any responsibilities for the accuracy or completeness of the work.
 - 2. Such checking is a courtesy service being provided by the Owner and does not relieve the Contractor of his/her responsibilities under this Construction Contract.
- C. If witnessed shop tests or inspections are required at the point of manufacture, the Contractor shall keep the Engineer advised as to the progress of the work to allow inspection at the proper time and place. Provide at least two (2) weeks advance notice before scheduled shop tests.
- D. Should a dispute arise as to the quality of workmanship, equipment or material performance, then the final decision regarding acceptability with these Contract Documents shall be that of the Owner.
- E. At the request of the Engineer, the Contractor shall promptly provide the services of a competent representative of the manufacturer at the project site, fully equipped and prepared to answer questions, perform tests, make adjustments and to prove compliance with the Contract Documents free of all additional charges. Proof of compliance shall be the responsibility of the Contractor, and such special visits to the project site by the manufacturer shall not be eligible under any cash allowances or stipulated man-hours necessary to startup the system and/or train the Owner as may be specified in the Technical Specifications.

1.03 QUALITY ASSURANCE - EQUIPMENT

- A. Erect and install products under the supervision of a competent and experienced superintendent. The method of installation, including anchorage, clearances, and tolerances for rotating assemblies, methods of support for equipment and adjacent piping, shall be as recommended by the equipment manufacturer unless detailed on the Drawings or specified.
- B. All material furnished shall be new, and guaranteed free from defects in workmanship, installation, and design.

- C. Design and fabricate equipment in conformance with ANSI, ASTM, ASME, ASHRAE, IEEE, NEC and NEMA Standards.
 - 1. Equipment shall withstand the stresses that may occur during fabrication, testing, transportation, installation and conditions of operation.
 - 2. Equipment shall comply with the latest OSHA regulations and the ANSI Safety Standards.
- D. Equipment shall be products of manufacturers who produce evidence of their ability to promptly furnish any and all interchangeable replacement parts as may be needed at any time within the expected life of the equipment.
- E. Manufacturers shall also have readily available access to suitable and accurate testing facilities for performing the required shop tests.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Equipment shall have been in successful regular operation under comparable conditions for a period of at least five (5) years.
 - 1. This time requirement does not apply when the manufacturer posts an Owner/Engineer acceptable Performance Bond or Letter of Credit for the duration of the time period that will guarantee replacement of the equipment in the event of failure.
 - 2. The bond shall be in a form that is acceptable to the Owner's legal council.
- B. The Owner reserves the right to reject any material or equipment manufacturer who, although he appears to be qualified and meets the technical requirements, does not provide satisfactory evidence indicating adequate and prompt post-installation repair and maintenance service, as required to suit the operational requirements of the Owner.
- C. Whenever it is required that the Contractor furnish materials or manufactured articles or shall do work for which no detailed specifications are set forth, the materials or manufactured articles shall be of the best grade in quality and workmanship obtainable on the market from firms of established good reputation, or, if not ordinarily carried in stock, shall conform to the usual standards for first-class materials or articles of the kind required.
- D. Perform work in full conformity and harmony with the intent to secure the best standard of construction and equipment of the work as a whole or in part.
- E. Items of any one type of material or equipment shall be the product of a single manufacturer.
 - 1. For ease of the Owner in maintaining and obtaining service for equipment and for obtaining spare parts from as few places as possible, to the maximum extent possible, use equipment of a single manufacturer.
 - 2. The Engineer reserves the right to reject any equipment from various manufacturers if suitable equipment can be secured from fewer manufacturers and to require that source of materials be unified to the maximum extent possible.
- F. Substitute equipment shall not be fabricated nor installed until after written decision to accept request is received from the Engineer.

2.02 CONTROL PANELS, MCC'S AND SWITCHBOARDS

- A. All control panels, motor control centers, and switchboards shall be fabricated with pilot lights, selector switches, PLC, graphics display panels, elapsed time meters and other components that shall match.

- B. Replacement of unlike products delivered to the job site shall be the responsibility of the Contractor.
- C. All costs associated with the replacement shall be borne by the Contractor.

2.03 NAMEPLATES

- A. Each unit of equipment shall have the manufacturer's name or trademark on a stainless steel nameplate securely affixed in a conspicuous place.
- B. The manufacturer's name or trademark may be cast integrally with stamp, or otherwise permanently marked upon the item of equipment.
- C. Such other information as the manufacturer may consider necessary for complete identification shall be shown on the nameplate.

2.04 FABRICATIONS

- A. Insofar as possible, shop prefabricate all items complete and ready for installation.
- B. Accurately fabricate all items to the details shown on the Drawings and on the shop drawings found in compliance with the Contract Documents.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Prior to work under any Section, carefully inspect the work of all other prime trades and verify that all such work is in conformance with the Contract Documents and is complete to the point where the work under that Section may properly commence.
- B. Avoid the need to remove and replace work and to avoid unnecessary cutting and patching.
- C. Inspect all surfaces to be sure that they have been properly prepared before applying new work to such surfaces.
- D. Verify that all work can be installed in strict accordance with the drawings and the approved shop drawings. Immediately report discrepancies to Engineer.
- E. Do not proceed with the work under any Section until these conditions are obtained.

3.02 INSTALLATION

- A. Furnish and install materials and equipment in accordance with the instructions of the applicable manufacturer, fabricator or processors, except as otherwise provided in the Contract Documents.
- B. All work shall be done in a workmanlike manner and set to proper lines and grades. The work shall be square, plumb and/or level as the case may be.
- C. Where performance criteria are specified, do all work necessary to attain the required end results.

3.03 FIELD QUALITY CONTROL

- A. Neither observations by Engineer nor inspections, tests or approvals by other persons shall relieve the Contractor from his obligations to perform the work in accordance with the requirements of the Contract Documents.
- B. If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any work to specifically be inspected, tested or approved by some public body, the Contractor shall assume full responsibility therefore, pay all costs in connection therewith, and furnish the Engineer with the required certificates of inspection, testing or approval.
- C. The Owner reserves the right to independently perform laboratory tests on random samples of material or performance tests on equipment delivered to the site.
 - 1. These tests, if made, will be conducted in accordance with the appropriate referenced standards or specification requirements.
 - 2. The entire shipment represented by a given sample, samples or piece of equipment may be rejected on the basis of the failure of samples or pieces of equipment to meet specified test requirements.
 - 3. All rejected materials or equipment shall be removed from the site, whether stored or installed in the work, and the required replacements shall be made, all at no additional cost to Owner.

3.04 ADJUST AND CLEAN

- A. Upon the completion of installations, and as a condition of its acceptance, visually inspect all work, adjust all components for proper alignment and touch-up abrasions and scratches to make them completely invisible.
- B. Thoroughly examine all materials and equipment with protective or decorative finishes for defects and damage prior to being covered.
 - 1. In the case of buried items of work, restore protective surface covers so as to conform to the Contract Documents prior to being backfilled, buried or embedded, as the case may be.
 - 2. In the case of exposed items of work, for which a decorative finish is required, all scratches, discoloration's, unmatched colors, disfigurements and damages shall be repaired and touched-up so as to provide a neat, clean finish, and be uniform in color.

3.05 DEFECTIVE WORK

- A. The repair, removal, replacement and correction of defective work is a part of this Contract and shall be promptly performed in accordance with the requirements set forth in the General Conditions or other portions of the Contract Documents. All costs in connection with the correction of defective work shall be borne by the Contractor.
- B. Products that fail to maintain the performance or other salient requirements of the Contract Documents, shows undue wear, or other deleterious effects during the maintenance period, shall be considered defective.

END OF SECTION 016100

SECTION 016500 - PRODUCT DELIVERY, STORAGE AND HANDLING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The Section includes the transportation, handling, storage and protection of products that are to be incorporated into the work.
- B. The procedures for turning equipment over to the Owner for installation by others is also included herein.

1.02 GENERAL

- A. Items shall be delivered as complete assemblies direct from the manufacturer with all internal wiring, piping, valving, and control devices intact except where partial disassembly is required by transportation regulations, protection of components, or where physical constraints may exist or be created for the setting of the item.
- B. Coordinate the disassembly and reassembly requirements with the manufacturer. Determine the need and extent of reassembly prior to bid.
 - 1. All labor, material and equipment costs associated with the disassembly and reassembly of the product shall be included in the Contract Price.
 - 2. Where reassembly of equipment is necessary, then the manufacturer shall provide reassembly instruction at the project site.
 - 3. A technician shall be present during the entire reassembly procedure and the manufacturer shall certify, in writing, that the unit was reassembled properly in accordance with instructions provided by the manufacturer and that all as-specified warranties remain in effect.
 - 4. The manufacturer's reassembly inspection time shall be in addition to the field service time specified and shall be included in the Contract Price. This time shall not be eligible for payment under any cash allowance item.
- C. In the case where equipment is to be installed by others, then the supplying contractor shall be responsible for its reassembly. If reassembly is necessary and the unit(s) are to be set inside an enclosure or building, reassemble the equipment inside said enclosure. The equipment once reassembled shall be turned over to the installing contractor as specified below.

1.03 PACKING

- A. Transport products in containers, crates, boxes or similar means such that the products are protected against damage that may occur during transportation.
- B. All parts shall be packaged separately or in container where parts of similar systems are grouped.
- C. Part numbers shall be indicated on the individual part. Use indelible ink to mark part numbers.
- D. All equipment shipments shall be included with a parts list showing a description (name) of the part and the manufacturer's part number.
 - 1. The parts list shall be shipped in a plastic zippered envelope with the words "Parts List" lettered on it in indelible ink.
 - 2. The parts list shall be placed inside the shipping container so that it is on the top of the contents.
- E. Equipment shall be shipped with storage, handling and installation instructions.

1. The Engineer reserves the right to withhold payment for equipment delivered to the site until such time as the storage, handling and installation instructions are supplied by the manufacturer.
 2. In the case where operation and maintenance manuals have been provided by the manufacturer, which includes the installation instructions, then the installation instructions shall also be included with the equipment shipment.
- F. All control panels shall be wood crated.
1. All sides of the control panel shall be covered with 3/4" plywood.
 2. The control panel number or name shall be printed on all sides of the crate in 1' high black lettering.
 3. The manufacturer's name, Contractor's name and project name shall also be printed on the front of the crate.
 4. All control panels and centers shall be packaged with three (3) copies of the approved wiring diagram inside the control panel enclosure in a separate plan holder attached to the inside door. The words "APPROVED FOR CONSTRUCTION" shall be indicated on each page of the wiring diagram.
- G. Delicate instruments and devices, reagents, chemicals, and glassware shall be shipped in packaging normally provided by the manufacturer.
- H. The Contractor shall require the manufacturer to be responsible for the proper packing of all products.

1.04 SHIPPING AND DELIVERY

- A. Product deliveries shall be accompanied with a bill of lading indicating the place of origination and the Contractor's purchase order number.
- B. Inspect shipments immediately upon delivery, to assure compliance with requirements of the Contract Documents and those products are undamaged.
- C. Promptly remove damaged material and unsuitable items from the job site.
- D. Provide equipment and personnel to handle products by methods to prevent soiling; disfigurement or damage.

1.05 STORAGE

- A. Store sensitive products and all spare parts in weather tight, climate controlled enclosures in an environment favorable to product.
- B. Store and protect products in accordance with the manufacturer's instructions.
- C. All other products that are to be installed underground or products such as pipe, valves, and fittings shall be stored outdoors but shall be blocked off the ground and covered with impervious sheet coverings.
- D. Store fabricated products above the ground on blocking or skids.
- E. Store loose granular materials in well-drained areas on solid surfaces to prevent mixing with foreign matter.
- F. Provide adequate ventilation to avoid condensation.

- G. In accordance with manufacturer's instructions protect bearings, couplings, shafts, rotating components, and assemblies. Protection of said equipment shall be continuous until the time the equipment is placed into permanent service.
- H. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
- I. Do not store volatile liquids in any building on site.
- J. Storage of products shall be the responsibility of the supplying contractor. The installing contractor shall take all necessary precautions to protect the equipment being furnished by others.
- K. Store with seals and labels intact and legible.

1.06 EQUIPMENT INSTALLED BY OTHERS

- A. All products, except products noted on the Drawings or specified, shall be furnished and installed under this Contract.
 - 1. Only noted or specified products shall be furnished under this Contract for installation by others.
 - 2. If it is not noted on the Drawings or specified, then the product shall be furnished and installed under the Contract.
- B. The Contractor shall furnish these products to the Owner. These products shall be stored as specified above.
- C. The Owner will then advise the installing contractor that the product(s) are ready for installation.
 - 1. In the case where the product is stored in a proper enclosure, but not stored inside the building to be constructed under this project, then the installing contractor shall move the product into the building to a location adjacent to the final location shown on the Drawings.
 - 2. In all cases, the installing contractor shall be responsible for moving from storage, uncrating, anchoring, mounting and installing the product as required by the Contract Documents.
- D. The Contractor and installing contractor(s) shall be present at the time the equipment is turned over to the Owner. Immediately thereafter, the Owner will turn the product over to the installing contractor for installation.
- E. The Owner, Contractor, Engineer and the installing contractor shall inspect the condition of the product at this time.
 - 1. Any defects in the product will be noted and the Contractor will be advised to make all repairs immediately.
 - 2. The installing contractor shall still be required to install the product if the damage is deemed cosmetic by the Engineer.
 - 3. The manufacturer's installation instructions or wiring diagram shall be turned over to the installing contractor at this time by the Contractor.
 - 4. Any damage occurring to the product during moving, setting and mounting the unit(s) shall be the responsibility of the installing contractor.
 - 5. The Contractor is advised to take photographs to document the condition prior to it being turned over to the installing contractor.
 - 6. The installing contractor is advised to take photographs to document the condition prior to its acceptance.

- F. The supplied unit(s) remain the property of the Contractor until final acceptance of the work.
- G. Any damage caused to the unit(s) due to improper installation, workmanship, and non-compliance with the manufacturer's written installation instructions shall be the responsibility of the contractor who caused said damage. The burden of proof shall rest with the supplying Contractor.
- H. In the event the Contractor discovers misuse, abuse or improper installation of the unit(s) by the installing contractor, then he shall immediately notify the Engineer in writing. The Engineer will investigate the accusations and make a determination. The Engineer's determination shall be binding and agreed to by both parties.
- I. If the Engineer's determination substantiates the accusations of the Contractor, then the Contractor shall install the unit(s), the costs for which will be paid for as extra work. All costs associated with the extra work change order, including engineering and attorney fees of the Owner and Contractor will be deducted from money due the installing contractor.

1.07 PROTECTION OF WORK

- A. The Contractor shall protect the installed work. All costs for protection shall be borne by the Contractor. Provide coverings as necessary to protect installed products from damage, from traffic and subsequent construction operations. Remove when no longer needed.
- B. Cover and protect equipment from dust, moisture or physical damage. Protect finished floor surfaces prior to allowing equipment or materials to be moved over such surfaces. Maintain finished surfaces clean, unmarred and suitably protected until accepted by the Owner.
- C. Additional time required to secure replacements and to make repairs will not be considered by the Engineer to justify any extension in the Contract Time of Completion. In the event of the damage, promptly make replacement and repairs to the approval of the Engineer at no additional costs.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 016500

SECTION 017800 - CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Submit the following documents to the Engineer before Substantial Completion:
 - 1. Operations and Maintenance Manuals prepared in accordance with Section 017823 and be updated as a result of start-up activities.
 - 2. Manufacturer's Start-up Reports (MSR's) for all equipment and systems where manufacturer field time is specified.
 - a. Each MSR shall be signed by the field technician(s) who attended the start-up.
 - b. If the manufacturer is taking exception to the installation or if the warranty is voided, he shall provide a statement to that effect and provide reasons and justification to explain the company's position.
 - 3. One binder containing original counterparts of all warranties, guarantees, bonds, or affidavits as specified in the Technical Specification Sections. These documents shall contain the original signatures and be placed in a plastic sheet protector, one document per protector.
 - 4. Spare parts checklist itemizing all spare parts furnished under the Contract summarized by Section.
 - 5. Electrical Underwriter's Certificate.
- B. Submit the following items to the Engineer with the final application for payment:
 - 1. Final Application for Payment prepared by the Engineer for Contractor's execution showing final amount of Contract including change orders.
 - 2. Maintenance Bond prepared in accordance with the Contract or General Conditions.
- C. All documents shall be complete, signed, dated, and notarized (where applicable) and be subject to the Engineer's acknowledgment of receipt or approval.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 017800

SECTION 017823 - OPERATING AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies the requirements for Operations and Maintenance Manuals required to be prepared by system suppliers and equipment manufacturers.
- B. The Contractor shall submit Operations and Maintenance Manuals for all equipment.
- C. Where the technical specifications call for the submission of manuals, said manuals shall be prepared in accordance with the requirements contained herein. It being understood that manuals shall be submitted for all equipment even if it is not specifically called out in the specifications.

1.02 MANUAL CONTENTS AND FORMAT

- A. All Operations and Maintenance Manuals shall be as specified hereinafter.
- B. The binder shall be 8 1/2" x 11", metal hinge, vinyl, large capacity by National or Equal. It shall show the name of the manufacturer or supplier and project name on the spine of the binder.
- C. A cover shall be provided showing the names of the Owner, Engineer, Contractor, and Manufacturer.
 - 1. It shall show the Contractor's order number and manufacturer's project number.
 - 2. The address of the manufacturer, service station telephone number, project title, contract number, and year shall also be shown.
- D. Provide tabbed color dividers for each separate product and system.
 - 1. The name of the product shall be typed on the tab.
 - 2. A separate tab shall also be provided for information such as troubleshooting instructions, spare parts list, etc.
- E. An index shall be provided in the back of the binder, with a separate tab, providing a quick way for the operator to find key and important topics contained in the manual.
- F. A separate listing for all charts, graphs, tables, figures and shop drawings shall be provided directly following the table of contents.
- G. Each manual shall contain one (1) copy of all shop drawings deemed in compliance with the Contract Documents by the Engineer submitted for the equipment or system for which the manual is prepared.
 - 1. Only these shop drawings shall be included in the manual.
 - 2. All shop drawings larger than 8 1/2" x 11" shall be folded and placed in a heavy duty, top loading plastic sheet protector with the title of the drawing showing; one (1) drawing per protector page.
- H. For systems being furnished with control panels, each manual shall contain a catalog cut for every electrical device installed inside the control panel or motor control center.
- I. Each manual shall contain the following as a minimum:
 - 1. Table of contents
 - 2. Final version of the warranty statement approved by the Engineer
 - 3. Nameplate data of each component, year of installation, contract number and specification number

4. Name, address and telephone number of the manufacturer and the manufacturer's local representative(s)
 5. Installation instructions
 6. Operation instructions including adjustments, the interrelation of components and the control sequence describing break-in, start-up, operation and shutdown
 7. Emergency operating instructions and capabilities
 8. Maintenance requirements include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair and reassembly instructions; and alignment, adjusting, balancing, and checking instructions
 9. Troubleshooting guide and corrective maintenance (repair) procedures for all electrical and mechanical equipment. These guides shall list the most frequent and common problems, together with the symptoms, possible causes of the trouble, and remedies
 10. Drawings (pictures or exploded views) which clearly depict and identify each part, suitable for assembly and disassembly of entire system and each component
 11. Wiring and control diagrams, if applicable
 12. Panelboard circuit directories including electrical service characteristics, if applicable
 13. Part list with current prices; ordering information; and recommended quantities of spare parts to be maintained in storage
 14. Charts of valve tag numbers, with location and function of each valve, keyed to the process and instrumentation diagram prepared as part of the Contract Documents
 15. Name, address, and telephone number of nearest parts supply house and nearest authorized repair service center.
 16. List of recommended spare parts and the recommended number of each per unit and per group of units.
- J. All electronic Operations and Maintenance Manuals shall be as specified hereinafter.
1. All files shall be in Adobe PDF format and submitted on compact discs.
 2. Files shall be organized by specification section and then by product.
 3. An electronic index and list of all charts, graphs, tables, figures, and shop drawings shall be included.
 4. All information provided in the paper Operations and Maintenance Manual shall be included in the electronic version.
- K. Submit one (1) copy of a preliminary draft manual at least fourteen (14) calendar days prior to the date set for start-up.
1. The Engineer will review the manual for content and compliance with these specifications.
 2. Written comments will be provided, but the manual will not be returned.
 3. The manual will be used at start-up, to record changes that should be made to the final manual.
 4. The manual will be retained on the site until such time as the final, updated manual is provided.
- L. Two (2) weeks after the date the unit was placed into service and the Owner has gained beneficial use, submit two (2) paper copies and two (2) electronic copies of the final updated Operations and Maintenance Manual.
- M. Where installation instructions are not included with the manual, they shall be shipped at least ten (10) days prior to the date the equipment is scheduled for installation.

1.03 RETAINAGE

- A. The Engineer will retain from payment due the Contractor, for failure to submit manuals as specified, an amount equal to 2% of the scheduled value for the equipment or system for which the manual applies. This Contract requirement only applies when a manual is specified to be provided in the Technical Specifications for a particular system or piece of equipment.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 017823

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Work of this Section includes the requirements for demonstrating and training of installed systems, equipment, and products.
- B. Manufacturer field services and the credit for unused service time is also included herein.

1.02 MANUFACTURER'S FIELD SERVICES

- A. When specified in individual specification sections require field services to be provided, said services shall be provided by qualified, authorized and factory trained representative(s) of the manufacturer (supplier).
- B. Field services shall generally consist of:
 - 1. installation supervision,
 - 2. verify terms of the manufacturer's warranty,
 - 3. equipment and system calibration,
 - 4. startup supervision,
 - 5. and operation and maintenance instructions to the Owner's employees.
- C. Such services do not include service time to correct a factory fault, correct problems resulting from a factory wiring or control logic error, or errors caused by poor or improper installation by the Contractor.
- D. Sale representatives are not acceptable.
- E. The time specified to be provided under the specification sections shall be exclusive of travel time to and from the facility or site. For the purposes of this Contract, one (1) day shall be defined as eight (8) hours exclusive of breaks or mealtime.
- F. The times specified to be provided by the manufacturer does not relieve the manufacturer from providing sufficient service time to place the equipment or systems into satisfactory operation and to obtain the specified performance. The manufacturer shall provide, as a minimum, the times specified in the Specification Sections.
- G. Where manufacturer services are specified for control panel or control center startup, the representative shall be experienced and trained to work on and field rewire such devices.
 - 1. Field representatives for control panel startup shall understand the control sequence specified and, in the case of programmable logic controllers, are able to make revisions to the factory program using handheld programming devices or laptop computers.
 - 2. The time spent by the representative to correct a PLC program shall not be included in the time specified for startup.
 - 3. The Owner will not pay for time spent in the field to correct a PLC programming problem.
- H. If for any reason, the specified service days are not used, then the Owner shall receive a credit equal to **[\$500.00 (FIVE Hundred Dollars and Zero Cents)]** for each unused field service day specified.
- I. A change order to the Contract reducing the Contract Price, by the dollar amount equivalent to the unused field service days, will be issued.

- J. Submit manufacturers' startup reports (MSR's) in accordance with the requirements contained in Section 013300 - Submittals.

1.03 SUBMITTALS

- A. The Contractor shall prepare a list of all manufacturer specified field time required by the technical specifications. Compile this summary listing and submit it to the Engineer for review in accordance with the requirements contained in Section 013300.
- B. Manufacturer's Startup Reports

1.04 QUALITY CONTROL

- A. The Contractor shall adhere to all instructions provided by the manufacturer's authorized representative.
- B. All verbal instructions necessary to satisfy performance of the equipment or the system shall be immediately provided by the Contractor. The manufacturer shall document all verbal orders in writing at a time suitable to the Contractor.
- C. All written instructions provided in operation, maintenance, and installation guides and manuals, provided by the manufacturer of such equipment and or system, shall be complied with by the Contractor.
- D. The Contractor shall comply with all manufacturer requirements such that written or implied warranties remain in full force during the time period so specified elsewhere in the technical specifications.
- E. Should manufacturer's instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- F. Actions and/or non performance by the Contractor that may void manufacturer warranties shall not constitute a release of the specified warranty, and all warranty claims made by the Owner shall be paid for by the Contractor as if the manufacturer's warranty was still in effect.

1.05 SCHEDULING - FIELD SERVICES

- A. The Contractor shall arrange field service on dates acceptable to the Owner and Engineer.
- B. The service visits shall be scheduled at least 2 weeks in advance so that the Owner and Engineer can adequately staff the date.
- C. Operator training will not be allowed until such time as the Manufacturer's Operation and Maintenance Manuals have been supplied and approved by the Engineer.
 - 1. The field service technician shall review the contents of the manual with designated employees of the Owner.
 - 2. Field services will not be deemed provided until the MSR is provided.

1.06 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel prior to date of Substantial Completion.

- B. Utilize manufacturer's and vendor's Operation and Maintenance Manuals as basis for instruction. Review contents of the manual with the Owner's personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of the equipment or of the system.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- E. The Contractor shall arrange to have the manufacturer's Operation and Maintenance Manuals updated with information that has been added during start-up activities.
- F. The final manual shall contain the most recent information and reflect all operational and maintenance aspects of the final installed and functioning system or equipment component of the system.
- G. Any changes to control panel wiring diagrams or interconnection wiring schematics shall be made and new prints provided as an update to previously approved manuals.
- H. Manufacturer field time shall be as specified in individual Sections of the Technical Specifications.
- I. For control panels, explain the control sequence, timing structure, and safety precautions when working inside the panel, terminal wiring system, PLC program, if applicable, operator interface(s) and control logic.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 017900

PART 1 - GENERAL

1.01 - SECTION INCLUDES

- A. Demolition of existing electrical systems.
- B. Secondary power wiring and distribution system.
- C. Electrical control systems and interlock wiring.
- D. Wiring for built-in equipment.
- E. Motor Control Centers.
- F. Instrumentation and Controls.

1.02 - RELATED WORK

- A. Foundations and pads required for equipment furnished under this division of specifications.
- B. Field painting, except such painting as is required to maintain shop coat painting and factory finish painting.
- C. Flashing and sealing of conduits through outside walls.
- D. Cutting and patching for electrical work, except for errors and omissions under this Division.

1.03 - QUALITY ASSURANCE

- A. It is understood that the rights and benefits given the Owner by the guarantees found in the technical specifications are in addition to and not in derogation of any rights or benefits found in the special and general provisions of the contract.
- B. Electrical equipment provided under this Division shall be turned over in operating condition. Instruction on further operation and maintenance shall be included in the operating and maintenance instructions.

1.04 - REFERENCES

- A. Perform work in accordance with standards listed below. Where these specifications are more stringent, they take precedence. In case of conflict, obtain a decision from the Engineer.
1. NFPA-70: National Electrical Code
 2. NFPA-101: Life Safety Code
 3. New York State Energy Code
 4. New York State Building Code
 5. Applicable New York State Administrative Code
 6. Applicable Town Ordinances.
 7. Electric utility rules and regulations.
 8. Telephone utility rules and regulations.

PART 2 - PRODUCTS**2.01 - MATERIALS AND EQUIPMENT**

- A. All materials and equipment used in carrying out these specifications shall have UL listing and label. Specifications and drawings indicate name, type, or catalog numbers of materials and equipment to be used as standards. Proposals shall be based on these standards. Contractor may use materials and equipment equivalent to those specified, subject to Engineer's approval.

PART 3 - EXECUTION**3.01 - COORDINATION**

- A. Carefully examine specifications, drawings and project site to be thoroughly familiar with items which require electrical connections and coordination. Electrical drawings are diagrammatic and shall not be scaled for exact sizes.
- B. Notify other Contractors of any deviations or special conditions necessary for the installation of work. Interferences between work of various contractors to be resolved prior to installation. Work installed not in compliance with specifications

and drawings and without properly checking and coordinating as specified above shall, if necessary, be removed and properly reinstalled without additional cost to the Owner. Engineer to be mediating authority in all disputes arising on project.

- C. Equipment shall be installed in accordance with manufacturer's recommendation. Where conflicts occur between contract documents and these recommendations, a clarification shall be requested of the Engineer for decision before proceeding with such work.
- D. Insofar as it is possible to determine in advance, advise masonry tradesmen to leave proper chases and openings. Place all outlets, anchors, sleeves, and supports prior to pouring concrete or installation of masonry work. Should the Contractor neglect doing this, any cutting and/or patching required to be done is at this Contractor's expense.

3.02 - CUTTING AND PATCHING

- A. Repair or replace routine damage caused by cutting in performance of work under this Division.
- B. Correct unnecessary damage caused due to installation of electrical work, brought about through carelessness or lack of coordination.
- C. Holes cut through floor slabs to be core drilled with drill designed for this purpose. All openings, sleeves, and holes in slabs to be properly sealed, fire proofed and waterproofed.
- D. Repairs to be performed with materials which match existing materials and to be installed in accordance with appropriate sections of these specifications.

3.03 - TESTS

- A. On completion of work, installation shall be completely operational and entirely free from ground, short circuits, and open circuits. Perform a thorough operational test in presence of the Engineer. Balance all circuits so that feeders to panels are not more than 10% out of balance between phases with all available load energized and operating. Furnish all labor, materials and instruments for above tests.
- B. Furnish Engineer with a copy of such tests including identification of each circuit and readings recorded, also the main service ground resistance test as described in Section 260526 of these specifications. Test information to include ampere readings

of all panels and major circuit breakers, isolation resistance reading of motors and transformers.

3.04 - IDENTIFICATION OF EQUIPMENT

- A. Properly identify the following:
 - 1. Wall mounted VFD.
 - 2. Relays.
 - 3. Pilot lights and control switches.
- B. Use permanently attached black phenolic plates with 1/4-inch white engraved lettering on the face of each, attached with two sheet metal screws.
- C. Panelboard identification plates shall indicate panel by name.

3.05 - INSTALLATION

- A. The Contractor shall carefully move and replace existing equipment, appliances and all related items, as required to conduct proposed work.
- B. Install and conduct all work per applicable NEC, State and local codes.

END OF SECTION

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PART 1 - GENERAL

1.01 - SECTION INCLUDES

- A. Electrical demolition.
- B. Removal of all existing control equipment in MCC's.

1.02 - SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items; location and construction of temporary work.

1.03 - REGULATORY REQUIREMENTS

- A. Conform to applicable code for demolition work, safety of structure and dust control.
- B. Obtain required permits from authorities.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Do not close or obstruct egress width to exits.
- E. Do not turn off electric equipment without authorization from Owner.
- F. Conform to procedures applicable when discovering hazardous or contaminated materials.
- G. Obtain a utilities mark-out of all buried underground utilities for telephone, electric, gas, sewer and water, including all customer owned utilities.

1.04 - SCHEDULING

- A. Schedule Work to coincide with new construction.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION**3.01 - EXAMINATION**

- A. Verify field circuiting arrangements at Plant No. 10.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on casual field observation. Report discrepancies to the Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing condition.

3.02 - PREPARATION

- A. Coordinate utility service outages with Utility Company.
- B. Provide power, wiring and connections to maintain all existing power, control and telemetry systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

3.03 - DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction, as indicated on drawings.
- B. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- C. Repair adjacent construction and finishes damaged during demolition and extension work.
- D. Provide caps and filler plates/plugs for all openings in equipment and enclosures after removal of conduits.
- E. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- F. Remove demolished materials from site as work progresses.
- G. Where existing devices and equipment are called to be removed, Contractor shall maintain circuit continuity to all existing devices and equipment remaining on that

circuit. Contractor shall provide all required conduit, conductors and boxes as required.

3.04 - CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Remove temporary work.

END OF SECTION

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PART 1 - GENERAL**1.01 - SECTION INCLUDES**

- A. Wires and cables.
- B. In general, the wires and cables included under this Section shall include, but not be limited to, the following:
 - 1. 600V power and control cable
 - 2. Instrumentation wires
- C. All conductors to be continuous from origin to panel or equipment termination without splices.

1.02 - REFERENCES

- A. ANSI/NFPA 70 - National Electric Code.
- B. NECA Standard of Installations.

1.03 - SUBMITTALS

- A. Submit product data under provisions of Section 013300.

1.04 - QUALITY ASSURANCE

- A. Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacturing, installing and servicing of similar items with a history of successful production acceptable to the Engineer as specified herein and in accordance with the General Conditions.
- B. Contractor shall submit the following information pertaining to the manufacturer(s):
 - 1. Complete literature, performance, and technical data describing the proposed equipment and listing of items made by the manufacturer.
 - 2. Location of closest service office from which this equipment shall be serviced.
 - 3. Location of closest parts inventory for item installation.

1.05 - COORDINATION

- A. Coordination:
1. Coordinate wire and cable required with the equipment being furnished by others for the satisfactory operation of the equipment or system.
 2. Review installation procedures under other sections and contracts and coordinate them with the work specified herein.
 3. Notify other prime contractors in advance of the installation of the work included to provide them with sufficient time for installation and coordination of interrelated items that are included in their contracts and that must be installed in conjunction with the work included in this Section.

1.06 - PROJECT CONDITIONS

- A. Verify that embedded conduit, in masonry and concrete, is installed as shown on the Drawings prior to the work being enclosed by others.
- B. The Contractor shall be present at all concrete pours made by the General Contractor.
- C. Conductor sizes are based on copper at 75°C.
- D. Wire and cable routing shown on Drawings is approximate unless dimensioned or specifically called for such as where conduit is to be embedded in concrete or masonry. Route wire and cable as required to meet project conditions and shall be routed above ceilings, directly under joists, in pipe trenches, where available, and in masonry. Where exposed conduit is permitted, it shall be run to maximize wall space.
- E. Field verify destination location to determine cable routing.
- F. Where wire and cable routing is not shown for proposed destination, determine exact routing and lengths required. Routing shall be reviewed with the Engineer.

PART 2 - PRODUCTS**2.01 - CONDUCTORS**

- A. Install products in accordance with manufacturer's recommendations.

- B. Single copper conductors with 600-volt insulation.
- C. Minimum size of feeder conductors and grounds shall be No. 12 AWG.
- D. Insulation: No. 12 AWG and No. 10 AWG, provide ANSI/NFPA 70, Type THWN-2.
- E. Use solid conductor for feeder and branch circuits, 10 AWG and smaller.
- F. All conductors shall include complete set of manufacturer's markings for insulation and conductor size.
- G. Manufacturers shall be ANACONDA, TRIANGLE, ROME, or approved equal.
- H. Provide white colored neutral conductors; provide black, color coded phase conductors; provide green colored ground conductors.

2.02 - 300 VOLT INSTRUMENTATION SIGNAL CABLE - FOR INDOOR USE

- A. Indoor Application:
 - 1. The 300-volt instrumentation signal cable for indoor use shall consist of single or multiple twisted pairs or triads of coated, stranded copper conductors with polyvinyl chloride (PVC) insulation and nylon jacket. Each individual pair or triad of wires shall have an aluminum/polyester tape shield with a tinned copper drain wire. For multiple pair or triad cables, an overall aluminum/polyester tape shield with a tinned copper drain wire shall enclose the individual wire assemblies. The overall jacket shall be PVC. Cables shall have a 105°C rating.
 - 2. The conductors shall be annealed, tin-coated copper with Class B stranding per ASTM B-8. Minimum size conductor shall be AWG No. 16.
 - 3. The insulation shall be PVC. The insulation thickness shall be 15 mils.
 - 4. Individual Conductor Insulation: The jacket over each individual wire shall be nylon and shall have a thickness of 4 mils.
 - 5. The shield for each individual pair or triad shall be an aluminum/polyester tape. The shield shall be 1.35 mils thick and shall be overlapped to provide 100% coverage. The shield shall also contain a 7-strand tinned copper drain wire which shall be a maximum of two sizes smaller than the conductors. All individual shields shall be completely isolated from each other.

6. The overall shield for multiple pair or triad cables shall be an aluminum/polyester tape. The shield shall be 2.35 mils thick and shall be overlapped to provide 100% coverage. The shield shall also contain a 7-strand tinned copper drain wire which shall be the same size as the conductors.
7. The overall jacket shall be PVC and shall meet the requirements of UL 13.
8. The jacket thickness shall be as follows:

Wire Size	No. of Pairs	No. of Triads	Jacket Thickness
16 AWG	1	--	35 Mils
16 AWG	2,4	--	50 Mils
16 AWG	8,10,12	--	60 Mils
16 AWG	--	1	35 Mils
16 AWG	--	2,4	50 Mils
16 AWG	--	8	60 Mils
16 AWG	--	12	70 Mils

9. Manufacturers and their products shall be equal to:
 - a. Cablec APVIC
 - b. Okonite A Type P-OS and Type SP-OS
 - c. Or approved equal

2.03 - MECHANICAL CONNECTORS

- A. Conductor tapping connectors shall be BURNDY Servit split bolt, Series KS and KS3, or approved equal.
- B. Split bolt connectors shall use BURNDY Type SC Servit cover on indoor applications.
- C. Terminal lugs shall be BURNDY Universal Terminal Series. Terminal lugs shall be sized for proper ampacity and proper number of conductor holes. Each conductor shall occupy only one hole on a terminal lug.
- D. Conductor tapping connectors for multiple conductors shall be BURNDY Series V-Tap with V-Tap covers, and V-Blok mounting platforms.

PART 3 - EXECUTION**3.01 - INSTALLATION**

- A. General:
1. Make terminations in accordance with cable manufacturers instructions for the particular type of wire and cable.
 2. Splices are not allowed in the underground duct and manhole systems. If splices are required, the Contractor shall obtain approval in writing from the Engineer prior to splicing.
 3. All splices shall be in made in terminal boxes.
- B. Wire and Cable Sizes: The sizes of wire and cable shall be as shown on the Contract Drawings, or if not shown, as approved by the Engineer. Minimum size wire shall be No. 12 AWG for all power, lighting and receptacle circuits. Wires for control circuits shall be No. 14 AWG minimum. Wire for instrumentation circuits shall not be smaller than No. 16 AWG. If due to field routing the voltage drop exceeds 2.5%, the size of conductors shall be increased such that 2.5% is the maximum voltage drop incurred.
- C. Number of Wires: The number of wires indicated on the Contract Drawings for the various control, indications, and metering circuits were determined for general schemes of control and for particular indication and metering systems. Coordinate wiring schemes with equipment schematics.
- D. Wiring Identification: All wiring shall have a unique wire number and be labeled at both ends. Wire numbers shall correspond with the equipment terminal wire numbers. Where no wire numbers are indicated, the Contractor shall assign wire numbers. Wire numbers shall not be duplicated.
- E. Cable Identification Tags: The Contractor shall furnish all labor and materials and affix in a permanent way to each cable in manholes, cable compartments and vaults, junction boxes, pull boxes and points of termination, a laminated plastic tag, bearing clearly printed, the cable number indicated on the Contract Drawings or some other approved identification number or symbol. All cables shall be temporarily tagged with its full ID number immediately after it has been pulled.
- F. Wiring Supplies: Only electrical wiring supplies manufactured under high standards of production and meeting the approval of the Engineer shall be used. Rubber

insulating tape shall be in accordance with ASTM D119 Friction tape shall be in accordance with ASTM D69.

- G. Training of Cable: Furnish all labor and material required to train cables around cable vaults within buildings and in manholes in any outdoor underground duct system. Sufficient length of cable shall be provided in each manhole and vault so that the cable can be trained and racked in an approved manner. In training or racking, the radius of bend of any cable shall be not less than the manufacturer's recommendation. All manhole cables shall be arc and fireproofed.
- H. Connections at Control Panels, Limit Switches and Similar Devices:
1. Where stranded wires are terminated at panels, and/or devices connections shall be made by solderless lug, crimp type ferrule or solder dipped.
 2. Where enclosure sizes and sizes of terminals at limit switches, solenoid valves, float switches, pressure switches, temperature switches, and other devices make 7-strand, No. 12 AWG, wire terminations impractical, the Contractor shall terminate external circuits in an adjacent junction box of proper size and shall install No. 14 AWG stranded wires to the junction box in a conduit.
- I. Pulling Temperature: Cable shall not be flexed or pulled when the temperature of the insulation or of the jacket is such that damage will occur due to low temperature embrittlement. When cable will be pulled with an ambient temperature within a three day period prior to pulling of 40°F or lower, cable reels shall be stored during the three day period prior to pulling in a protected storage with an ambient temperature not lower than 55EF and pulling shall be completed during the work day for which the cable is removed from the protected storage.
- J. Color Coding:
1. Conductor jacket shall be color coded as follows:

AC POWER		
480V/277 Volt, 3 ϕ	208Y/120 Volt, 3 ϕ	240/120 Volt, 3 ϕ
Phase A - Brown	Phase A - Blue	Phase A - Blue
Phase B - Orange	Phase B - Black	Phase B - Black
Phase C - Yellow	Phase C - Red	Phase C - Orange
Neutral - White	Neutral - White	Neutral - White
Ground - Green	Ground - Green	Ground - Green

2. Control (Per ICEA Method 1, K-2):

WIRE NUMBER	COLOR
1	Black
2	Red
3	Blue
4	Orange
5	Yellow
6	Brown
7	Red With Black
8	Blue With Black
9	Orange With Black
10	Yellow With Black
11	Brown With Black
12	Black With Red
13	Blue With Red
14	Orange With Red
15	Yellow With Red
16	Brown With Red
17	Black With Blue
18	Red With Blue
19	Orange With Blue

3. DC Power

- a. Positive Lead - RED
- b. Negative Lead - BLACK

4. Instrumentation Signal

Pairs - Black and White
Triads - Black, Red and White

5. Equipment Ground - GREEN

K. Instrumentation Cable Installation:

1. Where instrumentation cables are installed in panels, etc., arrange wiring to provide maximum clearance between cables and other conductors. Instrumentation cables shall not be installed in same bundle with conductors of other circuits.

2. Grounding of cable shield shall be accomplished at one point only, unless otherwise required by instrumentation systems manufacturer.
3. Special instrument cable shall be as specified or recommended by the vendor of the equipment or instruments requiring such wiring. Installation, storage, terminations, etc., shall be per manufacturer's recommendations.

3.02 - IDENTIFICATION

- A. Identify wire and cable under provisions of Section 260553.
- B. Identify each conductor with its circuit number.

3.03 - FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 014500.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Field Testing:
 1. Wires and cables shall be tested before being connected to motors, devices or terminal blocks.
 2. If tests reveal defects or deficiencies, the Contractor shall make the necessary repairs or shall replace the cable as directed by the Engineer, without additional cost to the Owner.
 3. All tests shall be made by and at the expense of the Contractor who shall supply all testing equipment.
- E. Continuity Tests: All cables, wires and shields shall be tested for continuity. Testing for continuity shall be by test light or buzzer.
- F. Insulation-Resistance Tests:
 1. 600V power and control cables and wires shall be tested for their insulation-resistance values. Test shall utilize a megohmmeter with applied voltage to be 1000VDC for one (1) minute. Insulation-resistance test shall be performed on

each conductor with all other conductors grounded. The resistance value shall be 20 megohms or greater.

2. 300V instrumentation signal cable shall be tested from conductor to conductor, conductor to ground, and conductor to shield using a digital volt-ohm meter. The resistance value shall be 10 megohms or greater.

END OF SECTION

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PART 1 - GENERAL

1.01 - SECTION INCLUDES

- A. Grounding electrodes and conductors.
- B. Equipment grounding conductors.
- C. Bonding.

1.02 - REFERENCES

- A. ANSI/NFPA 70 - National Electric Code.

1.03 - REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

2.01 - COMPONENTS

- A. Ground clamps: OZ ELECTRICAL MANUFACTURING COMPANY, Type "CG", or equal by STEEL CITY or APPLETON.
- B. Raceways, conductors, outlet boxes, pull and junction boxes to be furnished in accordance with applicable sections of these specifications.
- C. Wire: Copper, sized to meet NFPA 70 requirements.

PART 3 - EXECUTION

3.01 - INSTALLATION

- A. General:
 - 1. Clean all conductive surfaces on equipment to be grounded, to assure good electrical continuity.
 - 2. Locate all grounding attachments away from areas subject to physical damage. Provide protective covering as required.

B. Feeder/Branch Circuits:

1. All circuits shall have a separate green grounding conductor in conduit sized in accordance with NFPA 70. Minimum size of conductor shall be No. 12 AWG.
2. Flexible conduit will not be approved as achieving continuity of ground. All flexible conduit to have a jumper wire sized to ampacity of branch breaker and to be connected to conduit system on both ends; this applies to fixtures, motors, controls, etc.

3.02 - TEST

- A. Test ground on main service. Ground system resistance shall be no greater than 10 ohms using test equipment similar to a "Biddle" test. Test data to be submitted to the Engineer for approval and such approved test data to become a part of the Record Documents.

END OF SECTION

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PART 1 - GENERAL**1.01 - SECTION INCLUDES**

- A. System of supporting devices and hangers for support or bracing for conduit, electrical equipment, safety switches, fixtures, panelboards, outlet boxes, junction boxes and cabinets.

1.02 - REFERENCES

- A. ANSI/NFPA 70 - National Electric Code.

1.03 - REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS**2.01 - EQUIPMENT REQUIREMENTS**

- A. Provide appropriate corrosion-resistant supporting devices and hangers for electrical equipment, as manufactured by ERICO PRODUCTS, INC., CADDY FASTENERS, STEEL CITY, MINERALLAC or equivalent.
 - 1. "Z" purlin clips.
 - 2. Conduit clips.
 - 3. Beam clamps (universal and vertical flange).
 - 4. Beam clamps (set screw type).
 - 5. Combination push-in conduit clips.
 - 6. Combination conduit hanger clamps.
 - 7. Flexible conduit clips.
 - 8. Special combination conduit clips.
 - 9. One hole steel straps.

10. Conduit hangers.

- B. Provide materials, sizes and types of anchors, fasteners and supports to carry the loads of equipment, wire in conduit and conduit.

2.02 - CHANNEL SUPPORT SYSTEM

- A. Channel systems and supports shall be manufactured by KINDORF/THOMAS & BETTS, or approved equal.
- B. Channels shall be 1-1/2" x 1-1/2".
- C. Channels and all associated accessories and bolts shall be hot dipped galvanized.
- D. Channels shall have 9/16" bolt holes on 1-1/2" centers.

PART 3 - EXECUTION

3.01 - INSTALLATION

- A. Secure conduits to within 3 feet of each outlet box, junction box, cabinet, fitting, etc., and at intervals not to exceed 10 feet in accordance with currently effective edition of the National Electric Code.
- B. In seismic zones, support conduits 1 inch and smaller at 6 foot intervals.
- C. Install clamps secured to structure for feeder and other conduits routed against structure. Use drop rods and hangers to support conduits run apart from the structure.
- D. Provide and install suitable angle iron, channel iron or steel metal framing with accessories to support or brace electrical equipment including safety switches, fixtures, panelboards, etc.
- E. Paint all supporting metal not otherwise protected, with rust inhibiting primer and then with a finish coat if appropriate to match the surrounding metal surfaces. Prepainted or galvanized support material is not required to be painted or repainted.
- F. Do not use chains, perforated iron, baling wire or tie wire for supporting conduit runs. Use of clips to support conduit to top of t-bar ceiling grid will not be permitted.
- G. Obtain permission from Engineer before drilling or cutting structural members.

- H. Install surface mounted cabinets and panelboards with a minimum of four anchors.
- I. Do not fasten supports to pipes, ducts, mechanical equipment and conduit.
- J. Install products in accordance with manufacturer's instructions.

END OF SECTION

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X:\RDWD (RIVERHEAD WATER DISTRICT) - 10810\RDWD1602 - VFD AT PLANT NO. 10\01_DEE - DESIGN - ELECTRICAL\SPECIFICATIONS\260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS.DOC | SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS | RDWD 16-02 |

PART 1 - GENERAL**1.01 - SECTION INCLUDES**

- A. Conduit system with associated couplings, connectors and fittings. Conduits to be mechanically and electrically continuous from outlet to outlet and from outlets to cabinets, pull or junction boxes.
 - 1. Conduit Use - Rigid Galvanized Conduit:
 - a. All interior and exterior circuits.
- B. Junction boxes.

1.02 - REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- B. ANSI/NFPA 70 - National Electric Code.
- C. NECA Standard of Installation.
- D. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- E. ANSI/NEMA OS1 – Sheet-steel outlet boxes, device boxes, covers and box supports.
- F. NEMA 250 – Enclosures for electrical equipment (1000 volts maximum).

1.03 - SUBMITTALS

- A. Submit product data under provisions of Section 013300.

1.04 - REGULATORY REQUIREMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc.
- B. Conform to requirements of ANSI/NFPA 70.

1.05 - PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 017839.
- B. Accurately record actual routing of all conduits.

1.06 - FIELD SAMPLES

- A. Provide under provisions of Section 014500.
- B. Provide field sample of conduit two each at 2 feet in length.
- C. Provide field sample of expansion/deflection fitting, two each.

1.07 - DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect, and handle products in accordance with manufacturers' recommendations.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing abovegrade. Provide appropriate covering.

1.08 - PROJECT CONDITIONS

- A. Verify all conduit routings by field measurements.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system. Provide all required sweeps, boxes and fittings.

PART 2 - PRODUCTS**2.01 - RIGID GALVANIZED CONDUIT**

- A. Rigid conduit shall be hot dipped, galvanized, or electro-galvanized steel by WHEATLAND, TRIANGLE, REPUBLIC or approved equal.
- B. Associated couplings, connectors and fittings shall be as manufactured by THOMAS & BETTS CORP., O.Z. GEDNEY CO., EFCOR or approved equal. Catalog numbers used below are those of THOMAS & BETTS CORP. based on 3/4-inch size and are considered standards by which equivalents are to be judged.
- C. ERICKSON couplings, Series 676 or approved equal, shall be used where neither length of conduit can be rotated.

- D. Conduit connectors shall be threaded type. Set screw and compression type connections ARE NOT acceptable.
- E. Sealing fitting locknuts shall be Series 142SL.
- F. Steel or malleable iron insulated bullet hub, Series 370-379, complete with sealing "O" ring. DO NOT use "die cast" material.
- G. Entrance ells shall be Series 1491 or approved equal.
- H. Combination coupling shall be Series 531 for connecting rigid galvanized conduit to electrical metallic tubing.

2.02 - JUNCTION BOXES

- A. Acceptable Manufacturers: RACO, GENERAL ELECTRIC or approved equal.
- B. Sheet metal boxes: NEMA OS1, galvanized steel.
- C. Covers: Galvanized steel.

PART 3 - EXECUTION

3.01 - INSTALLATION OF CONDUITS

- A. Minimum size of conduits shall be 3/4-inch.
- B. Minimum conduit depth shall be 18" below grade, measured to the top of the conduit on exterior underground installations.
- C. Conduit joints shall be cut square, threaded, reamed smooth, and drawn up tight so conduit ends will butt in couplings, connectors and fittings.
- D. Make bends or offsets with standard ells or field bends with an approved bender.
- E. Run concealed conduits in direct line with long sweep bends or offsets. Run exposed conduits parallel to and at right angles to building lines. Group multiple conduit runs in banks.
- F. Secure conduits to all boxes and cabinets with double locknuts and bushings so system will be electrically continuous from service to all outlets.
- G. Install conduit in accordance with NECA Standard of Installation.

- H. Cap ends of conduits to prevent entrance of water and other foreign material during construction.
- I. Complete all conduit systems before pulling conductors.
- J. Support conduits under provisions of Section 260529.
- K. Provide approved expansion joints or fittings and bonding jumpers where conduits in concrete pass through building expansion joints.
- L. Provide cable supports in conduits rising vertically in accordance with the National Electric Code, Article 300-19.
- M. Provide No. 12 AWG copper pull wires or nylon cord in all empty conduits. Steel wire not acceptable as pull wire.
- N. Install conduit to preserve fire resistance rating of partitions and other elements.
- O. Ground and bond conduit under provisions of Section 260526.
- P. Where neither length of conduit can be rotated, ERICKSON couplings Series 676 shall be used.
- Q. In areas where enclosed and gasketed fixtures and weatherproof devices are specified, where rigid conduit enters a sheet metal enclosure, junction box and outlet box, and not terminated in a threaded hub, a steel, or malleable iron nylon insulated bullet hub, complete with recessed sealing "O" ring, shall be used, Series 370-379 . DO NOT use die cast material.
- R. In concrete slabs block up conduit from forms and securely fasten in place. All conduits in slabs shall be installed below concrete slab.
- S. Where conduits running overhead pass through building expansion joints, install flexible liquid tight conduit of same size with sufficient slack to allow conduits on either side of expansion joint to move a minimum of 3-inches in any direction. Provide supports as required on each side of expansion joint, all in accordance with seismic requirements of specific area.
- T. Failure to route conduit through building without interfering with other equipment and construction shall not constitute a reason for an extra charge. Equipment, conduit and fixtures shall fit into available spaces in building and shall not be introduced

into building at such times and manner as to cause damage to structure. Equipment requiring servicing shall be readily accessible.

- U. Arrange supports to prevent misalignment during wiring installation.
- V. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- W. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- X. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- Y. Do not attach conduit to ceiling support wires.
- Z. Arrange conduit to maintain headroom and present neat appearance.
- AA. Route exposed conduit parallel and perpendicular to walls.
- BB. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- CC. Route conduit in and under slab from point-to-point.
- DD. Do not cross conduits in slab.
- EE. Maintain adequate clearance between conduit and piping.
- FF. Maintain 12-inch clearance between conduit and surfaces with temperatures exceeding 104°F (40°C).
- GG. Bring conduit to shoulder of fittings; fasten securely.
- HH. Use conduit hubs with sealing locknuts to fasten conduit in damp and wet locations.
- II. Install no more than equivalent of three 90-degree bends on interior locations between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2-inch size.
- JJ. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

- KK. Do not use dissimilar strap or clamp supports. Provide dielectric tape, fittings, straps, and bushings where dissimilar metals are used.
- LL. Where fittings for liquid-tight flexible conduit are brought into an enclosure with a knockout, a gasket assembly, consisting of one piece "O" ring, with a Buna-R sealing material, Series 5200, shall be installed on outside of box. Fittings shall be made of either steel or malleable iron only, and shall have insulated throats or insulated bushings.
- MM. A copper ground wire sized in accordance with NEC shall be installed on the inside of the conduit as a jumper around flexible conduit to assure a continuity of ground.
- NN. Install a copper jumper across all flexible conduit including lighting fixtures, controls and other utilization equipment.
- OO. Install liquid-tight flexible conduit in such a manner as to prevent liquids from running on surface toward fittings.
- PP. Allow sufficient slack conduit to reduce the effect of vibration.
- QQ. Complete all conduit systems before pulling the conductors.
- RR. Support in accordance with requirements of National Electric Code.

3.02 – INSTALLATION OF JUNCTION BOXES

- A. Provide junction boxes as shown on Drawings and otherwise where required, sized according to number of conductors in box or type of service to be provided. Minimum junction box size 4-inch square and 2-1/8-inches deep. Provide screw covers for junction boxes.
- B. Install boxes in conduit runs wherever necessary to avoid long runs or too many bends. Do not exceed 100-foot runs without pull boxes. Install pull boxes at all 90-degree bends.
- C. Rigidly secure boxes to walls or ceilings. Conduit runs will not be considered adequate support.
- D. Install boxes with covers in accessible locations. Size boxes in accordance with the National Electric Code.

- E. Do not install junction boxes for joint use of line voltage and signal or low voltage controls unless all conductors are insulated for the highest voltage being used in the same box.
- F. Coordinate installation of exterior pull boxes with General contractor to establish elevations of finished grades and pavements. All castings shall have chimney adjustment of $\pm 6"$.

3.04 - CONDUIT LOCATIONS

- A. Route all conduit exposed on existing block walls or above finished ceilings. Provide boxes and conduits exposed on existing block walls for all power and controls.
- B. Surface mounted conduits will only be allowed in pipe trenches and existing block walls. Surface mounted conduits shall only be permitted for vertical runs. All horizontal runs shall be installed above finished ceilings.
- C. Contractor shall not route conduits over pump motors, roof hatches and trolley beams which would prevent removal of pump motors.

END OF SECTION

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X:\RDWD (RIVERHEAD WATER DISTRICT) - 10810\RDWD1602 - VFD AT PLANT NO. 10\01_DEE - DESIGN - ELECTRICAL\SPECIFICATIONS\260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.DOC | SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS | RDWD 16-02 |

PART 1 - GENERAL**1.01 - SECTION INCLUDES**

- A. Nameplates and labels.
- B. Wire and cable markers.
- C. Conduit markers.

1.02 - REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.03 - SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Provide catalog data for nameplates, labels and markers.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Underwriters Laboratories, Inc. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.04 - REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 - PRODUCTS**2.01 - NAMEPLATES AND LABELS**

- A. Nameplates: Engraved three-layer laminated plastic, white letters on black background.
- B. Locations:
 - 1. Motor Control Centers.
 - 2. Wall mounted VFD.

3. All control switches and pilot light devices.
- C. Letter Size:
1. Use 1/4 inch (6 mm) letters for identifying all control pilot lights.
- D. Labels: Embossed adhesive tape, with 3/16" (5mm) white letters on black background. Use for identifying existing equipment, distribution panels, switchboards, disconnect switches, and individual electrical devices.

2.02 - WIRE MARKERS

- A. Manufacturers:
1. 3M ELECTRICAL SPECIALTY DIV., Product Scotch Code.
 2. THOMAS & BETTS CORP., Product E-Z Code.
 3. Substitutions shall be permitted only after receiving written approval from the Engineer.
- B. Description: Epoxy film tape type wire markers.
- C. Locations: Each conductor at panelboards, auxiliary gutters, pull boxes, outlet and junction boxes, circuit breakers and each load connection.
- D. Legend:
1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
 2. Control Circuits: Control wire number indicated on interconnection diagrams on drawings.

PART 3 - EXECUTION

3.01 - PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.02 - APPLICATION

- A. Install nameplate and label parallel to equipment lines.

- B. Secure nameplate to equipment front using screws, rivets or adhesive.
- C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.
- D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches (75 mm) below finished grade.

3.03 - ELECTRICAL EQUIPMENT IDENTIFICATION

- A. The Contractor shall identify all existing circuits in existing distribution panels, switchboards and disconnect switches to remain.
- B. Label all circuits identifying the load served including all individual circuit breakers.
- C. Label all new circuit breakers and switches used for new feeder and branch circuits.

END OF SECTION

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PART 1 - GENERAL**1.01 - SECTION INCLUDES**

- A. Variable frequency controller.

1.02 - REFERENCES

- A. NEMA ICS 3.1 - Safety Standards for Construction and Guide for Selection, Installation and Operation of Variable Frequency Drive Systems.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- C. UL, and cUL Approved for both Single & Three Phase Input Voltage.
- D. IEEE Standard 444 (ANSI-C343).
- E. IEEE Standard 519.
- F. IEC: 146A.
- G. UL 508C (Power Conversion).
- H. CSA 22.2 No. 14-95 (Industrial Control Equipment).
- I. UL 1995 (Plenum rating).
- J. EN 50178 (LVD).
- K. EN 61800-3.
- L. IEC 529.
- M. FCC CFR 47 Part 15 Subpart B.

1.03 - SUBMITTALS

- A. Submit product data under provisions of Section 013300.
- B. Shop Drawings: Include front and side views of enclosures with overall dimensions and weights shown; conduit entrance locations and requirements; and nameplate legends.

- C. Product Data: Provide catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.
- D. Test Reports: Indicate field test and inspection procedures and test results.
- E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.
- F. Manufacturer's Field Reports: Indicate start-up inspection findings.
- G. Manufacturer's recommended spare parts list.

1.04 – QUALITY ASSURANCE

- A. VFD shall have a minimum MTBF (mean time between failure) rating of 28 years (245,280 Hours). Must be part of the submittal documentation.

PART 2 - PRODUCT

2.01 – MANUFACTURERS

- A. VFD shall be manufactured by Yaskawa Electric America, Inc. model iQpump.

2.02 - DESCRIPTION

- A. Provide enclosed variable frequency drives suitable for operation at the current, voltage, and horsepower indicated on the schedule. Conform to requirements of NEMA ICS 3.1.
- B. Minimum efficiency at full load: 98 percent.

2.03 - ENVIRONMENT RATINGS

- A. Operating Ambient: -10 degrees C to 40 degrees C (14 degrees F to 104 degrees F).
- B. Relative Humidity: 0 to 95% non-condensing.
- C. Altitude: 3,380 feet, higher altitude achieved by derating.

2.04 - RATINGS

- A. VFD must operate, without fault or failure, when voltage varies plus 10% or minus 15% from rating, and frequency varies plus or minus 5% from rating.
- B. VFD shall be 277/480 volts, 60 Hz, 3 Phase.
- C. Displacement Power Factor: 0.98 over entire range of operating speed and load.
- D. Minimum Efficiency: 96% at half speed; 98% at full speed.
- E. Starting Torque: 100% starting torque shall be available from 0.5 Hz. to 60 Hz.
- F. Overload capability: 110% of rated FLA (Full Load Amps) for 60 seconds; 180% of rated FLA, instantaneously.
- G. The VFD must meet the requirements for Radio Frequency Interference (RFI) above 7 MHz as specified by FCC regulations, part 15, subpart J, Class A devices.
- H. VFDs must have a minimum short circuit rating of 100K amps RMS without additional input fusing.

2.05 - DESIGN

- A. VFD shall employ microprocessor based inverter logic, isolated from all power circuits.
- B. VFD shall include surface mount technology with protective coating.
- C. VFD shall employ a PWM (Pulse Width Modulated) power electronic system, consisting of:
 - 1. Input Section:
 - a. VFD input power stage shall convert three-phase AC line power into a fixed DC voltage via a solid state full wave diode rectifier, with MOV (Metal Oxide Varistor) surge protection.
 - 2. Intermediate Section:
 - a. DC bus as a supply to the VFD output Section shall maintain a fixed voltage with filtering and short circuit protection.

- b. DC bus shall be interfaced with the VFD diagnostic logic circuit, for continuous monitoring and protection of the power components.
 - c. 30 HP to 150 HP @ 208 VAC, 30 HP to 150 HP @ 240 VAC, and 40 HP to 500 HP 480 VAC, VFDs shall include a DC bus reactor to minimize reflected harmonics.
3. Output Section:
- a. Insulated Gate Bipolar Transistors (IGBTs) shall convert DC bus voltage to variable frequency and voltage.
 - b. The VFD shall employ PWM sine coded output technology to power the motor.
- D. The VFD must be selected for operation at carrier frequencies at or above 5 kHz without derating to satisfy the conditions for current, voltage, and horsepower as indicated on the equipment schedule. Exception to this requirement is allowed only for VFDs providing 506 amps or more.
- E. The VFD must have plated bus bar to resist corrosion.
- F. VFD shall have an adjustable carrier frequency: The carrier frequency shall have a minimum of six settings to allow adjustment in the field.
- G. VFD shall have optional protocols for network communications. These protocols shall be accessible via a RS-422/485 communication port.
- H. VFD shall have a quick disconnect, removable control I/O terminal block to simplify control wiring procedures.
- I. VFD shall include two independent analog inputs. One shall be 0-10 VDC. The other shall be programmable for either 0-10 VDC or 4-20 mA. Either input shall respond to a programmable bias and gain.
- J. VFD shall include a minimum of seven multi-function digital input terminals, capable of being programmed to determine the function on a change of state. These terminals shall provide up to 30 functions, including, but not limited to:
- 1. Hand – Off – Auto operation selection.
 - 2. Detection of external fault condition.

3. Remote Reset.
 4. Multi-step speed commands.
 5. Run permissive.
 6. Floating control.
- K. VFD shall include two 0-10 VDC or 4-20 mA analog output for monitoring, or "speed tracking" the VFD. The analog output signal will be proportional to output frequency, output current, output power, PI (Proportional & Integral control) feedback or DC bus voltage.
- L. VFD shall provide terminals for remote input contact closure, to allow starting in the automatic mode.
- M. VFD shall include at least one external fault input, which shall be programmable for a normally open or normally closed contact. These terminals can be used for connection of firestats, freezestats, high pressure limits or similar safety devices.
- N. VFD shall include two form "A" contacts and one form "C" contact, capable of being programmed to determine conditions that must be met in order for them to change state. These output relay contacts shall be rated for at least 5A at 120 VAC and shall provide up to 18 functions, including, but not limited to:
1. Pump Fault.
 2. Low and High Pressure detection.
 3. Pump Over Cycling detection.
 4. Loss of Prime detection.
 5. Drive Fault.
 6. Over/Under Torque detection.
 7. Not Maintaining Set Point detection.
- O. VFD shall include a power loss ride through of 2 seconds.
- P. VFD shall have DC injection braking capability.

- Q. VFD shall have a motor preheat function to prevent moisture accumulation in an idle motor.
- R. VFD shall include diagnostic fault indication in selected language, last 10 faults storage and heatsink cooling fan operating hours.
- S. VFD shall have a digital operator with dedicated Hand-Off-Auto keys with program copy and storage functions to simplify set up of multiple drives. The digital operator shall be interchangeable for all drive ratings.
- T. VFD shall include a front mounted, sealed keypad operator, with an English language illuminated LCD display. The operator will provide complete programming, program copying, operating, monitoring, and diagnostic capability. Keys provided shall include industry standard commands for Hand, Off, and Auto functions.
- U. VFD plain language display shall provide readouts of; output frequency in hertz, PI feedback in percent, pump speed in RPM, set point and feedback level in programmable engineering units (PSI, GPM ,etc.) output voltage in volts, output current in amps, output power in kilowatts, D.C. bus voltage in volts, interface terminal status, heatsink temperature and fault conditions. All displays shall be viewed in an easy-to-read illuminated LCD.
- V. VFD unit shall include the following meters to estimate use of energy:
 - 1. Elapsed Time Meter.
 - 2. Kilowatt Meter.
 - 3. Kilowatt Hour Meter.
- W. VFD shall include PI control logic, to provide closed loop setpoint control capability, from a feedback signal, eliminating the need for closed loop output signals from a building automation system. The PI controller shall have a differential feedback capability for closed loop control of pumps for pressure, flow or temperature regulation in response to dual feedback signals.
- X. An energy saving function shall be available in both open loop (follower mode) and closed loop (PI) control, providing significant energy savings while minimizing operating hours on driven equipment. When the sleep function senses a minimal deviation of a feedback signal from setpoint, or low demand in open loop control, the

system reacts by stopping the driven equipment. Upon receiving an increase in speed command signal deviation, the drive and equipment resume normal operation.

- Y. VFD shall include loss of input signal protection, with a selectable response strategy including speed default to a percent of the most recent speed.
- Z. VFD shall include electronic thermal overload protection for both the drive and motor. The electronic thermal motor overload shall be approved by UL. If the electronic thermal motor overload is not approved by UL, a separate UL approved thermal overload relay shall be provided in the VFD enclosure.
- AA. VFD shall include factory settings for all parameters, and the capability for those settings to be reset.
- BB. VFD shall include user parameter initialization capability to re-establish project specific parameters.
- CC. VFD shall include the capability to adjust the following functions, while the VFD is running:
 - 1. Set Point command input.
 - 2. Acceleration adjustment from 0 to 6000 seconds.
 - 3. Deceleration adjustment from 0 to 6000 seconds.
 - 4. Analog monitor display.
 - 5. Removal of digital operator.

2.06 – TESTING AND QUALITY CONTROL

- A. In-circuit testing of all printed circuit boards shall be conducted, to insure the proper mounting and correct value of all components.
- B. All printed circuit boards shall be burned in for 4 hours, at 60 degrees C.
- C. Final printed circuit board assemblies shall be functionally tested, via computerized test equipment. All tests and acceptance criteria shall be preprogrammed. All test results shall be stored as detailed quality assurance data.

- D. All fully assembled controls shall be functionally tested, with fully loaded induction motors. The combined test data shall then be analyzed, to insure adherence to quality assurance specifications.
- E. Inspect and production test, under load, each completed VFD assembly.

PART 3 - EXECUTION

3.01 - EXAMINATION

- A. Verify that surface is suitable for VFD installation.
- B. Do not install VFD until the building environment can be maintained, within the service conditions required by the manufacturer.

3.01 - INSTALLATION

- A. Controllers shall be as shown on the Contract drawings.
- B. Install controller in accordance with manufacturer's written instructions and NEMA ICS 3.1.
- C. Tighten accessible connections and mechanical fasteners after placing controller.
- D. Install fuses in fusible switches.
- E. Select and install overload heater elements in controllers to match installed motor characteristics.
- F. Provide engraved plastic nameplates under the provisions of Section 260553.
- G. Provide neatly typed label inside each motor controller door identifying motor served, nameplate horsepower, full, load amperes, code letter, service factor, and voltage/phase rating.

3.02 - ADJUSTING

- A. Make final adjustments to installed drive to assure proper operation of system. Obtain performance requirements from installer of driven loads.

3.03 - DEMONSTRATION

- A. Demonstrate operation of controllers in automatic and manual modes.

- B. Provide the services of the manufacturer's trained personnel to completely check the VFD system installations and adjust the drive for operation. An additional period shall be included for trained personnel at the time of acceptance and field tests. A minimum amount of six days and three trips shall be required for this work.
- C. Manufacturer's trained personnel, after initial field startup shall remove all logic PC boards for the pump program logic and install and adjust a spare set of PC boards. These boards shall remain in the drives and the initial boards shall be provided as spares.
- D. Service Contract - Provide a one-year service contract for the pump control system. Service contract shall include the services of a manufacturer trained engineer to provide preventive maintenance service and calibration of the equipment. At least four routine service trips shall be made as scheduled by Owner. In addition, whenever trouble occurs with the system, a serviceman shall come and repair/replace defective parts at no additional cost. All parts required for repair shall be included at no additional cost. This service contract shall take effect one year after acceptance of the equipment and after the one-year guarantee period has lapsed.

END OF SECTION

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PART 1 - GENERAL

1.01 - SECTION INCLUDES

- A. Programmable logic controllers.
- B. Input/output hardware.
- C. Programmer/programming requirements.

1.02 - RELATED SECTIONS

- A. Section 265012 - Description of Controls.

1.03 - REFERENCES

- A. NEMA ICS 1 - General Standards for Industrial Control and Systems.
- B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
- C. NEMA ICS 3 - Industrial Systems.
- D. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

1.04 - SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Submit shop drawings indicating layout of completed assemblies, interconnecting cabling, dimensions, weights, external power requirements and a complete I/O list of control points.
- C. Submit wiring and schematics diagrams for the existing controls.

1.05 - QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five (5) years documented experience, which maintains service facilities within 50 miles of project.

PART 2 – PRODUCTS**2.01 - MANUFACTURERS**

- A. ALLEN BRADLEY Model 1746 I/O Modules.
 - 1. 1746-N08I 8-channel analog output card.
 - 2. 1746-NI16I 16-channel analog input card.

2.02 - INPUT/OUTPUT (I/O) CHARACTERISTICS

- A. The input characteristics shall be provided in 10-31 VDC and 4-20 mA analog current. All input circuits shall have optical isolation (1,500 volt minimum) and filtering to guard against high voltage transients from the externally connected devices.
- B. The output characteristics shall be provided in 10-31 VDC, relay contact, and analog current.
- C. The I/O modules for the modular PLC systems shall be available in 4, 8 or 16 points depending on which module is selected.
- D. Status indicators shall be provided for each of the input and output circuits and shall be illuminated when the circuit is energized.

2.03 - INPUT/OUTPUT - GENERAL

- A. During normal operation, a malfunction in any remote input/output channel shall affect the operation of only that channel and not the operation of the CPU or any other channel.
- B. Circuit components for both remote input and output shall be mounted on plug-in modules and keyed to prevent module insertion into the wrong slot.
- C. Isolation shall be used between all internal logic and external power circuits. This isolation shall meet the minimum specification of 1500 vrms.
- D. It shall be possible to replace any input or output module without disturbing field wiring.

- E. Each I/O module shall contain a visual indicator to display ON/OFF status of individual input or output points.
- F. Discrete output modules shall be provided with self-contained fuses for overload and short circuit protection of the module.
- G. All field wiring to I/O modules shall be through a heavy duty terminal strip. Pressure-type screw terminals shall be used to provide fast, secure wire connections. All input/output modules shall be color coded and titled with a distinctive label.

2.04 - ANALOG INPUT/OUTPUT MODULES

- A. Analog input which accepts analog signals and converts them to 3-digit BCD, 4-digit BCD or 14-bit binary values. Digital resolution shall be available in 1 part in 256, 1 part in 1,000 (BCD), or 1 part in 4,096 (binary). Analog inputs shall be available in single-ended and sourcing and differential and differential isolated versions. Analog inputs shall be available in the following ranges:
 - 1. Voltage range: +1 to +5 VDC.
 - 2. Current range: 4 to 20 mA.
- B. Analog output converts a 3-digit BCD number, a 4-digit BCD number, or a 12-bit binary number into an equivalent single-ended analog output signal. Output isolation shall be available. Analog outputs shall be available in the following ranges:
 - 1. Voltage range: +1 to +5 VDC.
 - 1. Current range: 4 to 20 mA.

2.05 – PLC SOFTWARE CHARACTERISTICS

- A. The PLC's memory shall consist of data table and program logic areas. The PLC shall examine the status of its inputs prior to every program scan and store the status in the "Input" data table area of its memory. The PLC shall update the "Output" data table area of its memory during every program scan, and then set the real world outputs accordingly. The updating of inputs, program logic and outputs should be repeated continuously while the PLC is in the run mode. The user application program shall be stored in the program logic area of memory as a ladder diagram. The status of a group of inputs and/or outputs controlling an output or outputs shall be called a ladder diagram rung. The program shall consist entirely of ladder

diagram rungs to carry out the control plan. The time that the PLC requires to scan 4,096 typical program instructions shall be less than or equal to 500 ms (milliseconds).

- B. Provide registered copy of latest edition of programming software and final accepted source code to District for each CPU furnished as part of this project.
- C. Inputs/Outputs:

PLANT NO. 10 – DIGITAL INPUTS	
DESCRIPTION	DIGITAL INPUTS
Tank – Pressure – Tracking Auto Selector Switch	Relay or Dry Contact (3) Required
Booster A VFD Fault	Relay or Dry Contact
Booster A VFD Run	Relay or Dry Contact
Booster B VFD Fault	Relay or Dry Contact
Booster B VFD Run	Relay or Dry Contact

PLANT NO. 10 – ANALOG INPUTS	
DESCRIPTION	ANALOG INPUTS
High Zone Pressure Transmitter	4-20 mA

PLANT NO. 10 – ANALOG OUTPUTS	
DESCRIPTION	ANALOG OUTPUTS
Booster A Speed Reference	4-20 mA
Booster B Speed Reference	4-20 mA

PART 3 - EXECUTION

3.01 – INSTALLATION

- A. Install in accordance with manufacturer's instructions on PLC.
- B. Install new 16-channel analog input card and 8-channel output card in existing PLC chassis.

3.02 - PROGRAMMING

- A. The Contractor shall be responsible to develop, document, program and debug the control sequence and logic necessary to assure system operation as stipulated in the specifications and on the contract drawings. The ladder logic shall be directly

programmed in the PLC's. This Contractor shall be responsible for complete programming and verification of performance to be consistent with the intended control operation.

- B. The contractor shall modify the existing PLC program to incorporate the new additional I/O's and new Booster A and B operation as specified on Section 265012.

3.03 - MANUFACTURER'S FIELD SERVICE

- A. Provide operating instruction manuals with adequate information pertaining to the following:
 - 1. Source Code.
 - 2. System specifications.
 - 3. Electrical power requirements.
 - 4. Application considerations.
 - 5. Assembly and installation procedures.
 - 6. Power up procedures.
 - 7. Troubleshooting procedures.
 - 8. Programming procedures.
 - 9. Explanation of internal fault diagnostics.
 - 10. Shutdown procedures.
- B. Documentation: Provide two copies of all working programs on CD as well as a printed program listing.
- C. Product Support Services: The Service Department of the Supplier shall have experienced representatives capable of providing telephone consultation, prompt on-site service and field replacement stock.

3.04 - DEMONSTRATION

- A. Provide complete system demonstration and performance verification services.

- B. Demonstrate operation and programming of controllers. Provide as part of the start-up and demonstration service described in Section 265012, instruction for operating personnel, to be conducted at project site with manufacturer's representative.
- C. Customer Training Programs: Provide a customer training program designed to teach the owner's personnel in the understanding and application of the programmable controller. The training program shall include training manuals and "hands-on" programming experience on a programmable controller of the type provided under this contract.

END OF SECTION

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PART 1 - GENERAL**1.01 - SECTION INCLUDES**

- A. Programmable logic controller software development.

1.02 - SUBMITTALS

- A. Submit PLC and Relay Logic Control drawings in accordance with Section 013300.
- B. Provide registered copy of PLC programming including final accepted program to District for each PLC furnished as part of this project.
- C. Provide submittal drawings for PLC/Communication cubicles for each plant.

PART 2 - PRODUCTS**2.01 - CONTROL SYSTEM INTEGRATION**

- A. Instrumentation control system shall be integrated and manufactured by EAGLE CONTROL., YAPHANK, NEW YORK or approved equal. Instrumentation control system shall be provided by a single source supplier.
- B. The contractor shall provide satisfactory evidence to the engineer that the instrumentation system supplier has demonstrable qualifications in performance of this kind of work with a minimum of ten (10) years related PLC experience to substantiate:
 - 1. That the instrumentation system supplier has been regularly engaged in providing similar PLC services and equipment for a minimum of ten (10) years.
 - 2. That the instrumentation system supplier has provided at least five (5) PLC installations of comparable scope and complexity, with references.
 - 3. That the instrumentation system supplier has a service center within 50 miles of the project location.
 - 4. No shop drawing submittals shall be made, nor any equipment delivered or installed with respect to instrumentation or control prior to the contractor having obtained written approval of the instrumentation system supplier.

5. That the instrumentation supplier has an office within 50 miles of the project site complete with the following:
 - a. Office has a minimum of two (2) field technicians staffed full time at this office which provides 24-hour, 7 days a week service with a minimum response time of 2-hours.
 - b. Office has a minimum of two (2) PLC programmers staffed full time at this location.
 - c. Office has a minimum of two (2) electrical engineers staffed full time at this location experienced with, PLC's and knowledge of water supply system operations.
 - d. The Water District and District's engineer shall have the right to inspect office, spare part supply and meet and interview service technicians, PLC programmers and engineers as part of determining qualification of system integrator.
- C. The contractor shall bear full responsibility for the instrumentation and controls. The contractor shall have the instrumentation system supplier:
 1. Design the instrumentation system, communication system and monitoring system described in these specifications.
 2. Prepare shop drawings for submittal by the contractor to the engineer.
 3. Provide the necessary information or modifications to the shop drawings to obtain approval.
 4. Supervise the installation.
 5. Perform debugging, testing, maintenance and operation of all instrumentation and control systems.
- D. The instrumentation system supplier shall prepare for submission by the contractor, detailed point-to-point wiring diagrams. Point-to-point wiring diagrams shall be provided for all existing electrical equipment to be interfaced with. Submittals not including this will be rejected. Engineering services shall be provided by the instrumentation system supplier during start-up and testing as required by other sections of the specification.

- E. The contractor shall require the instrumentation system supplier to verify all connections and operational features of all equipment controlled, directly or indirectly, by equipment furnished under this contract prior to submission of shop drawings, schematics shall show all remote connections and respective terminal numbers of all such equipment.
- F. The contractor shall have the instrumentation system supplier develop and provide details for installation of all field mounted control devices, communication equipment, transmitters, receivers, etc. per recommended practices of the equipment manufacturer and in a manner acceptable to the engineer. Such details shall include specific location, method of support and connection details, as a minimum.
- G. Qualified personnel of the instrumentation system supplier shall be provided, as specified hereinafter, for the purpose of instructing the owner's personnel in the operation, maintenance and troubleshooting of all instrumentation systems and related equipment.
- H. It is the intent of this specification that all devices, insofar as practical shall be purchased from a single manufacturer to simplify maintenance and operation.

2.02 - CONTROL SYSTEM

- A. Contractor will not be furnished any record drawings of existing conditions for execution of this project. Contractor shall provide all required field investigation by system integrator to develop existing conditions record drawings and verify existing controls are operational. Once Contractor begins installation, no claims shall be made for existing conditions not operational.
- B. Control system integrator shall provide all relays, timers, pilot lights, selector switches and contactors required for operation of control system.
- C. Contractor shall provide all wiring required for operation of control system as specified.
- D. Contractor shall provide all relays and controls for interfacing with new and existing I/O points. Provide IEC contactors for control of all valves and solenoids.
- E. Digital I/O and 120 volt power shall be permitted in common conduit.
- F. Analog signals shall be in dedicated conduit.

PART 3 - EXECUTION**3.01 –HIGH ZONE BOOSTER PUMPS SYSTEM OPERATION**

- A. The existing automatic start/stop signal via the existing H-O-A switch on the MCC shall remain as is.
- B. The parallel remote start/stop signal from the Administration building shall remain as is.
- C. When the Booster H-O-A switch is in the Automatic position, the Booster shall start based off of the Tank-Pressure-Tracking selector switch.
- D. When Tank-Pressure-Tracking selector switch is in the Tank position:
 - 1. Once the start level setpoint is reached a start time delay set via the HMI shall begin. After the time delay times out the lead Booster pump shall run at full speed (60Hz) to meet and maintain the High Zone Tank Level setpoint set through the HMI.
- E. When Tank-Pressure-Tracking selector switch is in the Pressure position:
 - 1. Once the start level setpoint is reached a start time delay set via the HMI shall begin. After the time delay times out the lead Booster pump shall run at full speed (60Hz) to meet and maintain the High Zone Pressure Level setpoint set through the HMI.
- F. When Tank-Pressure-Tracking selector switch is in the Tracking position:
 - 1. A PID pressure setpoint level shall be set via the HMI. A single set of start and stop level setpoints shall be set via the HMI. This will be the only setpoints for all pumps.
 - 2. Once the start level setpoint is reached a start time delay set via the HMI shall begin. After the time delay times out the lead pump shall start and run at a selectable speed for a selectable time. After this time elapses the lead pump shall follow the PID follower signal. The PID control shall be through the PLC.
 - 3. If the lead pump has run at 20mA (PID output) and the desired tank level or pressure level setpoint is not reached for an adjustable time period, the lag pump shall start at preset speed for an adjustable time period. After the period elapses the PLC shall lock the lead pump to run at 20mA. After an

adjustable time delay, the PLC shall release the lag pump to the PID follower signal.

4. If the lag pump has run at 4mA for an adjustable time period, the lag pump shall stop. After a time delay the PLC shall release the lead pump to the PID follower signal.
 5. If the lead pump has run at 4mA and the off level setpoint is reached for an adjustable time period, the lead pump shall stop.
- G. The Software Internal to the PLC shall coordinate the transfer pumps to allow a lower priority pump (e.g. Back-up) to move up the priority string in the event of the next higher pump control faulting or switching to off to maintain all operational pumps in the control system.
- H. All timer and time delays for the Booster pumps system operation shall be set via the HMI system.

3.02 - PROPORTIONAL INTEGRAL DERIVATIVE CONTROL (BOOSTER PRESSURE CONTROL)

- A. The proportional integral derivative controllers shall include an analog proportional controller to provide a continuous current output signal (0-20 or 4-20mA) to regulate the speed of the VFD. At minimum output (0 to 4 mA), the control output shall be programmable to be fully "on" or "off" depending on type of element used. At maximum output (20mA), control output shall be programmable to be fully modulated from its original position.
- B. The controller shall provide an output to the variable frequency drive to regulate the tank level or system pressure to a desired system setpoint set through the HMI system. The controller shall combine adjustable proportional gain and integral functions to allow the process to attain the desired setpoint value within the shortest amount of time and with a minimum of overshoot by comparing the instantaneous difference between actual level and desired level (setpoint) as well as the recent history of difference between actual and desired pressures.
- C. LOOP GAIN controls shall be provided to adjust the overall gain of the control loop. PROP GAIN control shall be provided to tune the controller to the process dynamics.
- D. One PID loop control systems is required.

3.03 - DEMONSTRATION

- E. Demonstrate operation of control system.
- F. Demonstrate procedure for changing set points and timer settings.

3.04 – STARTUP & DEMONSTRATION SERVICE

- A. The Contractor shall engage the control system supplier/integrator to provide startup for the control system. A factory-trained engineer that is thoroughly familiar with the equipment supplied and its specific application on this project shall perform the startup service. The same factory trained engineer shall provide a minimum of one (1) 8-hour day for demonstration of the new control system to the Owner's personnel.

END OF SECTION

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PART 1 - GENERAL**1.01 - SECTION INCLUDES**

- A. Operator Terminals.

1.02 - REFERENCES

- A. NEMA ICS 1 - General Standards for Industrial Control and Systems.
- B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
- C. NEMA ICS 3 - Industrial Systems.
- D. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

1.03 - SUBMITTALS

- A. Submit product data under provisions of Section 013300.
- B. Submit shop drawings indicating layout of completed assemblies, interconnecting cabling, dimensions, weights, and external power requirements.
- C. Submit scaled drawings of graphic screen generations including systems overview, controls settings, reports and alarms for approval by Engineer prior to development.
- D. Submit a written description of the alarms dialing scheduling/editing, reports editing and printing, access code and security, and communication from Plant No. 1 control room and Birch Drive, for approval by Engineer prior to development.

PART 2 - PRODUCTS**2.01 - MANUFACTURERS**

- A. ALLEN BRADLEY Panelview 800 Model 2711R-T4T. (2.02 - OPERATOR Workstation TERMINALS

2.02 - HUMAN MACHINE INTERFACE (HMI)

- A. Operator Terminal shall have the following features:
 - 1. 4-inch Color, TFT 480x277 WQVGA.
 - 2. Full Analog resistive Touch screen

3. Serial and Ethernet Communication
4. 128MB of Battery Backed Application Memory
5. Panel mount design to fit into motor control center.
6. Operating System: Microsoft Windows CE.

PART 3 - EXECUTION

3.01 – INSTALLATION

- A. Modify existing PLC programming to allow integration of new HMI to existing MCC.

3.02 – PLANT NO. 10 – HMI FUNCTION

- A. Install the HMI on the door of the existing instrumentation cubicle. Install all interconnections and wiring between programmable logic controller and operator terminal as recommended by manufacturer.
- B. Develop the HMI program for the graphics, alarms, controls and settings functions for the boosters.
- C. The HMI terminal shall allow operator access to the operating system to view the system overview and change the variable settings for the Boosters. Access code is required for changing setpoints, alarms acknowledge and resetting.
- D. Tank levels and pressure set points, time delays and alarm settings can be changed on the screen. It is required that an access password and any change shall be recorded.
- E. Generate a system graphics as indicated on the drawings to include the following:
 1. Lead and Lag Booster Setting.
 2. Display Booster Pump A and B on/off status.
 3. High Zone Tank Level Start/Stop setpoints.
 4. High Zone System Pressure Start/Stop setpoints.
 5. Delay timer settings.

6. High Zone Pressure.
7. Low Zone Tank Level.

END OF SECTION

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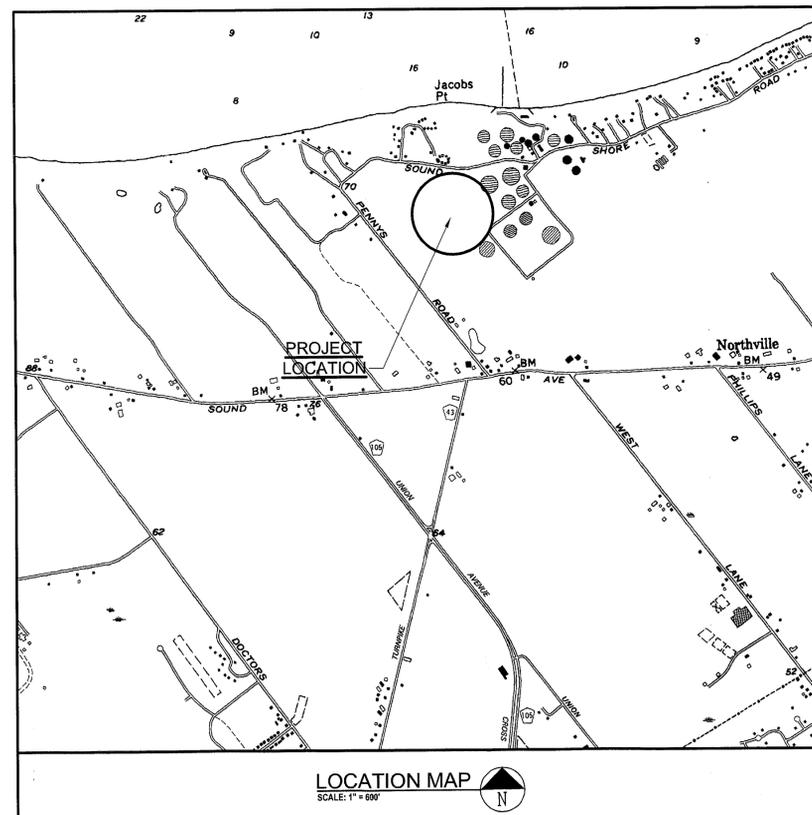
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RIVERHEAD WATER DISTRICT

TOWN OF RIVERHEAD
SUFFOLK COUNTY, NEW YORK

INSTALLATION OF TWO (2) NEW VFD'S AT PLANT NO. 10

RDWD 16-02
SEPTEMBER 2016



TOWN SUPERVISOR

Sean Walter

TOWN COUNCIL

John Dunleavy
Timothy Hubbard
Jodi Giglio
James Wooten

TOWN CLERK

Diane Wilhelm

SUPERINTENDENT

Mark Conklin

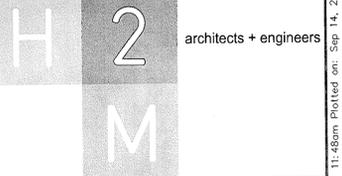
DRAWING LIST

INFORMATIONAL DRAWINGS

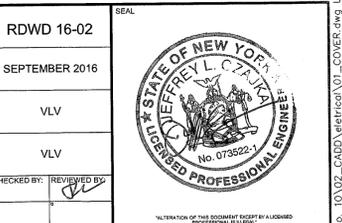
T0.0 COVER SHEET

ELECTRICAL DRAWINGS

E0.0 ELECTRICAL LEGENDS
E1.0 ELECTRICAL POWER PLAN



Melville, NY 11747
Albany, NY 12205
White Plains, NY 11601
New City, NY 10956
Parsippany, NJ 07054
Howell, NJ 07731



**RIVERHEAD
WATER DISTRICT**

INSTALLATION OF TWO (2)
NEW VFD'S AT PLANT NO. 10

FINAL BID DOCUMENT

SHEET #
T0.0

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