water

CONTRACT AND SPECIFICATIONS

RIVERHEAD WATER DISTRICT
TOWN OF RIVERHEAD
SUFFOLK COUNTY, NEW YORK

BOOSTER PUMPING STATION AT PLANT NO. 15

TUTHILLS LANES, JAMESPORT
Project No: RDWD 17-02

TOWN SUPERVISOR
Laura Jens-Smith

TOWN COUNCIL
Jodi Giglio
Timothy Hubbard
Catherine Kent
James Wooten

TOWN CLERK
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MARCH 2018

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Notice is hereby given that SEALED PROPOSALS for:

Booster Pumping Station at Plant No. 15

Contract G - General Construction

Contract E - Electrical Construction

Tuthills Lane, Jamesport

H2M Project No.: RDWD 17-02

will be received by the Town Board of the Town of Riverhead at the office of the Town Clerk, Riverhead Town Hall, 200 Howell Avenue, Riverhead, New York 11901, until 11:00 A.M., Prevailing Time on Thursday, March 15, 2018, at which time and place they will be publicly opened and read aloud.

Plans and specifications may be examined on or after Thursday, March 1, 2018 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 submitted must be accompanied by a certified check or bid bond, made payable to the Town of Riverhead, in an amount equal to five percent (5%) of the total amount of the bid, as a commitment by the bidder that, if its bid is accepted, it will enter into a contract to perform the work and will execute such further security as may be required for the faithful performance of the contract.

The Owner reserves the right to reject any or all bids, waive any informalities and to accept such bid which, in the opinion of the Owner, is in the best interests of the Owner.

BY 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

DATED: MARCH 1, 2018

END OF SECTION 001113

The BOARD OF COMMISSIONERS of the RIVERHEAD WATER DISTRICT (hereinafter called DISTRICT), will receive Sealed Proposals for:

Booster Pumping Station at Plant No. 15
Contract G - General Construction
Contract E - Electrical Construction
H2M PROJECT NO.: RDWD 1702

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 10:00 A.M. prevailing time, on Thursday, March 15, 2018 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..

ENVELOPES

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, "BOOSTER PUMPING STATION AT PLANT NO. 15 FOR THE RIVERHEAD WATER DISTRICT, TOWN OF RIVERHEAD, SUFFOLK COUNTY, NEW YORK", but otherwise unmarked. Bid package shall include Proposal sheets, Qualifications of Bidder sheets, Approval of Subcontractor sheets, and the New York State Uniform Contracting Questionnaire.

PLANS AND SPECIFICATIONS

Plans and specifications may be examined on or after Thursday, March 1, 2018 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 or employees, or the Engineer, will not be responsible in any manner for verbal answers to any inquiries regarding the meaning of the contract drawings or Specifications given prior to the awarding of the contract.

Bid document inquiries may be submitted in writing by the Contractor to the Town until 12:00 P.M. on Friday, March 9, 2018, after which they will no longer be accepted.

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 forty five (45) 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.

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

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.

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.

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.

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 MAINTENACE 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 seven (7) 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 INSURANCCE

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 RATES

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.

Each bidder shall submit with its bid a separate sealed list that names each subcontractor that the bidder will use to perform work on the contract, and the agreed-upon amount to be paid to each, for: (i) plumbing and gas fitting, (ii) steam heating, hot water heating, ventilating and air conditioning apparatus and (iii) electric wiring and standard illuminating fixtures. After the low bid is announced, the sealed list of subcontractors submitted with such low bid shall be opened and the names of such subcontractors shall be announced, and thereafter any change of subcontractor or agreed-upon amount to be paid to each shall require the approval of the owner, upon a showing presented to the owner of legitimate construction need for such change, which shall be open to public inspection. Legitimate construction need shall include, but not be limited to, a change in project specifications, a change in construction material costs, a change to subcontractor status as determined pursuant to paragraph (e) of subdivision two (2) of section two hundred twenty-two (222) of the labor law, or the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract. The sealed lists of subcontractors submitted by all other bidders shall be returned to them unopened after the contract award.

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

BIDDER'S DECLARATION:

The undersigned, 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 and the Contract Documents; and fully understands all the same; and it proposes and agrees, if this proposal is accepted, it will contract with the Town of Riverhead in the Contract accompanying this bid to furnish all the material, implements, etc., and perform all the work required in accordance with the Contract Documents; and it will accept in full payment therefore the following sums to wit:

Acknowledgement that the foregoing Bidder's Declaration is true and factual.

_____

SIGNATURE PRINT NAME TITLE DATE

END OF SECTION 004105

Board:

The undersigned hereby offers to furnish all labor, equipment, materials and appurtenances for Booster Pumping Station at Plant No. 15, Contract G - General Construction all in accordance with the plans and specifications prepared by H2M architects + engineers for the following unit and lump sum prices:

ITEM 1 - MOBILIZATION AND DEMOBILIZATON
For mobilization, demobilization, bonds, and insurances, as specified.
(Item not to exceed 5% of the total base bid)

LUMP SUM:_____ ($)
DOLLARS

ITEM 2A - SITE CLEARING
For clearing the site of plant life and growth as required to allow for installation of booster pump station, as specified.

LUMP SUM:_____ ($)
DOLLARS

ITEM 2B – EARTHWORK
For the removal/installation of required fill, soil preparation, etc. associated with the new booster pump station construction, as specified on the plans.

LUMP SUM:_____ ($)
DOLLARS

ITEM 3A – SITE WORK
For all new site work including but not limited to asphalt paving, drainage, fencing, final grading, and final restoration.

LUMP SUM:_____ ($)
DOLLARS

ITEM 3B – SITE PIPING, TRENCHING AND BACKFILLING
For furnishing and installing new site piping, valves, fittings, etc and all associated plumbing work, as specified.

LUMP SUM:_____ ($)
DOLLARS

ITEM 4 – NEW BOOSTER PUMP STATION
For all labor, materials, and equipment necessary for construction of the booster pump station.

LUMP SUM:_____ ($)
DOLLARS

ITEM 5 – TEMPORARY BRACING AND SHORING
For providing and installing all necessary temporary bracing and shoring in order to construct the new booster pump station.

LUMP SUM:_____ ($)
DOLLARS

ITEM 6 – BOOSTER PUMPING UNITS
For furnishing and installing two (2) new 1,000 gpm and one (1) new 750 gpm booster pumps, steel booster casings, electric motors, discharge heads, baseplates, suction pipes and accessories, as specified.

LUMP SUM:_____ ($)
DOLLARS

ITEM 7 – NEW LARGE MECHANICAL PIPING, VALVES AND ACCESSORIES
For all work associated with large mechanical piping including but not limited to large piping, valves, coatings, supports, accessories, etc.

LUMP SUM:_____ ($)
DOLLARS

ITEM 8 - NEW SMALL MECHANICAL PIPING, VALVES AND ACCESSORIES
For all work associated with small piping, including but not limited to, drainage lines, water service, sampling lines, valves, gauges, supports, sleeves, penetrations, cleanouts, coatings, accessories, etc.

LUMP SUM:_____ ($)
DOLLARS

ITEM 9 - CALCIUM HYPOCHLORITE TREATMENT SYSTEM
For all work associated with the calcium hypochlorite treatment system, including but not limited to, installation of chemical pump, tablet chlorinator, small piping,containment systems, accessories, etc.

LUMP SUM:_____ ($)
DOLLARS

ITEM 10 - HVAC EQUIPMENT
For furnishing and installing all HVAC systems in the booster pump station.

LUMP SUM:_____ ($)
DOLLARS

ITEM 11 - DISINFECTION AND TESTING
For disinfection and water quality testing for all process piping, chemical treatment systems, site piping, etc, as required.

LUMP SUM:_____ ($)
DOLLARS

ITEM 12 **- STARTUP AND TESTING**
For startup and testing of all systems furnished under this contract, as specified in Section 017500.

LUMP SUM:_____ ($)
DOLLARS

ITEM 13 - CASH ALLOWANCES - UNFORSEEN CONDITIONS
Allowances as specified in Section 012100 - Allowances for additional work not included in the original scope of this project due to unforeseeable conditions or requested by the owner.

LUMP SUM:__Twenty Five Thousand ___ ($ 25,000.00)
DOLLARS

ITEM 14 - CASH ALLOWANCES - QUALITY CONTROL TESTING
Allowances as specified in Section 012100 - Allowances for independent testing laboratory services, as specified.

LUMP SUM:__Five Thousand ___ ($ 5,000.00)
DOLLARS

ITEM 15 - PROJECT RECORD DOCUMENTS
For furnishing all project record documents, as specified.
(Items not to be less than $5,000.00)

LUMP SUM:_____ ($)
DOLLARS

TOTAL BASE BID (Sum of All Items)

_____
DOLLARS
($)

The Board of the Town of Riverhead reserves the right to award this contract based on either the total bid or any combination of bid items, as may be in the best interest of the Town of Riverhead. The award shall be made to the lowest responsible bidder based upon the bid items awarded. The Board reserves the right to reject any or all bids. The Board reserves the right to award this contract within forty-five (45) days of the bid opening.

Within ten (10) consecutive calendar days after the date of the Notice of Award (weekends and holidays included), the bidder shall execute the contract and furnish the required bonds and insurances. The Notice to Proceed will be issued after the contract has been executed by the Owner.

All work specified under this contract shall be substantially complete by July 6, 2018, and shall be ready for final payment by September 30, 2018. Substantially complete shall only be considered once all tank work is complete, including all disinfection, water quality sampling, and all associated Health Department approvals where the District will have beneficial use of the tank.

Failure of the contractor to complete all work within the specified time 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 respective day from the date of the Notice to Proceed.

In addition to liquidated damages, specific damages will be assessed and deducted from amounts otherwise due the contractor for additional inspection and contract management time required to be expended by the Engineer should the project be completed beyond the contract completion date. Such deduction shall be in accordance with the billing rates and fees established between H2M and the Town of Riverhead.

Each bidder shall submit with its bid a separate sealed list that names each subcontractor that the bidder will use to perform work on the contract, and the agreed-upon amount to be paid to each, for: I) plumbing and gas fitting, II) steam heating, hot water heating, ventilating and air conditioning apparatus, and III) electric wiring and standard illuminating fixtures. After the low bid is announced, the sealed list of subcontractors submitted with such low bid shall be opened and the names of such subcontractors shall be announced, and thereafter any change of subcontractor or agreed-upon amount to be paid to each shall require the approval of the Owner, upon a showing presented to the Owner of legitimate construction need for such change, which shall be open to public inspection. Legitimate construction need shall include, but not be limited to, a change in project specifications, a change in construction material costs, a change to subcontractor status as determined pursuant to paragraph (E) of subdivision two (2) of section two hundred twenty-two (222) of the labor law, or the subcontractor has become otherwise unwilling, unable, or unavailable to perform the subcontract. The sealed lists of subcontractors submitted by all other bidders shall be returned to them unopened after the contract award.

The contractor shall coordinate all work with the Owner to minimize disturbances to Owner operations.

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 undersigned hereby acknowledges receipt of the following addenda (if any):

ADDENDUM NO.	DATED
_____	_____
_____	_____
_____	_____

Each proposal shall be accompanied by either a certified check drawn on a solvent bank with an office in the State of New York, or a bid bond equal to five percent (5%) of the total amount of the bid and payable to the Town of Riverhead. The certified check or bid bond shall specify which contract it accompanies.

SECURITY ENCLOSED FOR THIS SECTION
(BASE BID PLUS CONTINGENCY ITEMS)

YES / NO
(Circle One)

PROPOSAL CERTIFICATION

This Bid is hereby submitted by:

BIDDER:
_____

BIDDER'S ADDRESS:
_____

_____

SIGNED BY: _____ TITLE: _____

PRINT NAME: _____ DATE: _____

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

Telephone number where the contractor or a competent representative can accept a telephone message and provide a reasonable reply as soon as possible, but within 24 hours of being contacted.

DAY: _____ NIGHT: _____

EMERGENCY: _____ FAX: _____

EMAIL: _____

Acknowledgement that the Qualification of Bidders section has been fully completed/executed.

_____

SIGNATURE PRINT NAME TITLE DATE

END OF SECTION 004116

Board:

The undersigned hereby offers to furnish all labor, equipment, materials and appurtenances for **Booster Pumping Station at Plant No. 15,** Contract E - Electrical Construction all in accordance with the plans and specifications prepared by H2M architects + engineers for the following unit and lump sum prices:

ITEM 1 - MOBILIZATION AND DEMOBILIZATON
For mobilization, demobilization, bonds, and insurances, as specified.
(Item not to exceed 5% of the total base bid)

LUMP SUM:_____ ($)
DOLLARS

ITEM 2 - ELECTRICAL SITE WORK
For all labor, materials, and equipment required for electrical site work, as specified.

LUMP SUM:_____ ($)
DOLLARS

ITEM 3 - RELOCATION OF EXISTING GENERATOR FROM PLANT NO. 12
For the relocation of existing diesel fuel fired generator and associated storage tank currently located at Plant No. 12 to new concrete pad foundation at Plant No. 15, as specified.

LUMP SUM:_____ ($)
DOLLARS

ITEM 4 – MOTOR CONTROL CENTER AND SERVICE ENTRANCE EQUIPMENT
For all labor, materials, and equipment required for new Motor Control Center (MCC) and Service Entrance Equipment, as specified.

LUMP SUM:_____ ($)
DOLLARS

ITEM 5 – INSTRUMENTATION AND CONTROLS
For all labor, materials, and equipment required for instrumentation and controls work, as specified.

LUMP SUM:_____ ($)
DOLLARS

ITEM 6 – ELECTRICAL WORK
For all labor, materials and equipment required for electrical work, as specified.

LUMP SUM:_____ ($)
DOLLARS

ITEM 7 - SCADA SYSTEM MODIFICATIONS
For all labor, materials and equipment required for the modifications to the existing SCADA system as required to reflect all new information associated with the booster station, as specified.

LUMP SUM:_____ ($)
DOLLARS

ITEM 8 - CONTROL MODIFICATIONS
Allowance for additional control modifications specified in Section 265012 – Description of Controls Section for hardware and software not included in base bid. Allowance shall be in accordance with Specification Section 012100 - Allowances and shall be paid on a per hour basis.

LUMP SUM:_____ ($)
DOLLARS

LUMP SUM COST FOR __HOURS:_____ ($)
DOLLARS

ITEM 9 - CASH ALLOWANCES - ADDITIONAL/UNFORSEEN WORK
Allowances as specified in Section 012100 - Allowances for additional work not included in the original scope of this project due to unforeseeable conditions or requested by the owner.

LUMP SUM:__Twenty Five Thousand ___ ($ 25,000.00)
DOLLARS

ITEM 10 - CASH ALLOWANCES - QUALITY CONTROL TESTING
Allowances as specified in Section 012100 - Allowances for independent testing laboratory services, as specified.

LUMP SUM:__Five Thousand ___ ($ 5,000.00)
DOLLARS

ITEM 11 - PROJECT RECORD DOCUMENTS
For furnishing all project record documents, as specified.
(Items not to be less than $5,000.00)

LUMP SUM:_____ ($)
DOLLARS

TOTAL BASE BID (Sum of All Items)

_____
DOLLARS
($)

The Board of the Town of Riverhead reserves the right to award this contract based on either the total bid or any combination of bid items, as may be in the best interest of the Town of Riverhead. The award shall be made to the lowest responsible bidder based upon the bid items awarded. The Board reserves the right to reject any or all bids. The Board reserves the right to award this contract within forty-five (45) days of the bid opening.

Within ten (10) consecutive calendar days after the date of the Notice of Award (weekends and holidays included), the bidder shall execute the contract and furnish the required bonds and insurances. The Notice to Proceed will be issued after the contract has been executed by the Owner.

All work specified under this contract shall be substantially complete by July 6, 2018, and shall be ready for final payment by September 30, 2018. Substantially complete shall only be considered once all tank work is complete, including all disinfection, water quality sampling, and all associated Health Department approvals where the District will have beneficial use of the tank.

Failure of the contractor to complete all work within the specified time 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 respective day from the date of the Notice to Proceed.

In addition to liquidated damages, specific damages will be assessed and deducted from amounts otherwise due the contractor for additional inspection and contract management time required to be expended by the Engineer should the project be completed beyond the contract completion date. Such deduction shall be in accordance with the billing rates and fees established between H2M and the Town of Riverhead.

Each bidder shall submit with its bid a separate sealed list that names each subcontractor that the bidder will use to perform work on the contract, and the agreed-upon amount to be paid to each, for: I) plumbing and gas fitting, II) steam heating, hot water heating, ventilating and air conditioning apparatus, and III) electric wiring and standard illuminating fixtures. After the low bid is announced, the sealed list of subcontractors submitted with such low bid shall be opened and the names of such subcontractors shall be announced, and thereafter any change of subcontractor or agreed-upon amount to be paid to each shall require the approval of the Owner, upon a showing presented to the Owner of legitimate construction need for such change, which shall be open to public inspection. Legitimate construction need shall include, but not be limited to, a change in project specifications, a change in construction material costs, a change to subcontractor status as determined pursuant to paragraph (E) of subdivision two (2) of section two hundred twenty-two (222) of the labor law, or the subcontractor has become otherwise unwilling, unable, or unavailable to perform the subcontract. The sealed lists of subcontractors submitted by all other bidders shall be returned to them unopened after the contract award.

The contractor shall coordinate all work with the Owner to minimize disturbances to Owner operations.

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 undersigned hereby acknowledges receipt of the following addenda (if any):

ADDENDUM NO.	DATED
_____	_____
_____	_____

_____ _____

Each proposal shall be accompanied by either a certified check drawn on a solvent bank with an office in the State of New York, or a bid bond equal to five percent (5%) of the total amount of the bid and payable to the Town of Riverhead. The certified check or bid bond shall specify which contract it accompanies.

SECURITY ENCLOSED FOR THIS SECTION
(BASE BID PLUS CONTINGENCY ITEMS)

YES / NO
(Circle One)

PROPOSAL CERTIFICATION

This Bid is hereby submitted by:

BIDDER:
_____

BIDDER'S ADDRESS:
_____

_____

SIGNED BY: _____ TITLE: _____

PRINT NAME: _____ DATE: _____

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

Telephone number where the contractor or a competent representative can accept a telephone message and provide a reasonable reply as soon as possible, but within 24 hours of being contacted.

DAY: _____ NIGHT: _____

EMERGENCY: _____ FAX: _____

EMAIL: _____

Acknowledgement that the Qualification of Bidders section has been fully completed/executed.

_____

SIGNATURE PRINT NAME TITLE DATE

END OF SECTION 004117

Enclosed is a certified check or bid bond for five percent (5%) of the total amount of the bid as required in the foregoing "Information for Bidders".

The Bidder hereby agrees to appear with its sureties at the office of the Town of Riverhead within ten (10) calendar days after due notice from the Board of the Town of Riverhead that the Contract has been awarded to it and is ready for signature; such notice to be given in writing within forty five (45) 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 Contract.

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 after due notice from the Board that the Contract has been awarded to it and is ready for signature, as given in accordance with the Contract Documents and/or its failure to execute and deliver the bond for the full amount of the Contract price, as provided in said Contract Documents, the Bidder's check or bid bond which is herewith deposited with the Board (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:

NAME	ADDRESS
_____	_____
_____	_____
_____	_____

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

Town of Riverhead

Suffolk County, New York

Bidders shall submit to the Owner the names of the Subcontractors which the Bidder proposes to use on the project. The Owner reserves the right to disapprove the use of any proposed subcontractor and in such event the Bidder shall submit the name of another Subcontractor in the like manner and in the time specified by the Owner. Such disapproval shall not result in additional costs to the Owner. The Owner reserves the right to reject any bid if the name of the proposed Subcontractors, or additional subcontractor information, is not submitted as required.

BIDDER:

FIRM NAME: _____

ADDRESS: _____

PREPARED BY: _____

SIGNED BY: _____

TITLE: _____

END OF SECTION 004350

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

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:

Booster Pumping Station at Plant No. 15
Contract G - General Construction
Contract E - Electrical Construction

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

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR-PROFIT CONSTRUCTION (CCA-2)

You have selected the For-Profit Construction questionnaire, commonly known as the "CCA-2," which may be printed and completed in this format or, **for your convenience**, **may be completed online using the New York State VendRep System.**

COMPLETION & CERTIFICATION

The person(s) completing the questionnaire must be knowledgeable about the vendor's business and operations. An owner or official must certify the questionnaire and the signature must be notarized.

NEW YORK STATE VENDOR IDENTIFICATION NUMBER (VENDOR ID)

The Vendor ID is a ten-digit identifier issued by New York State when the vendor is registered on the Statewide Vendor File. This number must now be included on the questionnaire. If the business entity has not obtained a Vendor ID, contact the IT Service Desk at ITServiceDesk@osc.state.ny.us or call 866-370-4672.

DEFINITIONS

All underlined terms are defined in the "New York State Vendor Responsibility Definitions List," found at http://www.osc.state.ny.us/vendrep/documents/questionnaire/definitions.pdf. These terms may not have their ordinary, common or traditional meanings. Each vendor is strongly encouraged to read the respective definitions for any and all underlined terms. By submitting this questionnaire, the vendor agrees to be bound by the terms as defined in the "New York State Vendor Responsibility Definitions List" existing at the time of certification.

RESPONSES

Every question must be answered. Each response must provide all relevant information which can be obtained within the limits of the law. However, information regarding a determination or finding made in error which was subsequently corrected or overturned, and/or was withdrawn by the issuing government entity, is not required. Individuals and Sole Proprietors may use a Social Security Number but are encouraged to obtain and use a federal Employer Identification Number (EIN).

NYS VENDOR ID: 000000000

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

BUSINESS ENTITY INFORMATION		
Legal Business Name	EIN ____	
Address of the Principal Place of Business (street, city, state, zip code)	New York State Vendor Identification Number	
	Telephone ext.	Fax
	Website	
Authorized Contact for this Questionnaire		
Name	Telephone ext.	Fax
Title	Email	

Additional Business Entity Identities: If applicable, list any other DBA, Trade Name, Former Name, Other Identity, or EIN used in the last five (5) years, the state or county where filed and the status (active or inactive).

Type	Name	EIN	State or County where filed	Status

I. BUSINESS CHARACTERISTICS		
1.0 Business Entity Type – Check appropriate box and provide additional information:		
a) ☐ Corporation (including PC)	Date of Incorporation	
b) ☐ Limited Liability Company (LLC or PLLC)	Date Organized	
c) ☐ Limited Liability Partnership	Date of Registration	
d) ☐ Limited Partnership	Date Established	
e) ☐ General Partnership	Date Established	County (if formed in NYS)
f) ☐ Sole Proprietor	How many years in business?	
g) ☐ Other	Date Established	
If Other, explain:		
1.1 Was the Business Entity formed in New York State?		☐ Yes ☐ No
If "No," indicate jurisdiction where the Business Entity was formed:		
☐ United States	State	
☐ Other	Country	

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

I. BUSINESS CHARACTERISTICS	
1.2 Is the Legal Business Entity publicly traded?	☐ Yes ☐ No
If "Yes," provide the CIK code or Ticker Symbol:	
1.3 Is the Business Entity currently registered to do business in New York State? *Note: Select "Not Required" if the Business Entity is a Sole Proprietor or General Partnership*	☐ Yes ☐ No ☐ Not Required
If "No," explain why the Business Entity is not required to be registered to do business in New York State:	
1.4 Is the responding Business Entity a Joint Venture? Note: If the submitting Business Entity is a Joint Venture, also submit a separate questionnaire for each Business Entity comprising the Joint Venture.	☐ Yes ☐ No
1.5 If the Business Entity's Principal Place of Business is not in New York State, does the Business Entity maintain an office in New York State? *(Select "N/A" if Principal Place of Business is in New York State.)*	☐ Yes ☐ No ☐ N/A
If "Yes," provide the address and telephone number for one office located in New York State.	
1.6 Is the Business Entity a New York State certified Minority-Owned Business Enterprise, or Women-Owned Business Enterprise, or New York State Small Business, or federally certified Disadvantaged Business Enterprise?	☐ Yes ☐ No
If "Yes," check all that apply: ☐ New York State certified Minority-Owned Business Enterprise (MBE) ☐ New York State certified Women-Owned Business Enterprise (WBE) ☐ New York State Small Business ☐ Federally certified Disadvantaged Business Enterprise (DBE)	
1.7 Identify each person or business entity that is, or has been within the past five (5) years, Principal Owner of 5.0% or more of the firm's shares; a Business Entity Official; or one of the five largest shareholders, if applicable. *(Attach additional pages if necessary.)* Joint Ventures: Provide information for all firms involved.	

Name *(For each person, include middle initial)*	Title	Percentage of ownership (Enter 0%, if not applicable)	Employment status with the firm
			☐ Current ☐ Former
			☐ Current ☐ Former
			☐ Current ☐ Former
			☐ Current ☐ Former

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

II. AFFILIATE and JOINT VENTURE RELATIONSHIPS		
2.0 Are there any other construction-related firms in which, now or in the past five years, the submitting Business Entity or any of the individuals or business entities listed in question 1.7 either owned or owns 5.0% or more of the shares of, or was or is one of the five largest shareholders or a director, officer, partner or proprietor of said other firm? *(Attach additional pages if necessary.)*		☐ Yes ☐ No
Firm/Company Name	Firm/Company EIN (If available)	Firm/Company's Primary Business Activity
Firm/Company Address		
Explain relationship with the firm and indicate percent of ownership, if applicable (enter N/A, if not applicable):		
Are there any shareholders, directors, officers, owners, partners or proprietors that the submitting Business Entity has in common with this firm?		☐ Yes ☐ No
Individual's Name *(Include middle initial)*	Position/Title with Firm/Company	
2.1 Does the Business Entity have any construction-related affiliates not identified in the response to question 2.0 above? *(Attach additional pages if necessary.)*		☐ Yes ☐ No
Affiliate Name	Affiliate EIN (If available)	Affiliate's Primary Business Activity
Affiliate Address		
Explain relationship with the affiliate and indicate percent of ownership, if applicable *(enter N/A, if not applicable)*:		
Are there any shareholders, directors, officers, owners, partners or proprietors that the submitting Business Entity has in common with this affiliate?		☐ Yes ☐ No
Individual's Name *(Include middle initial)*	Position/Title with Firm/Company	
2.2 Has the Business Entity participated in any construction-related Joint Ventures within the past three (3) years? *(Attach additional pages if necessary.)*		☐ Yes ☐ No
Joint Venture Name	Joint Venture EIN (If available)	Identify parties to the Joint Venture

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR-PROFIT CONSTRUCTION (CCA-2)

III. CONTRACT HISTORY	
3.0 Has the Business Entity completed any construction contracts?	☐ Yes ☐ No
If "Yes," list the ten most recent construction contracts the Business Entity has completed using Attachment A – Completed Construction Contracts, found at www.osc.state.ny.us/vendrep/documents/questionnaire/ac3294s.doc. *If less than ten, include most recent subcontracts on projects up to that number.*	
3.1 Does the Business Entity currently have uncompleted construction contracts?	☐ Yes ☐ No
If "Yes," list all current uncompleted construction contracts by using Attachment B – Uncompleted Construction Contracts, found at www.osc.state.ny.us/vendrep/documents/questionnaire/ac3295s.doc. *Note: Ongoing projects must be included.*	

IV. INTEGRITY – CONTRACT BIDDING ***Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:***	
4.0 Been suspended or debarred from any government contracting process or been disqualified on any government procurement?	☐ Yes ☐ No
4.1 Been subject to a denial or revocation of a government prequalification?	☐ Yes ☐ No
4.2 Had any bid rejected by a government entity for lack of qualifications, responsibility or because of the submission of an informal, non-responsive or incomplete bid?	☐ Yes ☐ No
4.3 Had a proposed subcontract rejected by a government entity for lack of qualifications, responsibility or because of the submission of an informal, non-responsive or incomplete bid?	☐ Yes ☐ No
4.4 Had a low bid rejected on a government contract for failure to make good faith efforts on any Minority-Owned Business Enterprise, Women-Owned Business Enterprise or Disadvantaged Business Enterprise goal or statutory affirmative action requirements on a previously held contract?	☐ Yes ☐ No
4.5 Agreed to a voluntary exclusion from bidding/contracting with a government entity?	☐ Yes ☐ No
4.6 Initiated a request to withdraw a bid submitted to a government entity or made any claim of an error on a bid submitted to a government entity?	☐ Yes ☐ No
For each "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity involved, project(s), relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.	

V. INTEGRITY – CONTRACT AWARD ***Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:***	
5.0 Defaulted on or been suspended, cancelled or terminated for cause on any contract?	☐ Yes ☐ No
5.1 Been subject to an administrative proceeding or civil action seeking specific performance or restitution (except any disputed work proceeding) in connection with any government contract?	☐ Yes ☐ No
5.2 Entered into a formal monitoring agreement, consent decree or stipulation settlement as specified by, or agreed to with, any government entity?	☐ Yes ☐ No
5.3 Had its surety called upon to complete any contract whether government or private sector?	☐ Yes ☐ No
5.4 Forfeited all or part of a standby letter of credit in connection with any government contract?	☐ Yes ☐ No

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR-PROFIT CONSTRUCTION (CCA-2)

V. INTEGRITY – CONTRACT AWARD

Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:

For each "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity/owners involved, project(s), contract number(s), relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.

VI. CERTIFICATIONS/LICENSES

Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:

6.0	Had a revocation or suspension of any business or professional permit and/or license?	☐ Yes ☐ No
6.1	Had a denial, decertification, revocation or forfeiture of New York State certification of Minority-Owned Business Enterprise, Women-Owned Business Enterprise or a federal certification of Disadvantaged Business Enterprise status, for other than a change of ownership?	☐ Yes ☐ No

For each "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.

VII. LEGAL PROCEEDINGS/GOVERNMENT INVESTIGATIONS

Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:

7.0	Been the subject of a criminal investigation, whether open or closed, or an indictment for any business-related conduct constituting a crime under local, state or federal law?	☐ Yes ☐ No
7.1	Been the subject of:	
	(i.) An indictment, grant of immunity, judgment or conviction (including entering into a plea bargain) for conduct constituting a crime; or	☐ Yes ☐ No
	(ii.) Any criminal investigation, felony indictment or conviction concerning the formation of, or any business association with, an allegedly false or fraudulent Minority-Owned Business Enterprise, Women-Owned Business Enterprise, or a Disadvantaged Business Enterprise?	☐ Yes ☐ No
7.2	Received any OSHA citation, which resulted in a final determination classified as serious or willful?	☐ Yes ☐ No
7.3	Had a government entity find a willful prevailing wage or supplemental payment violation?	☐ Yes ☐ No
7.4	Had a New York State Labor Law violation deemed willful?	☐ Yes ☐ No
7.5	Entered into a consent order with the New York State Department of Environmental Conservation, or a federal, state or local government enforcement determination involving a violation of federal, state or local environmental laws?	☐ Yes ☐ No

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR-PROFIT CONSTRUCTION (CCA-2)

VII. LEGAL PROCEEDINGS/GOVERNMENT INVESTIGATIONS

Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:

7.6	Other than previously disclosed, been the subject of any citations, notices or violation orders; a pending administrative hearing, proceeding or determination of a violation of: • Federal, state or local health laws, rules or regulations; • Federal, state or local environmental laws, rules or regulations; • Unemployment insurance or workers compensation coverage or claim requirements; • Any labor law or regulation, which was deemed willful; • Employee Retirement Income Security Act (ERISA); • Federal, state or local human rights laws; • Federal, state or local security laws?	☐ Yes ☐ No

For each "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.

Note: Information regarding a determination or finding made in error, which was subsequently corrected or overturned, and/or was withdrawn by the issuing government entity, is not required.

VIII. LEADERSHIP INTEGRITY

If the Business Entity is a Joint Venture Entity, answer "N/A - Not Applicable" to questions in this section.

Within the past five (5) years has any individual previously identified or any individual currently or formerly having the authority to sign, execute or approve bids, proposals, contracts or supporting documentation on behalf of the Business Entity with any government entity been:

8.0	Sanctioned relative to any business or professional permit and/or license?	☐ Yes ☐ No ☐ N/A
8.1	Suspended, debarred or disqualified from any government contracting process?	☐ Yes ☐ No ☐ N/A
8.2	The subject of a criminal investigation, whether open or closed, or an indictment for any business-related conduct constituting a crime under local, state or federal law?	☐ Yes ☐ No ☐ N/A
8.3	Charged with a misdemeanor or felony, indicted, granted immunity, convicted of a crime or subject to a judgment for: (i.) Any business-related activity, including but not limited to fraud, coercion, extortion, bribe or bribe-receiving, giving or accepting unlawful gratuities, immigration or tax fraud, racketeering, mail fraud, wire fraud, price-fixing or collusive bidding; or (ii.) Any crime, whether or not business-related, the underlying conduct of which related to truthfulness, including but not limited to the filing of false documents or false sworn statements, perjury or larceny	☐ Yes ☐ No ☐ N/A

For each "Yes," provide an explanation of the issue(s), the individual involved, the relationship to the submitting Business Entity, the government entity involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

IX. FINANCIAL AND ORGANIZATIONAL CAPACITY

9.0 Within the past five (5) years, has the Business Entity or any affiliate received any formal unsatisfactory performance assessment(s) from any government entity on any contract?	☐ Yes ☐ No
If "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer below or attach additional sheets with numbered responses.	
9.1 Within the past five (5) years, has the Business Entity or any affiliate had any liquidated damages assessed over $25,000?	☐ Yes ☐ No
If "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, relevant dates, the contracting party involved, the amount assessed and the current status of the issue(s). Provide answer below or attach additional sheets with numbered responses.	
9.2 Within the past five (5) years, has the Business Entity or any affiliate had any liens, claims or judgments over $25,000 filed against the Business Entity which remain undischarged or were unsatisfied for more than 90 days? (*Note: Including but not limited to tax warrants or liens. Do not include UCC filings.)*	☐ Yes ☐ No
If "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, relevant dates, the Lien holder or Claimants' name(s), the amount of the lien(s) and the current status of the issue(s). Provide answer below or attach additional sheets with numbered responses.	
9.3 In the last seven (7) years, has the Business Entity or any affiliate initiated or been the subject of any bankruptcy proceedings, whether or not closed, or is any bankruptcy proceeding pending?	☐ Yes ☐ No
If "Yes," provide the Business Entity involved, the relationship to the submitting Business Entity, the bankruptcy chapter number, the court name and the docket number. Indicate the current status of the proceedings as "Initiated," "Pending" or "Closed." Provide answer below or attach additional sheets with numbered responses.	

9.4 What is the Business Entity's Bonding Capacity?	
a. Single Project	b. Aggregate (All Projects)
9.5 List Business Entity's Gross Sales for the previous three (3) Fiscal Years:	

1st Year (Indicate year) Gross Sales	2nd Year (Indicate year) Gross Sales	3rd Year (Indicate year) Gross Sales
9.6 List Business Entity's Average Backlog for the previous three (3) fiscal years: (Estimated total value of uncompleted work on outstanding contracts)		
1st Year (Indicate year) Amount	2nd Year (Indicate year) Amount	3rd Year (Indicate year) Amount
9.7 Attach Business Entity's most recent annual financial statement and accompanying notes or complete Attachment C – Financial Information, found at www.osc.state.ny.us/vendrep/documents/questionnaire/ac3296s.xls. *(This information must be attached.)*		

NYS VENDOR ID: 000000000

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

X. FREEDOM OF INFORMATION LAW (FOIL)	
10.0 Indicate whether any information provided herein is believed to be exempt from disclosure under the Freedom of Information Law (FOIL). *Note: A determination of whether such information is exempt from FOIL will be made at the time of any request for disclosure under FOIL. Attach additional pages if necessary.*	☐ Yes ☐ No
If "Yes," indicate the question number(s) and explain the basis for the claim.	

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE FOR-PROFIT CONSTRUCTION (CCA-2)

Certification

The undersigned: (1) recognizes that this questionnaire is submitted for the express purpose of assisting New York State government entities (including the Office of the State Comptroller (OSC)) in making responsibility determinations regarding award or approval of a contract or subcontract and that such government entities will rely on information disclosed in the questionnaire in making responsibility determinations; (2) acknowledges that the New York State government entities and OSC may, in their discretion, by means which they may choose, verify the truth and accuracy of all statements made herein; and (3) acknowledges that intentional submission of false or misleading information may result in criminal penalties under State and/or Federal Law, as well as a finding of non-responsibility, contract suspension or contract termination.

The undersigned certifies that he/she:

- is knowledgeable about the submitting Business Entity's business and operations;
- has read and understands all of the questions contained in the questionnaire;
- has not altered the content of the questionnaire in any manner;
- has reviewed and/or supplied full and complete responses to each question;
- to the best of his/her knowledge, information and belief, confirms that the Business Entity's responses are true, accurate and complete, including all attachments, if applicable;
- understands that New York State government entities will rely on the information disclosed in the questionnaire when entering into a contract with the Business Entity; and
- is under an obligation to update the information provided herein to include any material changes to the Business Entity's responses at the time of bid/proposal submission through the contract award notification, and may be required to update the information at the request of the New York State government entities or OSC prior to the award and/or approval of a contract, or during the term of the contract.

Signature of Owner/Official _____

Printed Name of Signatory _____

Title _____

Name of Business _____

Address _____

City, State, Zip _____

Sworn to before me this _____ day of _____, 20___;

_____ Notary Public

IRAN DIVESTMENT ACT CERTIFICATION

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: _____

_____ (Name of corporation or partnership)

_____ (Signature of Individual)

_____ (Officer stating title) (Partner)

_____ (Print Name of Individual)

END OF SECTION 004547

Town of Riverhead
Suffolk County, New York

The Owner may make such investigation as the Owner 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 Owner all information and data required by the Owner, including complete financial data, within the time and in the form and manner required by the Owner. The Owner reserves the right to reject any bid if the evidence required by the Owner is not submitted as required or if the evidence submitted by or the investigation of any Bidder fails to satisfy the Owner 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 Owner, 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 Town of Riverhead 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

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 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: _____

_____

_____

and if required by the District Engineers, 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

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. Commercial General Liability and Insurance - The Contractor shall take out and maintain during the life of this Contract such 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) Comprehensive General Liability Insurance in the amount not less than ONE MILLION DOLLARS ($1,000,000.) each occurrence and TWO MILLION DOLLARS ($2,000,000.) general aggregate.

(2) Umbrella Liability for bodily injury and property damage in an amount not less than FIVE MILLION DOLLARS ($5,000,000.)

C. Commercial General Liability and Umbrella Liability - The above policies for commercial general liability and umbrella liability insurance must be so written as to include Contractor's Protective Liability Insurance to protect the contractor against claims arising from the operations of any subcontractor.

The above policies for Commercial General Liability insurance must name the Town of Riverhead, The Riverhead Water District, its employees, public officials, officers, agents, etc., as additional insureds on a primary and non-contributory basis for General Liability, Automobile Liability and/or Excess Umbrella Liability. That additional insured status must be evidenced by a copy of endorsement CG 20 10 10 01, “additional insured – owners, lessee or contractors – scheduled person or organization” endorsement (see attached sample) or its equivalent and copy of endorsement CG 20 37 10 01, “additional insured – owners, lessees or contractors - completed operations” endorsement (see attached sample), or its equivalent.

D. Blanket Waiver of Subrogation – The above policies for workers’ compensation insurance as well as comprehensive general liability insurance, automobile insurance, and excess

umbrella liability insurance shall include waiver of transfer of rights of recovery against the Town of Riverhead, The Riverhead Water District, and H2M architects + engineers. Such waiver of subrogation shall be evidenced by certificate of insurance or copy of endorsement to the appropriate policy.

E. Owner's Protective Liability Insurance – (TOWN DISTRICT, and/or TOWN BOARD, TOWN OF RIVERHEAD as OWNER and H2M architects + engineers as engineer) – If the Town of Riverhead, Riverhead Water District deem necessary, the Contractor shall furnish to the TOWN DISTRICT with respect to the operations he or any of his subcontractors perform, a regular Owner's Protective Liability Insurance Policy for and in behalf of the TOWN DISTRICT and/or TOWN BOARD, TOWN OF RIVERHEAD as OWNER, providing for a limit of not less than ONE MILLION DOLLARS ($1,000,000.) each occurrence, a total limit of TWO MILLION DOLLARS ($2,000,000.) general aggregate 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 THOUSAND DOLLARS ($100,000.) for all damages. The insurance must fully cover the legal liability of the TOWN DISTRICT, TOWN BOARD, TOWN OF RIVERHEAD as OWNER and H2M architects + engineers as ENGINEER. 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.

F. Commercial Automobile Liability - The Contractor shall take out and maintain during the life of the Contract such automobile public liability 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 ONE MILLION DOLLARS ($1,000,000.) for bodily injuries, including wrongful death per occurrence.

(2) Umbrella Liability for bodily injury and property damage in an amount of not less than FIVE MILLION DOLLARS ($5,000,000.).

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 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 con-tract 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 suitable 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.

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. 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.

16. 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.

17. 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 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 incor-poration 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.

18. 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.

19. 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.

20. 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.

21. 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 repre-sentative 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.

22. 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 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.

23. 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.

24. 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.

25. 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, 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.

26. 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.

27. 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.

28. 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.

29. 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 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.

30. 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.

31. 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.

32. 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.

33. 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.

34. 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.

35. 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 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 deter-mined 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.

36. 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.

37. 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.

38. 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.

IN WITNESS WHEREOF, the parties hereto have set their hands and seals the day and year first above written.

RIVERHEAD WATER DISTRICT

BY: _____ (TOWN SEAL)
SEAN WALTER, SUPERVISOR

_____
CONTRACTOR
BY: _____

TITLE: _____ (SEAL)

STATE OF NEW YORK)
) ss:
COUNTY OF SUFFOLK)

On the ___ day of _____, 20__, before me personally came SEAN WALTER, to me known, who being by me duly sworn, did depose and say that he is the duly elected SUPERVISOR of the TOWN OF RIVERHEAD, COUNTY OF SUFFOLK, NEW YORK, and that at a meeting of the Town Board of the Town of Riverhead, duly held on the __ day of _____, 20__, the said Board, also acting in its capacity as the Governing Body of the Riverhead Water District, authorized the said SUPERVISOR to execute all and any contracts on behalf of the Board; that he knows the seal of said Town, and that the said Water District seal is also the seal of the Town of Riverhead; that the seal affixed to the foregoing instrument is its corporate seal; that it was affixed thereto by order of the said Board, and that he signed his name thereto and executed the said instrument on behalf of the said Water District by like order and authority.

_____
NOTARY PUBLIC

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

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

Andrew M. Cuomo, Governor

Roberta Reardon, Commissioner

Town of Riverhead

Jessica Alves, Staff Engineer
1035 Pulaski St
Riverhead NY 11901

Schedule Year	2017 through 2018
Date Requested	01/07/2018
PRC#	2018000204

Location	Riverhead
Project ID#	RDWD 1702
Project Type	New booster building, chlorination system, and booster pumping system at Plant No. 15

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2017 through June 2018. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.state.ny.us. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission: a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion online.

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project. There are very few exceptions to this rule. Complete information regarding these exceptions is available on the "4 Day / 10 Hour Work Schedule" form (PW 30.1).

Wages and Supplements

The wages and supplements to be paid and/or provided to laborers, workers, and mechanics employed on a public work project shall be not less than those listed in the current Prevailing Rate Schedule for the locality where the work is performed. If a prime contractor on a public work project has not been provided with a Prevailing Rate Schedule, the contractor must notify the Department of Jurisdiction (Contracting Agency) who in turn must request an original Prevailing Rate Schedule form the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12240; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.state.ny.us.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.state.ny.us.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.state.ny.us.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. Payrolls must be maintained for at least Five (5) years from the project's date of completion. See Spota Bill Notice. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provided, and Daily and weekly number of hours worked in each classification.

The filing of payrolls to the Department of Jurisdiction is a condition of payment. Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, by are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed $100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds $25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8 . Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYSDOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "Public Work Project" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers. compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers. Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 12240 or by Fax to NYSDOL Apprenticeship Training (518) 457-7154. All requests for verification must include the name and social security number of the person for whom the information is requested.

The only conclusive proof of individual apprentice registration is written verification from the NYSDOL Apprenticeship Training Albany Central office. Neither Federal nor State Apprenticeship Training offices outside of Albany can provide conclusive registration information.

It should be noted that the existence of a registered apprenticeship program is not conclusive proof that any person is registered in that program. Furthermore, the existence or possession of wallet cards, identification cards, or copies of state forms is not conclusive proof of the registration of any person as an apprentice.

Interest and Penalties

In the event that an underpayment of wages and/or supplements is found:

- Interest shall be assessed at the rate then in effect as prescribed by the Superintendent of Banks pursuant to section 14-a of the Banking Law, per annum from the date of underpayment to the date restitution is made.
- A Civil Penalty may also be assessed, not to exceed 25% of the total of wages, supplements, and interest due.

Debarment

Any contractor or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with any state, municipal corporation or public body for a period of five (5) years when:

- Two (2) willful determinations have been rendered against that contractor or subcontractor and/or its successor within any consecutive six (6) year period.
- There is any willful determination that involves the falsification of payroll records or the kickback of wages or supplements.

Criminal Sanctions

Willful violations of the Prevailing Wage Law (Article 8 of the Labor Law) may be a felony punishable by fine or imprisonment of up to 15 years, or both.

Discrimination

No employee or applicant for employment may be discriminated against on account of age, race, creed, color, national origin, sex, disability or marital status.

No contractor, subcontractor nor any person acting on its behalf, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates (NYS Labor Law, Article 8, Section 220-e(a)).

No contractor, subcontractor, nor any person acting on its behalf, shall in any manner, discriminate against or intimidate any employee on account of race, creed, color, disability, sex, or national origin (NYS Labor Law, Article 8, Section 220-e(b)).

The Human Rights Law also prohibits discrimination in employment because of age, marital status, or religion.

There may be deducted from the amount payable to the contractor under the contract a penalty of $50.00 for each calendar day during which such person was discriminated against or intimidated in violation of the provision of the contract (NYS Labor Law, Article 8, Section 220-e(c)).

The contract may be cancelled or terminated by the State or municipality. All monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of the anti-discrimination sections of the contract (NYS Labor Law, Article 8, Section 220-e(d)).

Every employer subject to the New York State Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers notices furnished by the State Division of Human Rights.

Workers' Compensation

In accordance with Section 142 of the State Finance Law, the contractor shall maintain coverage during the life of the contract for the benefit of such employees as required by the provisions of the New York State Workers' Compensation Law.

A contractor who is awarded a public work contract must provide proof of workers' compensation coverage prior to being allowed to begin work.

The insurance policy must be issued by a company authorized to provide workers' compensation coverage in New York State. Proof of coverage must be on form C-105.2 (Certificate of Workers' Compensation Insurance) and must name this agency as a certificate holder.

If New York State coverage is added to an existing out-of-state policy, it can only be added to a policy from a company authorized to write workers' compensation coverage in this state. The coverage must be listed under item 3A of the information page.

The contractor must maintain proof that subcontractors doing work covered under this contract secured and maintained a workers' compensation policy for all employees working in New York State.

Every employer providing worker's compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Unemployment Insurance

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the New York State Department of Labor.

Andrew M. Cuomo, Governor

Roberta Reardon, Commissioner

Town of Riverhead

Jessica Alves, Staff Engineer
1035 Pulaski St
Riverhead NY 11901

Schedule Year 2017 through 2018
Date Requested 01/07/2018
PRC# 2018000204

Location Riverhead
Project ID# RDWD 1702
Project Type New booster building, chlorination system, and booster pumping system at Plant No. 15

Notice of Contract Award

New York State Labor Law, Article 8, Section 220.3a requires that certain information regarding the awarding of public work contracts, be furnished to the Commissioner of Labor. One "Notice of Contract Award" (PW 16, which may be photocopied), **MUST** be completed for **EACH** prime contractor on the above referenced project.

Upon notifying the successful bidder(s) of this contract, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

Contractor Information
All information must be supplied

Federal Employer Identification Number: _____

Name: _____

Address: _____

_____

City: _____ State: _____ Zip: _____

Amount of Contract: $_____

Approximate Starting Date: ____/____/____

Approximate Completion Date: ____/____/____

Contract Type:
- [ ] (01) General Construction
- [ ] (02) Heating/Ventilation
- [ ] (03) Electrical
- [ ] (04) Plumbing
- [ ] (05) Other : _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

IMPORTANT NOTICE

FOR

CONTRACTORS & CONTRACTING AGENCIES

Social Security Numbers on Certified Payrolls

The Department of Labor is cognizant of the concerns of the potential for misuse or inadvertent disclosure of social security numbers. Identity theft is a growing problem and we are sympathetic to contractors' concerns with regard to inclusion of this information on payrolls if another identifier will suffice.

For these reasons, ***the substitution of the use of the last four digits of the social security number on certified payrolls submitted to contracting agencies on public work projects is now acceptable to the Department of Labor.***

NOTE: This change does not affect the Department's ability to request and receive the entire social security number from employers during the course of its public work / prevailing wage investigations.

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

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1. Purpose and Scope:

This Item describes the Public Work Enforcement Fund (the Fund, PWEF) and its relevance to State agencies and public benefit corporations engaged in construction or reconstruction contracts, maintenance and repair, and announces the recently-enacted increase to the percentage of the dollar value of such contracts that must be deposited into the Fund. This item also describes the roles of the following entities with respect to the Fund:

- New York State Department of Labor (DOL),
- The Office of the State of Comptroller (OSC), and
- State agencies and public benefit corporations.

2. Background and Statutory References:

DOL uses the Fund to enforce the State's Labor Law as it relates to contracts for construction or reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law. State agencies and public benefit corporations participating in such contracts are required to make payments to the Fund.

Chapter 511 of the Laws of 1995 (as amended by Chapter 513 of the Laws of 1997, Chapter 655 of the Laws of 1999, Chapter 376 of the Laws of 2003 and Chapter 407 of the Laws of 2005) established the Fund.

3. Procedures and Agency Responsibilities:

The Fund is supported by transfers and deposits based on the value of contracts for construction and reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law, into which all State agencies and public benefit corporations enter.

Chapter 407 of the Laws of 2005 increased the amount required to be provided to this fund to .10 of one-percent of the total cost of each such contract, to be calculated at the time agencies or public benefit corporations enter into a new contract or if a contract is amended. The provisions of this bill became effective August 2, 2005.

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

OSC will report to DOL on all construction-related ("D") contracts approved during the month, including contract amendments, and then DOL will bill agencies the appropriate assessment monthly. An agency may then make a determination if any of the billed contracts are exempt and so note on the bill submitted back to DOL. For any instance where an agency is unsure if a contract is or is not exempt, they can call the Bureau of Public Work at the number noted below for a determination. Payment by check or journal voucher is due to DOL within thirty days from the date of the billing. DOL will verify the amounts and forward them to OSC for processing.

For those contracts which are not approved or administered by the Comptroller, monthly reports and payments for deposit into the Public Work Enforcement Fund must be provided to the Administrative Finance Bureau at the DOL within 30 days of the end of each month or on a payment schedule mutually agreed upon with DOL.

Reports should contain the following information:

- Name and billing address of State agency or public benefit corporation;
- State agency or public benefit corporation contact and phone number;
- Name and address of contractor receiving the award;
- Contract number and effective dates;
- Contract amount and PWEF assessment charge (if contract amount has been amended, reflect increase or decrease to original contract and the adjustment in the PWEF charge); and
- Brief description of the work to be performed under each contract.

Checks and Journal Vouchers, payable to the "New York State Department of Labor" should be sent to:

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12240

Any questions regarding billing should be directed to NYSDOL's Administrative Finance Bureau-PWEF Unit at (518) 457-3624 and any questions regarding Public Work Contracts should be directed to the Bureau of Public Work at (518) 457-5589.

Construction Industry
Fair Play Act

Required Posting For Labor Law
Article 25-B § 861-d

Construction industry employers must post the "Construction Industry Fair Play Act" notice in a prominent and accessible place on the job site.

Failure to post the notice can result in penalties of up to $1,500 for a first offense and up to $5,000 for a second offense.

The posting is included as part of this wage schedule. Additional copies may be obtained from the NYS DOL website, www.labor.ny.gov.

If you have any questions concerning the Fair Play Act, please call the State Labor Department toll-free at 1-866-435-1499 or email us at: dol.misclassified@labor.state.ny.us .

New York State Department of Labor
Required Notice under Article 25-B of the Labor Law

ATTENTION ALL EMPLOYEES, CONTRACTORS AND SUBCONTRACTORS:
YOU ARE COVERED BY THE
CONSTRUCTION INDUSTRY FAIR PLAY ACT

The law says that you are an employee unless:

- You are free from direction and control in performing your job AND
- You perform work that is not part of the usual work done by the business that hired you AND
- You have an independently established business

Your employer cannot consider you to be an independent contractor unless all three of these facts apply to your work.

IT IS AGAINST THE LAW FOR AN EMPLOYER TO MISCLASSIFY EMPLOYEES AS INDEPENDENT CONTRACTORS OR PAY EMPLOYEES OFF-THE-BOOKS.

Employee rights. If you are an employee:

- You are entitled to state and federal worker protections such as
  - unemployment benefits, if unemployed through no fault of your own, able to work, and otherwise qualified
  - workers' compensation benefits for on-the-job injuries
  - payment for wages earned, minimum wage, and overtime (under certain conditions)
  - prevailing wages on public work projects
  - the provisions of the National Labor Relations Act and
  - a safe work environment
- It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor*:*

- You must pay all taxes required by New York State and Federal Law.

Penalties for paying off-the-books or improperly treating employees as independent contractors:

- **Civil Penalty** — First Offense: up to $2,500 per employee. Subsequent Offense(s): up to $5,000 per employee.
- **Criminal Penalty** — First Offense: Misdemeanor - up to 30 days in jail, up to a $25,000 fine and debarment from performing Public Work for up to one year. Subsequent Offense(s): Misdemeanor - up to 60 days in jail, up to a $50,000 fine and debarment from performing Public Work for up to 5 years.

If you have questions about your employment status or believe that your employer may have violated your rights and you want to file a complaint, call the Department of Labor at 1(866)435-1499 or send an email to dol.misclassified@labor.state.ny.us. All complaints of fraud and violations are taken seriously and you can remain anonymous.

Employer Name:

IA 999 (09/10)

WORKER NOTIFICATION

(Labor Law §220, paragraph a of subdivision 3-a)

Effective February 24, 2008

This provision is an addition to the existing prevailing wage rate law, Labor Law §220, paragraph a of subdivision 3-a. It requires contractors and subcontractors to provide written notice to all laborers, workers or mechanics of the *prevailing wage rate* for their particular job classification *on each pay stub**. It also requires contractors and subcontractors to *post a notice* at the beginning of the performance of every public work contract *on each job site* that includes the telephone number and address for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her particular job classification. The required notification will be provided with each wage schedule, may be downloaded from our website *www.labor.state.ny.us* or made available upon request by contacting the Bureau of Public Work at 518-457-5589.

* In the event that the required information will not fit on the pay stub, an accompanying sheet or attachment of the information will suffice.

(11.11)

New York State Department of Labor
Bureau of Public Work

Attention Employees

THIS IS A:

PUBLIC WORK PROJECT

If you are employed on this project as a **worker, laborer, or mechanic** you are entitled to receive the **prevailing wage and supplements rate** for the classification at which you are working.

Chapter 629 of the Labor Laws of 2007:

These wages are set by law and must be posted at the work site. They can also be found at: www.labor.ny.gov

If you feel that you have not received proper wages or benefits, please call our nearest office.*

Albany	(518) 457-2744	Patchogue	(631) 687-4882
Binghamton	(607) 721-8005	Rochester	(585) 258-4505
Buffalo	(716) 847-7159	Syracuse	(315) 428-4056
Garden City	(516) 228-3915	Utica	(315) 793-2314
New York City	(212) 932-2419	White Plains	(914) 997-9507
Newburgh	(845) 568-5156		

* For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name: _____

Project Location: _____

OSHA 10-hour Construction

Safety and Health Course – S1537-A

Effective July 18, 2008

This provision is an addition to the existing prevailing wage rate law, Labor Law §220, section 220-h. It requires that on all public work projects of at least $250,000.00, all laborers, workers and mechanics working on the site, be certified as having successfully completed the OSHA 10-hour construction safety and health course. It further requires that the advertised bids and contracts for every public work contract of at least $250,000.00, contain a provision of this requirement.

NOTE: ***The OSHA 10 Legislation only applies to workers on a public work project that are required, under Article 8, to receive the prevailing wage.***

Where to find OSHA 10-hour Construction Course

1. NYS Department of Labor website for scheduled outreach training at:

   www.labor.state.ny.us/workerprotection/safetyhealth/DOSH_ONSITE_CONSULTATION.shtm

2. OSHA Training Institute Education Centers:

   Rochester Institute of Technology OSHA Education Center
   Rochester, NY
   Donna Winter
   Fax (585) 475-6292
   e-mail: dlwtpo@rit.edu
   (866) 385-7470 Ext. 2919
   www.rit.edu/~outreach/course.php3?CourseID=54

   Atlantic OSHA Training Center
   UMDNJ – School of Public Health
   Piscataway, NJ
   Janet Crooks
   Fax (732) 235-9460
   e-mail: crooksje@umdnj.edu
   (732) 235-9455
   https://ophp.umdnj.edu/wconnect/ShowSchedule.awp?~~GROUP~AOTCON~10~

   Atlantic OSHA Training Center
   University at Buffalo
   Buffalo, New York
   Joe Syracuse
   Fax (716) 829-2806
   e-mail:mailto:japs@buffalo.edu
   (716) 829-2125
   http://www.smbs.buffalo.edu/CENTERS/trc/schedule_OSHA.php

   Keene State College
   Manchester, NH
   Leslie Singleton
   e-mail: lsingletin@keene.edu
   (800) 449-6742
   www.keene.edu/courses/print/courses_osha.cfm

3. List of trainers and training schedules for OSHA outreach training at:

   www.OutreachTrainers.org

Requirements for OSHA 10 Compliance

Chapter 282 of the Laws of 2007, codified as Labor Law 220-h took effect on July 18, 2008. The statute provides as follows:

The advertised specifications for every contract for public work of $250,000.00 or more must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training "prior to the performing any work on the project."

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (*Note: Completion cards do not have an expiration date*.)
- Training roster, attendance record of other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-485-5696.

WICKS Reform 2008

(For all contracts advertised or solicited for bid on or after 7/1/08)

- Raises the threshold for public work projects subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work. The total project's threshold would increase from $50,000 to: $3 million in Bronx, Kings, New York, Queens and Richmond counties; $1.5 million in Nassau, Suffolk and Westchester counties; and $500,000 in all other counties.

- For projects below the monetary threshold, bidders must submit a sealed list naming each subcontractor for the plumbing, HVAC and electrical work and the amount to be paid to each. The list may not be changed unless the public owner finds a legitimate construction need, including a change in specifications or costs or use of a Project Labor Agreement (PLA), and must be open to public inspection.

- Allows the state and local agencies and authorities to waive the Wicks Law and use a PLA if it will provide the best work at the lowest possible price. If a PLA is used, all contractors shall participate in apprentice training programs in the trades of work it employs that have been approved by the Department of Labor (DOL) for not less than three years. They shall also have at least one graduate in the last three years and use affirmative efforts to retain minority apprentices. PLA's would be exempt from Wicks, but deemed to be public work subject to prevailing wage enforcement.

- The Commissioner of Labor shall have the power to enforce separate specification requirements on projects, and may issue stop-bid orders against public owners for non-compliance.

- Other new monetary thresholds, and similar sealed bidding for non-Wicks projects, would apply to certain public authorities including municipal housing authorities, NYC Construction Fund, Yonkers Educational Construction Fund, NYC Municipal Water Finance Authority, Buffalo Municipal Water Finance Authority, Westchester County Health Care Association, Nassau County Health Care Corp., Clifton-Fine Health Care Corp., Erie County Medical Center Corp., NYC Solid Waste Management Facilities, and the Dormitory Authority.

- Reduces from 15 to 7 days the period in which contractors must pay subcontractors.

IMPORTANT INFORMATION

Regarding Use of Form PW30.1
(Previously 30R)

"Employer Registration for Use of 4 Day / 10 Hour Work Schedule"

To use the '4 Day / 10 Hour Work Schedule':

There MUST be a *Dispensation of Hours (PW30)* in place on the project

AND

You MUST register your intent to work 4 / 10 hour days, by completing the PW30.1 Form.

REMEMBER…

The '4 Day / 10 Hour Work Schedule' applies ONLY to Job Classifications and Counties listed on the PW30.1 Form.

Do not write in any additional Classifications or Counties.

(**Please note** : For each Job Classification check the individual wage schedule for specific details regarding their 4/10 hour day posting.)

Instructions for Completing Form PW30.1

(Previously 30R)

"Employer Registration for Use of 4 Day / 10 Hour Work Schedule"

Before completing Form PW30.1 check to be sure …

- There is a *Dispensation of Hours* in place on the project.
- The 4 Day / 10 Hour Work Schedule applies to the Job Classifications you will be using.
- The 4 Day / 10 Hour Work Schedule applies to the County / Counties where the work will take place.

Instructions (Type or Print legibly):

Contractor Information:

- Enter the Legal Name of the business, FEIN, Street Address, City, State, Zip Code; the Company's Phone and Fax numbers; and the Company's email address (if applicable)
- Enter the Name of a Contact Person for the Company along with their Phone and Fax numbers, and the personal email address (if applicable)

Project Information:

- Enter the Prevailing Rate Case number (PRC#) assigned to this project
- Enter the Project Name / Type (i.e. Smithtown CSD – Replacement of HS Roof)
- Enter the Exact Location of Project (i.e. Smithtown HS, 143 County Route #2, Smithtown,NY; Bldgs. 1 & 2)
- If you are a Subcontractor, enter the name of the Prime Contractor for which you work
- On the Checklist of Job Classifications -
  - Go to pages 2 and 3 of the form
  - Place a checkmark in the box to the right of the Job Classification you are choosing
  - Mark all Job Classifications that apply

    ****Do not write in any additional Classifications or Counties.****

Requestor Information:

- Enter the name of the person submitting the registration, their title with the company , and the date the registration is filled out

Return Completed Form:

- **Mail** the completed PW30.1 form to: NYSDOL Bureau of Public Work, SOBC – Bldg.12 – Rm.130, Albany, NY 12240 -***OR -***
- **Fax** the completed PW30.1 form to: NYSDOL Bureau of Public Work at (518)485-1870

Bureau of Public Work Harriman
State Office Campus
Building 12, Room 130
Albany, New York 12240
Phone: (518) 457-5589 | Fax: (518) 485-1870
www.labor.ny.gov

Employer Registration for Use of 4 Day / 10 Hour Work Schedule

Before completing this form, make sure that:

- There is a **Dispensation of Hours** in place on the project.
- The 4 Day / 10 Hour Work Schedule applies to the Job Classifications you will be using.
- The 4 Day / 10 Hour Work Schedule applies to the County / Counties where the work will take place.

Please **type or print** the requested information and then **mail or fax** to the address above.

Contractor Information

Company Name:_____ FEIN: _____

Address: _____

City:_____State: _____ Zip Code: _____

Phone No:_____ Fax No:_____ Email: _____

Contact Person: _____

Phone No:_____Fax No:_____ Email: _____

Project Information

Project PRC#: _____ Project Name/Type: _____

Exact Location
of Project: _____ County: _____

(If you are Subcontractor)
Prime Contractor Name: _____

Job Classification(s) to Work 4/10 Schedule: *(Choose all that apply on Job Classification Checklist - Pages 3-8)*
**** Do not write in any additional Classifications or Counties****

Requestor Information

Name: _____

Title: _____ Date: _____

Please use the list below with the number assigned to each county as a reference to the corresponding numbers listed in the following pages under **Entire Counties** & **Partial Counties**.

1. Albany County
2. Allegany County
3. Bronx County
4. Broome County
5. Cattaraugus County
6. Cayuga County
7. Chautauqua County
8. Chemung County
9. Chenango County
10. Clinton County
11. Columbia County
12. Cortland County
13. Delaware County
14. Dutchess County
15. Erie County
16. Essex County
17. Franklin County
18. Fulton County
19. Genesee County
20. Greene County
21. Hamilton County
22. Herkimer County
23. Jefferson County
24. Kings County (Brooklyn)
25. Lewis County
26. Livingston County
27. Madison County
28. Monroe County
29. Montgomery County
30. Nassau County
31. New York County (Manhattan)
32. Niagara County
33. Oneida County
34. Onondaga County
35. Ontario County
36. Orange County
37. Orleans County
38. Oswego County
39. Otsego County
40. Putnam County
41. Queens County
42. Rensselaer County
43. Richmond County (Staten Island)
44. Rockland County
45. Saint Lawrence County
46. Saratoga County
47. Schenectady County
48. Schoharie County
49. Schuyler County
50. Seneca County
51. Steuben County
52. Suffolk County
53. Sullivan County
54. Tioga County
55. Tompkins County
56. Ulster County
57. Warren County
58. Washington County
59. Wayne County
60. Westchester County
61. Wyoming County
62. Yates County

Job Classification Checklist

(Place a checkmark by all classifications that will be using the 4/10 schedule)

**** Do not write in any additional Classifications or Counties****

Job Classification	Tag #	Entire Counties	Partial Counties	Check Box
Carpenter – Building	276B-All	7	2 ,5	
Carpenter – Building	276B-Cat	15	5	
Carpenter – Building	276-B-LIV	26, 28, 35, 59	61	
Carpenter – Building	276B-Gen	19, 32, 37	61	
Carpenter – Heavy & Highway	276HH-All	2, 5, 7		
Carpenter – Heavy & Highway	276HH-Erie	15		
Carpenter – Heavy & Highway	276HH- Gen	19, 32, 37, 61		
Carpenter – Heavy & Highway	276HH-Liv	26, 28, 35, 59		
Carpenter – Residential	276R-All	7	2, 5	
Carpenter – Building	277B-Bro	4, 54		
Carpenter – Building	277B-CAY	6, 50, 62		
Carpenter – Building	277B-CS	8, 12, 49, 51, 55	2	
Carpenter – Building	277 JLS	23, 25, 45		
Carpenter – Building	277 omh	22, 27, 33		
Carpenter – Building	277 On	34		
Carpenter – Building	277 Os	38		
Carpenter – Building	277CDO Bldg	9, 13, 39		
Carpenter – Heavy & Highway	277CDO HH	9, 13, 39		
Carpenter – Heavy & Highway	277HH-BRO	4, 6, 8, 12, ,22, 23, 25, 27, 33, 34, 38, 45, 49, 50, 51, 54, 55, 62		
Carpenter – Building	291B-Alb	1, 18, 20, 29, 42, 47, 48		
Carpenter – Building	291B-Cli	10, 16, 17		
Carpenter – Building	291B-Ham	21, 57, 58		
Carpenter – Building	291B-Sar	46		
Carpenter – Heavy & Highway	291HH-Alb	1, 10, 16, 17,18, 20, 21, 29, 42, 46, 47, 48, 57, 58		
Electrician	25m	30, 52		
Electrician – Teledata Cable Splicer	43	12, 22, 27, 33, 38	6, 9, 34, 39, 55, 59	

Job Classification Checklist

(Place a checkmark by all classifications that will be using the 4/10 schedule)

**** Do not write in any additional Classifications or Counties****

Job Classification	Tag #	Entire Counties	Partial Counties	Check Box
Electrician	86	26, 28	19, 35, 37, 59, 61	
Electrician	840 Teledata and 840 Z1	62	6, 34, 35, 50, 59	
Electrician	910	10, 16, 17, 23, 25, 45		
Electrical Lineman	1049Line/Gas	30, 41, 52		
Electrical Lineman	1249a	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42, 44, 46, 47, 48, 49, 50, 45, 51, 53, 54, 55, 56, 57, 58, 59, 61, 62		
Electrical Lineman	1249a West	60		
Electrical Lineman	1249a-LT	1, 2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, 37, 38, 39, 42, 46, 47, 48, 49, 50, 45, 51, 53, 54, 55, 57, 58, 59, 61, 62		
Electrical Lineman	1249aREG8LT	11, 14, 36, 40, 44, 56		
Electrical Lineman	1249aWestLT	60		
Elevator Constructor	138	11, 14, 20, 36, 40, 53, 56	13, 44, 60	
Elevator Constructor	14	2, 5, 7, 15, 19, 32, 37, 61		
Elevator Constructor	27	8, 26, 28, 35, 49, 50, 51, 59, 62		
Elevator Constructor	35	1, 10, 16, 18, 21, 22, 29, 39, 42, 46, 47, 48, 57, 58		
Elevator Constructor	62.1	4, 6, 9, 12, 23, 25, 27, 33, 34, 38, 45, 54, 55	13	
Glazier	201	1, 10, 11, 16, 17, 18, 20, 21, 29, 42, 46, 47, 48, 57, 58		
Glazier	660r	2, 5, 7, 15, 19, 32, 37, 61		
Glazier	660	2, 5, 7, 15, 19, 32, 37, 61		
Glazier	677.1	23, 25, 26, 28, 35, 45, 50, 59, 62		
Glazier	677Z-2	6, 12, 22, 27, 33, 34, 38		
Glazier	677z3	4, 8, 9, 13, 39, 49, 51, 54, 55		
Glazier	677r.2	6, 12, 22, 27, 33, 34, 38		
Insulator – Heat & Frost	30-Syracuse	4, 6, 8, 9, 12, 22, 23, 25, 27, 33, 34, 38, 39, 49, 50, 45, 54, 55		
Laborer – Building	621b	2, 7	5	
Laborer – Building	633 bON	34		

Job Classification Checklist

(Place a checkmark by all classifications that will be using the 4/10 schedule)

**** Do not write in any additional Classifications or Counties****

Job Classification	Tag #	Entire Counties	Partial Counties	Check Box
Laborer – Building	633b Cay	6		
Laborer – Building	633bOS	38		
Laborer – Building	785(7)	4	9, 13, 54	
Laborer – Building	785B-CS	8, 51	49	
Laborer – Building	7-785b	12, 55	49, 54	
Laborers – Heavy & Highway	157h/h	47	18, 29, 46	
Laborers – Heavy & Highway	190 h/h	1, 42, 58	11, 20, 46	
Laborers – Heavy & Highway	35/2h	21, 22, 27, 33	18, 29	
Laborer – Residential	621r	2, 7	5	
Laborers – Tunnel	157	47	18, 29, 46	
Laborers – Tunnel	35T	21, 22, 27, 33	18, 29	
Laborers – Tunnel	190	1, 42, 58	11, 20, 46	
Mason – Building	2TS.1	1, 10,11, 16, 17, 18, 20, 21, 29, 42, 46, 47, 48, 57, 58		
Mason – Building	2TS.2	22, 23, 25, 33, 45	27	
Mason – Building	2TS.3	6, 34, 38	27	
Mason – Building	2b-on	34		
Mason – Building	2b.1	1, 11, 18, 20, 21, 29, 42, 46, 47, 48, 58	57	
Mason – Building	2b.2	22, 33	25	
Mason – Building	2b.3	6, 34	27	
Mason – Building	2b.4	38		
Mason – Building	2b.5	23	25	
Mason – Building	2b.6	45		
Mason – Building	2b.8	10, 16, 17	57	
Mason – Building	3b-Co-Z2	8, 49, 51	2	
Mason – Building	3B-Z1	19, 26, 28, 35, 50, 59, 61, 62		
Mason – Building – Residential	3B-Z1R	19, 26, 28, 35, 50, 59, 61, 62		
Mason – Building	3B-Bing-Z2	4, 9, 13, 39, 54		
Mason – Building	3B-Ith-Z2	12, 55		

Job Classification Checklist

(Place a checkmark by all classifications that will be using the 4/10 schedule)

**** Do not write in any additional Classifications or Counties****

Job Classification	Tag #	Entire Counties	Partial Counties	Check Box
Mason – Building	3B-Jam-Z2	7	2, 5	
Mason – Building – Residential	3B-Jam-Z2R	2, 4, 8, 7, 9, 12, 39, 13, 49, 51, 54, 55	5	
Mason – Building	3B-Z3	15, 32	5	
Mason – Building	3B-Z3.Orleans	37		
Mason – Residential	3B-Z3R	15, 32	5	
Mason – Residential	3B-z3R.Orleans	37		
Mason - Heavy & Highway	3h	2, 4, 8, 7, 9, 12, 13, 19, 26, 28, 35, 37, 39, 49, 50, 51, 54, 55, 59, 61, 62	5, 15, 32	
Mason – Tile Finisher	3TF-Z1	19, 26, 28, 35, 50, 59, 61, 62		
Mason – Tile Finisher	3TF-Z2	2, 4, 8, 7, 9, 12, 13, 39, 49, 51, 54, 55	5	
Mason – Tile Finisher	3TF-Z3	15, 32, 37	5	
Mason – Tile Finisher	3TF-Z1R	19, 26, 28, 35, 50, 59, 61, 62		
Mason – Tile Finisher	3TF-Z2R	2, 4, 7, 9, 12, 13, 39, 49, 51, 54, 55	5	
Mason – Tile Finisher	3TF-Z3R	15, 32, 37	5	
Mason – Tile Setter	3TS-Z1	19, 26, 28, 35, 50, 59, 61, 62		
Mason – Tile Setter Residential	3TS-Z1R	19, 26, 28, 35, 50, 59, 61, 62		
Mason – Tile Setter	3TS-Z2	2, 4, 7, 8, 9, 12, 13, 39, 49, 51, 54, 55	5	
Mason – Tile Setter Residential	3TS-Z2R	2, 4, 7, 8, 9, 12, 13, 39, 49, 51, 54, 55	5	
Mason – Tile Setter	3TS-Z3	15, 32, 37	5	
Mason – Tile Setter Residential	3TS-Z3R	15, 32, 37	5	
Mason – Building/Heavy & Highway	780	3, 24, 30, 31, 41, 43, 52		
Operating Engineer - Heavy & Highway	137H/H	40, 60	14	
Operating Engineer – Heavy & Highway	158-832H	2, 8, 26, 28, 35, 49, 51, 59, 62	19	
Operating Engineer – Heavy & Highway	158-H/H	1, 4, 9, 10, 11, 14, 16, 17, 18, 20, 21, 22, 29, 39, 42, 46, 47, 48, 54, 57, 58		
Operating Engineer – Heavy & Highway	158-545h	6, 12, 23, 25, 27, 33, 38, 45, 50, 55		
Painter	1456-LS	1, 3, 10, 11, 14, 16, 17, 18, 20, 21, 24, 29, 30, 31, 36, 40, 41, 42, 43, 44, 46, 47, 48, 52, 53, 56, 57, 58, 60		
Painter	150	28, 59, 62	26, 35	

Job Classification Checklist

(Place a checkmark by all classifications that will be using the 4/10 schedule)

**** Do not write in any additional Classifications or Counties****

Job Classification	Tag #	Entire Counties	Partial Counties	Check Box
Painter	178 B	4, 9, 54		
Painter	178 E	8, 49	51	
Painter	178 I	12, 55		
Painter	178 O	13, 39		
Painter	31	6, 22, 27, 33, 34, 50	25, 35, 38	
Painter	38.O		38	
Painter	38.W	23, 45	25	
Painter	4-Buf,Nia,Olean	2, 15, 19, 32, 37, 61	5, 7, 26, 51	
Painter	4-Jamestown		5, 7	
Sheetmetal Worker	46	26, 28, 35, 50, 59, 62		
Sheetmetal Worker	46r	26, 28, 35, 50, 59, 62		
Teamsters – Heavy & Highway	294h/h	1, 11, 18, 20, 29, 42, 46, 47, 48, 58	57	
Teamsters – Heavy & Highway	317bhh	6, 12, 50, 51, 55, 62	2	
Teamsters - Building/Heavy & Highway	456	40, 60		

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

This information is provided to assist you in the interpretation of particular requirements for each classification of worker contained in the attached Schedule of Prevailing Rates.

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.

Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. In most cases the payment or provision of supplements is for each hour worked (noted in the schedule as 'Per hour worked'). Some classifications require the payment or provision of supplements for each hour paid (noted in the schedule as 'Per hour paid'), which require supplements to be paid or provided at a premium rate for premium hours worked. Some classifications may also require the payment or provision of supplements for paid holidays on which no work is performed.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.state.ny.us) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3

Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12240

District Office Locations:	Telephone #	FAX #
Bureau of Public Work - Albany	518-457-2744	518-485-0240
Bureau of Public Work - Binghamton	607-721-8005	607-721-8004
Bureau of Public Work - Buffalo	716-847-7159	716-847-7650
Bureau of Public Work - Garden City	516-228-3915	516-794-3518
Bureau of Public Work - Newburgh	845-568-5287	845-568-5332
Bureau of Public Work - New York City	212-932-2419	212-775-3579
Bureau of Public Work - Patchogue	631-687-4882	631-687-4902
Bureau of Public Work - Rochester	585-258-4505	585-258-4708
Bureau of Public Work - Syracuse	315-428-4056	315-428-4671
Bureau of Public Work - Utica	315-793-2314	315-793-2514
Bureau of Public Work - White Plains	914-997-9507	914-997-9523
Bureau of Public Work - Central Office	518-457-5589	518-485-1870

Suffolk County General Construction

Asbestos Worker — 01/01/2018

JOB DESCRIPTION Asbestos Worker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES

Per Hour:	07/01/2017
Abestos Worker Removal & Abatement Only*	$ 44.00

NOTE: *On Mechanical Systems that are NOT to be SCRAPPED.

SUPPLEMENTAL BENEFITS

Per Hour:	
Abestos Worker Removal & Abatement Only	$ 8.70

OVERTIME PAY
See (B, B2, *E, J) on OVERTIME PAGE
Hours worked on Saturdays are paid at time and one half only if forty hours have been worked during the week.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8) on HOLIDAY PAGE

REGISTERED APPRENTICES
Apprentice Removal & Abatement Only:
1000 hour terms at the following percentage of Journeyman's rates.

1st	2nd	3rd	4th
78%	80%	83%	89%

SUPPLEMENTAL BENEFIT

Per Hour:	
Apprentice Removal & Abatement	$ 8.70

4-12a - Removal Only

Boilermaker — 01/01/2018

JOB DESCRIPTION Boilermaker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2017	01/01/2018
Boilermaker	$ 55.23	$ 57.17
Repairs & Renovations	$ 55.23	$ 57.17

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2017	01/01/2018
Boilermaker Repair $ Renovations	32% of hourly Wage Paid + $ 25.27	32% of hourly Wage Paid + $ 25.35

NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay.

Repairs & Renovation Includes replacement of parts and repairs & renovation of existing unit.

OVERTIME PAY
See (D, O) on OVERTIME PAGE
Repairs & Renovation see (B,E,Q)

HOLIDAY

Paid: See (8, 16, 23, 24) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 12, 15, 16, 22, 23, 24, 25) on HOLIDAY PAGE
NOTE: *Employee must work in pay week to receive Holiday Pay.
**Employee gets 4 times the hourly wage rate for working Labor Day.

REGISTERED APPRENTICES
Wage per hour:
(1/2) Year Terms at the following pecentage of Boilermaker's Wage

1st	2nd	3rd	4th	5th	6th	7th
65%	70%	75%	80%	85%	90%	95%

Supplemental Benefits Per Hour:

Apprentice(s)	07/01/2017 32% of Hourly Wage Paid Plus Amount Below	01/01/2018 32% of Hourly Wage Paid Plus Amount Below
1st Term	$ 19.35	$ 19.37
2nd Term	20.20	20.22
3rd Term	21.04	21.06
4th Term	21.89	21.92
5th Term	22.74	22.77
6th Term	23.60	23.62
7th Term	24.43	24.46

NOTE: "Hourly Wage Paid" shall include any and all premium(s)

4-5

Carpenter **01/01/2018**

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per hour: 07/01/2017

Piledriver	$ 51.63
Dockbuilder	$ 51.63

SUPPLEMENTAL BENEFITS
Per hour worked:

Journeyworker	$ 48.62

OVERTIME PAY
See (B, E2, O) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr.
Apprentices See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wages per hour
(1)year terms:

1st	2nd	3rd	4th
$20.65	$25.82	$33.56	$41.30

Supplemental benefits per hour:

Apprentices	$ 32.49

8-1556 Db

Carpenter **01/01/2018**

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per hour: 07/01/2017

Carpet/Resilient
Floor Coverer $ 50.50

INCLUDES HANDLING & INSTALLATION OF ARTIFICIAL TURF AND SIMILAR TURF INDOORS/OUTDOORS.

SUPPLEMENTAL BENEFITS
Per hour worked:
$ 45.85

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18, 19) on HOLIDAY PAGE.

Paid for 1st & 2nd yr.
Apprentices See (5,6,11,13,16,18,19,25)
Overtime: See (5,6,11,13,16,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wage per hour - (1) year terms:

1st	2nd	3rd	4th
$20.20	$25.25	$32.83	$40.40

Supplemental benefits per hour - all apprentice terms:

$ 31.11

8-2287

Carpenter **01/01/2018**

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per Hour: 07/01/2017

Marine Construction:

Marine Diver $ 65.38
Marine Tender 46.44

SUPPLEMENTAL BENEFITS
Per Hour Worked:

Journeyman $ 48.62

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18, 19) on HOLIDAY PAGE
Overtime: See (5, 6, 10, 11, 13, 16, 18, 19) on HOLIDAY PAGE

8-1456MC

Carpenter **01/01/2018**

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per hour: 07/01/2017

Building
Millwright $ 51.50

SUPPLEMENTAL BENEFITS
Per hour worked:

Millwright $ 52.38

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (18,19)* on HOLIDAY PAGE.

Overtime See (5,6,8,11,13,18,19,25) on HOLIDAY PAGE.

* Must show up to work

REGISTERED APPRENTICES
Wages per hour:

(1) year terms:

1st.	2nd.	3rd.	4th.
$28.33	$33.48	$38.63	$48.93

Supplemental benefits per hour paid:

(1) year terms:

1st.	2nd.	3rd.	4th.
$34.25	$37.85	$42.10	$48.66

8-740.1

Carpenter **01/01/2018**

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
Per Hour:
07/01/2017

Timberman $ 46.99

SUPPLEMENTAL BENEFITS
Per Hour Worked:
07/01/2017

$ 48.23

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr.
Apprentices See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wages per hour:
(1) year terms:

1st	2nd	3rd	4th
$18.80	$23.50	$30.54	$37.59

Supplemental benefits per hour:

$ 32.30

8-1556 Tm

Carpenter — 01/01/2018

JOB DESCRIPTION Carpenter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Westchester

PARTIAL COUNTIES
Orange: South of but including the following, Waterloo Mills, Slate Hill, New Hampton, Goshen, Blooming Grove, Mountainville, east to the Hudson River.
Putnam: South of but including the following, Cold Spring, TompkinsCorner, Mahopac, Croton Falls, east to Connecticut border.
Suffolk: West of Port Jefferson and Patchogue Road to Route 112 to the Atlantic Ocean.

WAGES

Per hour:	07/01/2017	10/17/2017
Core Drilling:		
Driller	$ 38.82	$ 39.69
Driller Helper	30.96	31.62

Note: Hazardous Waste Pay Differential:
For Level C, an additional 10% above wage rate per hour
For Level B, an additional 10% above wage rate per hour
For Level A, an additional 10% above wage rate per hour
Note: When required to work on water: an additional $ 0.50 per hour.

SUPPLEMENTAL BENEFITS

Per hour worked:	07/01/2017	10/17/2017
Driller and Helper	$ 24.66	$ 25.45

OVERTIME PAY
OVERTIME: See (B,E,K*,P,R**) on OVERTIME PAGE.

HOLIDAY
Paid: See (5,6) on HOLIDAY PAGE.
Overtime: * See (5,6) on HOLIDAY PAGE.
** See (8,10,11,13) on HOLIDAY PAGE.

8-1536-CoreDriller

Carpenter - Building / Heavy&Highway — 01/01/2018

JOB DESCRIPTION Carpenter - Building / Heavy&Highway **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES

Per Hour:	07/01/2017
Carpenter (Building)	$ 49.02
Carpenter (Heavy Highway)	$ 49.02

"NOTE" ADD 15% to straight time hourly wage for NEW YORK STATE D.O.T. and other GOVERMENTAL MANDATED Off-Shift Work.

SUPPLEMENTAL BENEFITS
Per Hour:

Both Carpenter Categories	$ 31.47

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

One(1) Year Terms at the following:
Per Hour:

1st	2nd	3rd	4th
$ 23.48	$ 27.61	$ 29.68	$ 33.81

Supplemental Benefits
Per Hour:

All Terms: $ 17.95

4-Reg.Council Nass/Suff

Electrician **01/01/2018**

JOB DESCRIPTION Electrician **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES

Per Hour:	07/01/2017	04/28/2018
Telephone and Intergrated Tele-Data System Electrician	$ 37.13	$ 37.48

This rate classification applies to ALL Voice, Data & Video work.: Excluding Fire Alarm Systems and Energy Managment Systems (HVAC Controls), in those cases the regular Electrician rate applies. To ensure proper use of this rate please call Nassau Offices at (516)228-3912 or Suffolk Offices at (631)687-4882.

SUPPLEMENTAL BENEFITS
Per Hour:

Tele-Data Electrican	16% of Hourly Wage Paid + $18.02	16% of Hourly Wage Paid + $18.68

NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16, 25) on HOLIDAY PAGE

4-25tela

Electrician **01/01/2018**

JOB DESCRIPTION Electrician **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES

Per Hour:	07/01/2017	03/30/2018
Electrician Electrical Maintenance	$ 42.70	$ 43.20
Traffic Signal	$ 43.60	$ 44.10

"PLEASE NOTE"
Applicable to "EXISTING ELECTRICAL SYSTEMS" including, but not limited to TRAFFIC SIGNALS & STREET LIGHTING. Not used for addons.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday, with one-half (1/2) hour allowed for a lunch period.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per Hour:

Electrician	12% of Hourly Wage Paid + $17.20	12% of Hourly Wage Paid + $17.61

NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay

OVERTIME PAY
See (B, E2, K, P) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
One(1) Year Term(s) at the following Percentage of Journeyman(s) Wage:

1st	2nd	3rd	4th	5th	6th
40%	50%	60%	70%	80%	90%

Supplemental Benefits:

	Apprentices Hired Prior to 04/26/2014	Apprentices Hired After 04/26/2014
	07/01/2017-06/30/2018	07/01/2016-06/30/2018
1st	12% + $9.90	3% + $3.66
2nd	12% + $10.79	8% + $4.20
3rd	12% + $11.70	9% + $5.24
4th	12% + $12.59	10% + $ 7.00
5th	12% + $13.48	11% + $10.95
6th	12% + $13.66	12% + $14.05

NOTE: Percentages are on "Hourly Wage Paid"
NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay

4-25m

Electrician 01/01/2018

JOB DESCRIPTION Electrician **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
Per Hour:

	07/01/2017	04/30/2018
Electrician Pump & Tank	$ 41.05	$ 41.65

SUPPLEMENTAL BENEFITS
Per Hour:

Electrician Pump & Tank	65.25% of *Wage Paid	65.25% of *Wage Paid

*Wage Paid includes any and all Premiums

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
1 Year Terms at the Following:

Per Hour:

1st Term	$ 12.32	$ 12.50
2nd Term	$ 14.37	$ 14.58

3rd Term	$ 16.42	$ 16.66
4th Term	$ 18.47	$ 18.74
5th Term	$ 24.63	$ 24.99
6th Term	$ 28.74	$ 29.16

SUPPLEMENTAL BENEFITS

Per Hour:

All Terms	65.25% of *Wage Paid	65.25% of Wage Paid

*Wage Paid includes any and all Premiums

4-25 Pump & Tank

Electrician 01/01/2018

JOB DESCRIPTION Electrician **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES

Per Hour:	07/01/2017	04/28/2018
Electrician/Wireman	$ 51.50	$ 51.75
HVAC Controls	51.50	51.75
Fire Alarms	51.50	51.75

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2017	04/28/2018
Electrcian/Wireman (all catagories)	16% of Hourly Wage Paid + $24.96	16% of Hourly Wage Paid + $25.26

NOTE: "Hourly Wage Paid" shall include any and all premium[s]

OVERTIME PAY
See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
One(1) Year Terms at the following Percetage of Journeyman(s) Wage:

1st	2nd	3rd	4th	5th	6th
35%	35%	40%	45%	60%	75%

Supplemental Benefits Per Hour:

	07/01/2017	04/28/2018
1st	3% + $2.87	3% + $2.87
2nd	8% + $4.84	8% + $4.84
3rd	9% + $6.04	9% + $6.04
4th	10% + $ 8.19	10% + $8.19
5th	13% + $11.03	13% + $11.03
6th	14% + $17.29	14% + $17.29

NOTE: Percentages are on "Hourly Wage Paid"
NOTE: "Hourly Wage Paid" shall include any and all premium(s).

4-25

Electrician 01/01/2018

JOB DESCRIPTION Electrician **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES

Per Hour:	07/01/2017
Tree Trimmer/Remover Line Clearance Specialist	$ 32.72
Groundman*	$19.63

These rates apply to all tree trimming/removal contracts including but not limited to "Electrical Line Clearance"/"Long Island Railroad Right of Ways".

All tree removal for heavy highway or building construction contracts MUST use Heavy Highway Laborer and Operating Engineer classifications.

* Note: Groundman is not to exceed 20% of the total company workforce

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2017
Tree Trimmer/Remover Line Clearance Specialist and Groundman	19.75% of Hourly Wage Paid + $9.82

NOTE: "Hourly Wage Paid" shall include any and all premium(s) paid

OVERTIME PAY
See (B, E, P, S) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 8, 16, 23, 24, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 16, 23, 24, 25, 26) on HOLIDAY PAGE

4-1049/Tree

Electrician Lineman — 01/01/2018

JOB DESCRIPTION Electrician Lineman **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Queens, Suffolk

WAGES
For Utility Distribution & Transmission Line Construction:

Per Hour:	07/01/2017	04/02/2018
Lineman/Splicer	$ 53.85	$ 55.60
Material Man	46.85	48.37
Heavy Equip. Operator	43.08	44.48
Groundman	32.31	33.36
Flagman	24.23	25.02

For Natural Gasline Construction:

Per Hour:	07/01/2017
Journeyman U.G.Mech.	$ 44.08

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per Hour:
Utility Distribution & Transmission Line Construction:

	07/01/2017	04/02/2018
All Classifications	32% of Hourly Wage Paid + $ 11.93	32% of Hourly Wage Paid + $ 12.43

NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay

Natural Gasline Construction:

Per Hour:	07/01/2017
Journeyman U.G.Mech.	26% of Hourly Wage Paid + $11.96

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE
OVERTIME for Natural Gas Mechanic:(B,G,P)

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 16, 23, 25, 26) on HOLIDAY PAGE
Same as Above for Natural Gas Mechanic.

REGISTERED APPRENTICES
1000 hour Terms at the following Percentage of Journeyman's Wage.
(Lineman Only)

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFIT:	07/01/2017	04/02/2018
All Terms	31% of Hourly Wage Paid + $11.93	31% of Hourly Wage Paid + $12.43

4-1049 Line/Gas

Elevator Constructor — 01/01/2018

JOB DESCRIPTION Elevator Constructor **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

PARTIAL COUNTIES
Rockland: Entire County except for the Township of Stony Point
Westchester: Entire County except for the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES
Per hour:

	07/01/2017	03/17/2018
Elevator Constructor	$ 62.64	$ 64.48
Modernization & Service/Repair	49.14	50.49

SUPPLEMENTAL BENEFITS
Per Hour:

Elevator Constructor	$ 38.27	$ 39.98
Modernization & Service/Repair	37.25	38.94

OVERTIME PAY
Constructor. See (D, M, T) on OVERTIME PAGE.

Modern./Service See (B, F, S) on OVERTIME PAGE.

HOLIDAY
Paid: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES PER HOUR:
*Note:1st Term is based on Average wage of Constructor & Modernization.

Terms 2 thru 4 Based on Journeyman's wage of classification Working in.

1 YEAR TERMS:

1st Term*	2nd Term	3rd Term	4th Term
50%	55%	65%	75%

SUPPLEMENTAL BENEFITS

Elevator Constructor		
1st Term	$ 30.99	$ 32.50
2nd Term	31.69	33.22
3rd Term	32.82	34.38
4th Term	33.94	35.54

Modernization & Service/Repair		
1st Term	$ 30.92	$ 32.43
2nd Term	31.32	32.83
3rd Term	32.37	33.92
4th Term	33.43	35.01

4-1

Glazier 01/01/2018

JOB DESCRIPTION Glazier **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per hour:	07/01/2017	05/01/2018
Glazier	$ 53.90	+ additional
Scaffolding	$ 54.90	$ 1.25

Scafolding includes swing scaffold, mechanical equipment, scissor jacks, man lifts, booms & buckets 24' or more, but not pipe scaffolding.

Repair & Maintenance $ 27.23

Repair & Maintenance- All repair & maintenance work on a particular building,whenever performed, where the total cumulative contract value is under $121,550

SUPPLEMENTAL BENEFITS

Per hour paid:	07/01/2017
Journeyworker	$ 31.99
Repair & Maintenance	$ 18.24

OVERTIME PAY
See (C*,D* E2, O) on OVERTIME PAGE. (Premium is applied to the respective base wage only.)

* If an optional 8th hour is required to complete the entire project, the same shall be paid at the regular rate of pay. If a 9th hour is worked, then both hours or more (8th & 9th or more) will be paid at double time rate of pay.

For 'Repair & Maintenance' see (B, B2, F, P) on overtime page.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (4, 6, 16, 25) on HOLIDAY PAGE

For 'Repair & Maintenance' see (5, 6, 16, 25)

REGISTERED APPRENTICES
Wage per hour:
(1) year terms at the following wage rates:

	07/01/2017
1st term	$ 18.44
2nd term	26.61

3rd term	32.10
4th term	42.97

Supplemental Benefits:
(Per hour worked)

1st term	$ 15.36
2nd term	21.21
3rd term	23.41
4th term	27.56

8-1281 (DC9 NYC)

Insulator - Heat & Frost — 01/01/2018

JOB DESCRIPTION Insulator - Heat & Frost **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES
Per Hour: 07/01/2017

Insulators Heat & Frost	$ 64.68

SUPPLEMENTAL BENEFITS
Per Hour:

Insulators Heat & Frost	$ 33.56

OVERTIME PAY
See (A, D, O, V) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages:
1 year terms Per Hour:

1st	2nd	3rd	4th
$32.31	$38.77	$45.24	$51.68

Supplemental Benefits per hour:

Apprentice Insulator(s)

1st	$ 16.78
2nd	20.14
3rd	23.49
4th	26.85

4-12

Ironworker — 01/01/2018

JOB DESCRIPTION Ironworker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

PARTIAL COUNTIES
Rockland: Southern section - south of Convent Road and east of Blue Hills Road.

WAGES
Per hour:

	07/01/2017	07/01/2018
Reinforcing & Metal Lathing	$ 56.28	$ 2.00/Hr. to be Allocated

SUPPLEMENTAL BENEFITS
Per hour paid:

Reinforcing & Metal Lathing	$ 33.30

OVERTIME PAY
See (B, B1, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 13, 18, 19, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1) year terms at the following wage rates:
Wages Per Hour:

1st term	2nd term	3rd term	4th Term
$ 28.38	$ 32.38	$ 35.38	$ 37.38

SUPPLEMENTAL BENIFITS
Per Hour:

1st term	2nd term	3rd term	4th Term
$ 11.34	$ 13.34	$ 17.30	$ 18.30

4-46Reinf

Ironworker 01/01/2018

JOB DESCRIPTION Ironworker **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
Per Hour: 07/01/2017 01/01/2018

IRONWORKER:

Ironworker Rigger $ 60.47 Additional $1.36

Ironworker Stone Derrickman $ 60.47

SUPPLEMENTAL BENEFITS
Ironworker: $ 39.24

OVERTIME PAY
See (B, D1, *E, Q, **V) on OVERTIME PAGE
*Time and one-half shall be paid for all work on Saturday up to eight (8) hours and double time shall be paid for all work thereafter.
** Benefits same premium as wages on Holidays only

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 25) on HOLIDAY PAGE
*Work stops at schedule lunch break with full day's pay.

REGISTERED APPRENTICES
Wage per hour:

1/2 year terms at the following hourly wage rate:

	1st	2nd	3rd	4th	5th	6th
07/01/2017	$30.34	$30.34	$43.07	$47.89	$52.70	$52.70

Supplemental benefits:

Per hour paid:	$19.63	$19.63	$29.47	$29.47	$29.47	$29.47

9-197D/R

Ironworker 01/01/2018

JOB DESCRIPTION Ironworker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2017	01/01/2018
Ornamental	$ 45.10	Additional
Chain Link Fence	45.10	$ 1.25/Hr.
Guide Rail Installation	45.10	To be allocated

SUPPLEMENTAL BENEFITS
Per hour paid:
Journeyworker: $ 51.16

OVERTIME PAY
OVERTIME: See (A*,D1,E**,Q,V) on OVERTIME PAGE.

*Time and one-half shall be paid for all work in excess of seven (7) hours at the end of a work day to a maximum of two (2) hours on any regular work day (8th & 9th hours of work) and double time shall be paid for all work thereafter.
**Time and one-half shall be paid for all work on Saturday up to seven (7) hours and double time shall be paid for all work thereafter.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
1st term represents first 1-10 months, thereafter (1/2) year terms at the following percentage of Journeyman's wage.

1st	2nd	3rd	4th	5th
50%	55%	60%	70%	80%

Supplemental Benefits per hour paid:

1st Term	$ 38.74
2nd Term	39.93
3rd Term	41.12
4th Term	43.51
5th Term	45.89

4-580-Or

Ironworker 01/01/2018

JOB DESCRIPTION Ironworker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
PER HOUR:

	07/01/2017	01/01/2018	07/01/2018
Ironworker:		Additional	Additional
Structural	$ 50.05	$1.72/Hr.	$1.83/Hr.
Bridges		to be allocated	to be allocated
Machinery			

SUPPLEMENTAL BENEFITS
PER HOUR:

Journeyman $ 73.03

OVERTIME PAY
See (B, B1, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 18, 19) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES PER HOUR:

6 month terms at the following rate:

1st	$ 26.12
2nd	26.72
3rd - 6th	27.32

Supplemental Benefits
PER HOUR:

All Terms 50.72

4-40/361-Str

Laborer - Building 01/01/2018

JOB DESCRIPTION Laborer - Building **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
WAGES

Per Hour:	07/01/2017
Building Laborer	$ 39.40
Asbestos Abatement Workers	36.00
(Re-Roofing Removal see Roofer)	

SUPPLEMENTAL BENEFITS
Per Hour:

Building Laborer	$ 29.56
Asbestoes Abatment Worker	16.45

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE
See also(H)for Fire Watch on OVERTIME PAGE
Asbestos Worker See (B, H)

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 25) on HOLIDAY PAGE
Asbestos Worker see (5,6,8 & 28)

REGISTERED APPRENTICES
Regular Hours Work Terms

Term #1	1 hr to 1000hrs
Term #2	1001hrs to 2000hrs
Term #3	2001hrs to 3000hrs
Term #4	3001hrs to 4000hrs

Wages per hour:

1st Term	$ 17.46
2nd Term	20.55
3rd Term	25.43
4th Term	30.41

Benifits per hour

1st Term	$ 19.65
2nd Term	22.44
3rd Term	22.44
4th Term	22.44

4-66

Laborer - Heavy&Highway 01/01/2018

JOB DESCRIPTION Laborer - Heavy&Highway **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
Laborer (Heavy/Highway):
GROUP # 1: Asphalt Rakers, Concrete Curb Formsetters.
GROUP # 2: Asphalt Shovelers, Roller Boys and Tampers.
GROUP # 3: Basic Laborer, Power Tool(Jackhammer), Landscape Construction, Traffic Control Personnel(flaggers)

WAGES PER HOUR:

	07/01/2017	06/01/2018
GROUP # 1		
Total Wage Paid	$ 49.65	Additional

"Base Wage"	43.52	$ 2.37
GROUP # 2		
Total Wage Paid	$ 48.37	Additional
"Base Wage"	42.24	$ 2.33
GROUP # 3		
Total Wage Paid	$ 44.48	Additional
"Base Wage"	38.35	$ 2.21

NOTE: "Base Wage" for Premium/Overtime calculation Only. $6.13 is differance between "Base" and "Total"

SUPPLEMENTAL BENEFITS
Per Hour:
ALL GROUPS $ 29.27

After Forty (40)paid hours in a work week
OVERTIME PAY $ 18.34

OVERTIME PAY
OVERTIME PAY
See (B, E2, F) on OVERTIME PAGE
NOTES: Premium/Overtime Pay to be calculated on "Base Wage" ONLY
Example Group# 3: $38.35 X Time and One Half = $57.53 + $6.13 = $63.66
Premium Pay of 30% of base wage for all Straight time hours on all New York State, D.O.T. and other Goverment Mandated Off-Shift Work.
Hazardous Material Work add an Additional 10% of base wage

HOLIDAY
HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (1) on HOLIDAY PAGE

REGISTERED APPRENTICES
1000 hour(s) Terms at the following Pecentage of the "Base Wage" except
4th Term calculate at Total Wage Paid.

1st 0-1000/Hrs.	60%
2nd 1001-2000/Hrs.	70%
3rd 2001-3000/Hrs.	80%
4th 3001-4000/Hrs.	90%

Supplemental Benefits per hour:

All APPRENTICES	$ 29.27
After Forty(40) paid hours in a work Week	$ 18.34

4-1298

Mason 01/01/2018

JOB DESCRIPTION Mason **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES
Per Hour: 07/01/2017

Brick/Blocklayer $ 60.18

SUPPLEMENTAL BENEFITS
Per Hour:

Brick/Block Layer $ 27.30

OVERTIME PAY
See (A, E, E2, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(800 hour) Terms at the following Percentage of Journeyworkers Wage:

1st	2nd	3rd	4th	5th
50%	60%	70%	80%	90%

Supplemental Benefits per hour:

All Apprentices $ 16.90

4-1Brk

Mason - Building **01/01/2018**

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Nassau, Rockland, Suffolk, Westchester

WAGES
Per hour: 07/01/2017

Building:
Tile Finisher $ 43.36

SUPPLEMENTAL BENEFITS
Per Hour:

Journey worker $ 20.57* per hour paid
plus $ 8.42 per hour worked

OVERTIME PAY
See (B, E, Q, *V) on OVERTIME PAGE
* This portion of Supplemental benefits subject to same premium rate as shown for overtime wages.
Work beyond 10 hours on a Saturday shall be paid at double the hourly wage rate.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

9-7/88A-tf

Mason - Building **01/01/2018**

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
Building:

07/01/2017

Wages per hour:

Mosaic & Terrazzo Mechanic $ 52.46

Mosaic & Terrazzo Finisher 50.86

SUPPLEMENTAL BENEFITS
Journeyworker:
Per hour:

Mosaic & Terrazzo Mechanic $ 23.55* per hour paid plus
$ 10.49 per hour worked

Mosaic & Terrazzo Finisher $23.55* per hour paid plus
$10.51 per hour worked

OVERTIME PAY
See (A, *E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

Easter Sunday is an observed holiday.Holidays falling on a Saturday will be observed on that Saturday. Holidays falling on a Sunday will be celebrated on the Monday.

REGISTERED APPRENTICES
Wages per hour:
(750 Hour) terms at the following wage rate.

	1st	2nd	3rd	4th	5th	6th	7th	8th
07/01/2017	$ 26.23	$ 28.85	$ 31.48	$ 34.10	$ 36.72	$ 39.35	$ 44.59	$ 49.84

Supplemental benefits per hour:

07/01/2017	$ 11.78* plus	$ 5.22**
	$ 12.95* plus	$ 5.73**
	$ 14.13* plus	$ 6.24**
	$ 15.31* plus	$ 6.77**
	$ 16.49* plus	$ 7.29**
	$ 17.66* plus	$ 7.81**
	$ 20.02* plus	$ 8.85**
	$ 22.37* plus	$ 9.90**

* Per Hour paid and subject to same premium as overtime wages.
** Per hour worked

9-7/3

Mason - Building — 01/01/2018

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2017	01/01/2018
Building-Marble Restoration:		
Marble, Stone & Terrazzo Polisher, etc	$ 40.62	$ 40.89

SUPPLEMENTAL BENEFITS
Per Hour Paid:
Journeyworker:

Building-Marble Restoration:		
Marble, Stone & Polisher	$ 26.06	$ 26.69

OVERTIME PAY
See (B, *E, Q, V) on OVERTIME PAGE
*ON SATURDAYS, 8TH HOUR AND SUCCESSIVE HOURS PAID AT DOUBLE HOURLY RATE.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE
1ST TERM APPRENTICE GETS PAID FOR ALL OBSERVED HOLIDAYS.

REGISTERED APPRENTICES
WAGES per hour:
(900 hour)terms at the following per cent of journeyman's wages:

	1st	2nd	3rd	4th
	0-900	901-1800	1801-2700	over 2700
07/01/2017	70%	80%	90%	100%

Supplemental Benefits Per Hour:

07/01/2017	$ 23.25	$ 23.98	$ 24.72	$ 25.45

9-7/24-MP

Mason - Building 01/01/2018

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Wages:	07/01/2017	01/01/2018
Marble Cutters& Setters	$ 58.18	$ 58.53

SUPPLEMENTAL BENEFITS
Per Hour:

Journeyworker	$ 35.12	$ 36.22

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage Per Hour:

750 hour terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-750	751-1500	1501-2250	2251-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6751	6751-7500
$23.10	$25.98	$28.87	$31.76	$34.64	$37.53	$40.42	$43.30	$49.08	$54.85

Supplemental Benefits per hour paid at the following term:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$24.53	$25.31	$26.12	$26.91	$27.71	$28.51	$29.32	$30.12	$31.71	$33.31

9-7/4

Mason - Building 01/01/2018

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2017	01/01/2018
Marble, Stone,etc. Maintenance Finishers:	$ 22.42	$ 22.67

Note 1: An additional $2.00 per hour for time spent grinding floor using "60 grit" and below.
Note 2: Flaming equipment operator shall be paid an additional $25.00 per day.

SUPPLEMENTAL BENEFITS
Per Hour:

Marble, Stone, etc Maintenance Finishers:	$ 13.11	$ 13.34

OVERTIME PAY
See (B, *E, Q, V) on OVERTIME PAGE
*Double hourly rate after 8 hours on Saturday

HOLIDAY
Paid: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE
1st term apprentice gets paid for all observed holidays.

REGISTERED APPRENTICES
WAGES per hour:

(750 hour)terms at the following percentage of journeyman's wage rate:	07/01/2017
1st term 0-750	70%
2nd term 750-1500	74%
3rd trem 1501-2250	78%
4th term 2251-3000	82%
5th term 3001-3750	88%
6th term 3751-4500	96%

Supplemental Benefits:
Per hour paid

1st term	$ 12.77
2nd term	12.78
3rd term	12.80
4th term	12.81
5th term	12.83
6th term	12.86

9-7/24M-MF

Mason - Building 01/01/2018

JOB DESCRIPTION Mason - Building **DISTRICT** 9

ENTIRE COUNTIES
Nassau, Rockland, Suffolk, Westchester

WAGES
Per hour: 07/01/2017

Building:
Tile Setters $ 56.13

SUPPLEMENTAL BENEFITS
Per Hour:

Journey Worker $23.60* per hour paid
Plus $8.57 per hour worked

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE
* This portion of benefits subject to same premium rate as shown for overtime wages.
Work beyond 10 hours on Saturday shall be paid at double the hourly wage rate.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage per hour:

Tile Setters:
(750 hour) term at the following wage rate:

Term: 1st 1-750	2nd 751-1500	3rd 1501-2250	4th 2251-3000	5th 3001-3750	6th 3751-4500	7th 4501-5250	8th 5251 6000
$29.13	$33.57	$36.69	$40.13	$43.77	$47.22	$50.15	$53.93

Supplemental Benefits per hour:

1st term	$14.95* plus $0.75	6th term	$18.45* plus $1.58
2nd term	$14.95* plus $0.89	7th term	$15.95* plus $5.62

3rd term	$15.95* plus $1.15	8th term	$20.70* plus $6.06
4th term	$16.95* plus $1.20		
5th term	$17.45* plus $1.53		

9-7/52A

Mason - Building / Heavy&Highway **01/01/2018**

JOB DESCRIPTION Mason - Building / Heavy&Highway **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES
WAGES

NOTE: Shall include but not limited to Precast concrete slabs (London Walks)Marble and Granite pavers 2'x 2' or larger.
Per Hour:

	07/01/2017
Stone Setter	$ 62.98
Stone Tender	$ 44.89

SUPPLEMENTAL BENEFITS
Per Hour:

Stone Setter	$ 31.65
Stone Tender	$ 19.40

OVERTIME PAY
See (*C, **E, Q) on OVERTIME PAGE
* On weekdays the eighth (8th) and ninth (9th) hours are time and one-half all work thereafter is paid at double the hourly rate.
** The first nine (9) hours on Saturday is paid at time and one-half all work thereafter is paid at double the hourly rate.

HOLIDAY
Paid: See (*18) on HOLIDAY PAGE
Overtime: See (5, 6, 10) on HOLIDAY PAGE
Paid: *Must work first 1/2.

REGISTERED APPRENTICES
Per Hour:

Stone Setter(800 hour) terms at the following Percentage of Stone Setters wage rate per hour:

1st	2nd	3rd	4th	5th	6th
50%	60%	70%	80%	90%	100%

Supplemental Benefits:
All Apprentices $ 19.51

4-1Stn

Mason - Building / Heavy&Highway **01/01/2018**

JOB DESCRIPTION Mason - Building / Heavy&Highway **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
Per hour:

	07/01/2017	01/01/2018
Marble-Finisher	$ 46.32	$ 46.66

SUPPLEMENTAL BENEFITS
Journeyworker:
per hour paid

Marble- Finisher	$ 33.29	$34.03

OVERTIME PAY
See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY

Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE
* Work beyond 8 hours on a Saturday shall be paid at double the rate.
** When an observed holiday falls on a Sunday, it will be observed the next day.

9-7/20-MF

Mason - Building / Heavy&Highway 01/01/2018

JOB DESCRIPTION Mason - Building / Heavy&Highway **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES

Per Hour:	07/01/2017	07/01/2018
Cement Mason	$ 50.97	$ 2.00/Hr. to be Allocated

SUPPLEMENTAL BENEFITS
Per Hour:

Cement Mason	$ 32.71
Overtime Rate*	$ 49.07

OVERTIME PAY
See (*B1, Q, V) on OVERTIME PAGE
* Applies to 9th and 10th hours and Saturday Work

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 13, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1) year terms at the following Percentage of Journeyworkers Wage.

1st Term	50%
2nd Term	60%
3rd Term	70%

Supplement Benefits per hour paid:

1st Term	$ 22.08/OT Rate $ 33.12
2nd Term	$ 24.21/OT Rate $ 36.32
3rd Term	$ 26.33/OT Rate $ 39.50

4-780

Mason - Heavy&Highway 01/01/2018

JOB DESCRIPTION Mason - Heavy&Highway **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES

Per Hour:	07/01/2017
Pointer, Caulkers & Cleaners	$ 52.57

SUPPLEMENTAL BENEFITS
Per Hour:

Pointer, Cleaners & Caulkers	$ 26.00

OVERTIME PAY
See (B, E2, H) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

One (1) year terms at the following wage rates.

1st	2nd	3rd	4th
$ 25.89	$ 28.97	$ 34.12	$ 41.33

Apprentices Supplemental Benefits:
(per hour paid)

$ 13.64	$ 18.15	$ 20.90	$ 21.60

4-1PCC

Operating Engineer - Building 01/01/2018

JOB DESCRIPTION Operating Engineer - Building **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
BUILDING CATEGORIES:

CLASS " AA "CRANES:
ABI Machine (150,000lbs and over or 149,999lbs and under when driving steel sheet piles),Crane, Truck Crane, Derrick, Dragline, Dredge, Crawler Crane, Tower Crane & Pile Driver, Vertical Drill Rig (115,000lbs and over).

CLASS "A":
ABI Machine (149,999 and under used for augering and drilling), Asphalt Spreader, Backhoe Crawler(360 swing), Barrier Machine, CAP (ice machine), Cherrypicker CAP (over 70 tons), CMI or Maxim Spreader, Concrete Pump, Directional Boring, GradAll, Grader, Hydraulic Cherrypicker/Crane (2seats), Hoist (3drum or multi platform), Laser Screed, Loading Machine (Bucket/CAP 10yrds or more), Milling Machine (Large), Power Winch (stone setting/structural steel), Scoop Carry-All Scraper (in tandem), Sideboom Tractor (includes tank work), Track Alignment Machine, Stone Spreader (self propelled), Striping Machine (long line/truck mounted), Tree Grapple, Zamboni.

CLASS "B":
Backhoe (other than 360), Belt Screte, Boom Truck, Bulldozer, Boring Machine/Auger, Cherry Picker(under 70 Tons), Conveyor-Multi, Curb Machine (asphalt or concrete), Dinky Locomotive, Drill Rig (dowels)Fork Lift, Hoist (2 Drum), Loading Machine & Front Loader, Mechanical Compactors (machine drawn), Mulch Machine(Machine Fed), Post Hole/Auger, Power Wincher (Not Included in Class "A"), Asphalt Roller, Hydraulic Pump with Boring Machine, Scoop, Carryall/Scaper, Skid Loader/Skid Steer/Bobcat, Trenching Machine, Vermeer Cutter, Work Boat, Inspection/Safety Boat.

CLASS "C":
Concrete Finish/Saw/Spreader, Dirt Roller, Hoist (1 drum), Interior Hoist, Milling Machine (small), Oiler Truck Crane (pile work), Power Broom, Vactor Truck, VacAll.

CLASS "D":
Boiler (thermoplastic), Concrete Breaker, Conveyer, Curing Machine, Fork Lift or Walk Behind (power operated), Generator, Hydra Hammer, Compactors (mechanical or hand operated), Maintenance Engineer (small equipment/well point), Mechanic (field man), Micro-Trap with Compressor, Power Winch Truck Mounted, Pin Puller, Portable Heaters, Power Buggies, Pump (double action diaphragm), Pump (4 inch or over), Pump (hydraulic/submersible) Jet Pump, Pulvi-Mixer, Ridge Cutter, Shot Blaster.

CLASS "E":
Batching Plant, Compressor (structural steel/2 or more battery), Generator (small), Grinder, Ground Heater, Power Grinder, Mixer with Skip, Mulching Machine (hand fed), Power Washer, Pumps (up to 3 inch/single action 1 to 3 inches), Pump (gypsum), Root Cutter, Stump Chipper, Track Tamper, Tractor (caterpillar or wheel), Trenching Machine (hand), Welding Machine (pile work/structural steel), Deckhand on Work Boat.

	07/01/2017	06/01/2018 Additional
Class "AA"	$ 73.56	$ 3.03/Hr
Cranes: Boom length over 100 feet add $ 1.00 per hour		
" " " 150 " " $ 1.50 " "		
" " " 250 " " $ 2.00 " "		
" " " 350 " " $ 3.00 " "		
Class "A"	$ 61.03	Additional $ 2.80/Hr
Add $3.50 for Hazardous Waste Work		
Class "B"	$ 57.86	$ 2.68/Hr
Add $2.50 for Hazardous Waste Work		

Class "C"	$ 55.74	$ 2.62/Hr
Add $1.50 for Hazardous Waste Work		
Class "D"	$ 44.18	$ 0.00
Add $1.00 for Hazardous Waste Work		
Class "E"	$ 42.23	$ 0.00

SUPPLEMENTAL BENEFITS
Per Hour:

All Classes	$ 36.65
Overtime Rate	30.35

OVERTIME PAY
See (D, O) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 15, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16, 25) on HOLIDAY PAGE
"NOTE" Employee must be Employed day before
and day after Holiday to recieve Holiday Pay.

REGISTERED APPRENTICES
One(1) Year Terms at the following Rate:

1st Term	$ 20.84
2nd Term	21.67
3rd Term	22.33

Supplemental Benefits per hour:

All Apprentices	$ 15.64
Overtime Rate	5.60

4-138

Operating Engineer - Building / Heavy&Highway — 01/01/2018

JOB DESCRIPTION Operating Engineer - Building / Heavy&Highway **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES

Per Hour:	07/01/2017	08/01/2017
Well Driller	$ 35.75	$ 36.07
Well Driller Helper	$ 31.22	$ 31.39

Hazardous Waste Differential
Added to Hourly Wage:

Level A	$ 3.00
Level B	2.00
Level C	1.00

Monitoring Well Work
Add to Hourly Wage:

Level A	$ 3.00
Level B	2.00

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2017
Well Driller & Helper	$ 10% of straight time rate plus $ 11.95

Additional $ 3.45 for Premium Time

OVERTIME PAY
See (B, E, G, P) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 16, 23) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 23) on HOLIDAY PAGE

REGISTERED APPRENTICES
Apprentices at 12 Month Terms

Wages Per Hour:	07/01/2017
1st Term	$ 20.84
2nd Term	$ 21.67
3rd Term	$ 22.33

SUPPLEMENTAL BENIFITS
Per Hour:

1st Term	10% of Wage + $ 5.10
2nd Term	10% of Wage + $ 5.60
3rd Term	10% of Wage + $ 6.60

BENEFITS AT PREMIUM TIME
Per Hour:

1st Term	10% of Wage + $ 5.85
2nd Term	10% of Wage + $ 6.60
3rd Term	10% of Wage + $ 8.10

4-138well

Operating Engineer - Heavy&Highway **01/01/2018**

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
Party Chief - One who directs a survey party
Instrument Man - One who runs the instrument and assists Party Chief
Rodman - One who holds the rod and in general, assists the survey party
Categories cover GPS & Under Ground Surveying

Per Hour:	07/01/2017
Heavy Highway/Building	
Party Chief	$ 67.76
Instrument Man	51.66
Rodman	44.30

SUPPLEMENTAL BENEFITS
Per Hour:

Heavy Highway/Building	$ 34.23
Premium*:	
Heavy Highway/Building	$ 43.40
Premium**:	
Heavy Highway/Building	$ 52.56

* Applies to instances where 1-1/2 regular rate are paid
**Applies to instances where 2 times the rate are paid.

OVERTIME PAY
See (B, *E, Q) on OVERTIME PAGE
* Doubletime paid on the 9th hour on Saturday.

HOLIDAY
Paid: See (5, 6, 9, 11, 12, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 9, 11, 12, 15, 25) on HOLIDAY PAGE

4-15D-N/S co.

Operating Engineer - Heavy&Highway **01/01/2018**

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
HEAVY/HIGHWAY CATEGORIES:

CLASS "AA" CRANES:
Crane, Truck Crane, Derrick, Dragline, Dredge, Crawler Crane, Tower Crane, Pile Driver.

CLASS "A":
Asphalt Spreader, Backhoe Crawler/Hydraulic Excavator (360 up to & over 150,000lbs), Barrier Machine, Cherrypicker (over 70 tons), Concrete Pump, Directional Boring, Grader, Gradall, Hoist, Hydraulic Cherrypicker/crane, Loading Machine (bucket 10 yds. or more), Laser Screed, Milling Machine (Large), Power Winch-Stone Setting/Structural Steel or Truck Mounted, Powerhouse, Road Paver, Scoop-Carryall-Scaper in Tandem, Side Boom Tractor, Stone Spreader(self propelled), Striping Machine (long line/truck mounted), Tree Graple, Tank Work, Track Alignment Machine.

CLASS "B":
Backhoe (other than 360), Boom Truck, Bulldozer, Boring Machine/Auger, Cherry Picker (under 70 tons), Convetor-Multi, Curb Machine Asphalt/Concrete, Post Hole-Auger, Fork Lift, Hoist (2 drum), Loading Machine & Front Loader, Mulch Machine (machine fed), Power Wincher (all others not included in class A), Asphalt Roller, Hydraulic Pump with Boring Machine, Scoop, Carryall/Scraper, Skid Loader/Skid Steer, Maintenance Man on Tower Crane, Trenching Machine, Vermeer Cutter, Work Boat, Inspection/Safety Boat.

CLASS "C":
Concrete Finish/Saw/Spreader, Dirt Roller, Hoist (1 drum), Interior Hoist, Oiler Truck Crane(Pile work), Power Broom, Small Milling Machine, Vactor Truck/VacAll Truck.

CLASS "D":
Concrete Breaker, Conveyor, Curing Machine, Fireman, Fork lift (walk behind), Generator, Hydra Hammer, Maintenance Engineer, Compactors (hand operated), Pin Puller, Portable Heaters, Power Buggies, Pumps (double action, 4 inch and over, Hydraulic & Submersible), Jet Pump, Ridge Cutter, Robotic Unit Operator(Trenchless Pipe Rehab), Shotblaster.

CLASS "E":
Batching Plant (On Job Site), Compressor, Generator(small), Grinder, Mixer, Mulching Machine (Hand Feed), Oiler, Pumps (Single action up to 3 In.), Pump (Gypsum), Root Cutter, Stump Chipper, Oiler, Trenching Machine (Hand,walk behind), Track Tamper, Tractor (caterpiller or wheel),Welding Machine (Pile work & Structural Steel), Deckhand on Work Boat, Inspection/Safety Boat.

	07/01/2017	06/01/2018 Additional
Class "AA"	$ 72.86	$3.03
Cranes: Boom Length over 100 feet add $ 1.00 per hour		
" " " 150 " " $ 1.50 " "		
" " " 250 " " $ 2.00 " "		
" " " 350 " " $ 3.00 " "		
		Additional
Class "A"	$ 64.40*	$ 2.80
*Add $3.50 for Hazardous Waste Work.		
Class "B"	$ 60.12*	$ 2.68
*Add $2.50 for Hazardous Waste Work.		
Class "C"	$ 57.95*	$ 2.62
*Add $1.50 for Hazardous Waste Work		
Class "D"	$ 46.08	$ 0.00
*Add $1.00 for Hazardous Waste Work		
Class "E"	$ 44.12	$ 0.00

"NOTE": ADD 30% to straight time hourly wage for NEW YORK STATE D.O.T. and other GOVERNMENTAL MANDATED off-shift work.

SUPPLEMENTAL BENEFITS
Per Hour:

ALL CLASSES	$ 36.90
Note: OVERTIME AMOUNT	$ 30.35

OVERTIME PAY
See (D, O) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 7, 8) on HOLIDAY PAGE
Overtime: See (5, 6, 7, 8) on HOLIDAY PAGE
"Note" Employee must be employed day before and day after a holiday to receive holiday pay.

REGISTERED APPRENTICES
Wage per hour:
REGISTERED APPRENTICES
One(1) Year Terms at the following Rate:

1st Term	$ 20.84
2nd Term	21.67
3rd Term	22.33

SUPPLEMENTAL BENEFITS:

APPRENTICES	$ 15.64
Note: Overtime Amount	$ 5.60

4-138

Operating Engineer - Marine Dredging — 01/01/2018

JOB DESCRIPTION Operating Engineer - Marine Dredging **DISTRICT** 4

ENTIRE COUNTIES
Albany, Bronx, Cayuga, Chautauqua, Clinton, Columbia, Dutchess, Erie, Essex, Franklin, Greene, Jefferson, Kings, Monroe, Nassau, New York, Niagara, Orange, Orleans, Oswego, Putnam, Queens, Rensselaer, Richmond, Rockland, St. Lawrence, Suffolk, Ulster, Washington, Wayne, Westchester

WAGES
These wages do not apply to Operating Engineers on land based construction projects. For those projects, please see the Operating Engineer Heavy/Highway Rates. The wage rates below for barge mounted cranes and other equipment are only for marine dredging work in navigable waters found in the counties listed above.

Per Hour:

DREDGING OPERATIONS	07/01/2017	10/01/2017
CLASS A		
Operator, Leverman, Lead Dredgeman	$ 37.25	$ 38.18
CLASS A1 Dozer,Front Loader Operator	To conform to Operating Engineer Prevailing Wage in locality where work is being performed including benefits.	
CLASS B		
Barge Operator Spider/Spill Tug Operator(over1000hp), OperatorII, Fill Placer, Derrick Operator, Engineer, Chief Mate, Electrician, Chief Welder, Maintenance Engineer	$ 32.21	$33.02
Certified Welder, Boat Operator(licensed)	$ 30.33	$ 31.09
CLASS C		
Drag Barge Operator, Steward, Mate, Assistant Fill Placer,	$ 29.50	$ 30.24
Welder (please add)$ 0.06		
Boat Operator	$ 28.54	$ 29.26
CLASS D		

Shoreman, Deckhand, Rodman, Scowman, Cook, Messman, Porter/Janitor	$ 23.71	$ 24.30
Oiler(please add)	$ 0.09	

SUPPLEMENTAL BENEFITS
Per Hour:
THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

	07/01/2017	10-01-2017
All Classes A & B	$10.75 plus 8% of straight time wage, Overtime hours add $ 0.63	$11.23 plus 8% of straight time wage, Overtime hours add $ 0.63
All Class C	$10.45 plus 8% of straight time wage, Overtime hours add $ 0.48	$10.93 plus 8% of straight time wage, Overtime hours add $ 0.48
All Class D	$10.15 plus 8% of straight time wage, Overtime hours add $ 0.33	$10.63 plus 8% of straight time wage, Overtime hours add $ 0.33

OVERTIME PAY
See (B, F, R) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 26) on HOLIDAY PAGE

4-25a-MarDredge

Operating Engineer - Survey Crew - Consulting Engineer — 01/01/2018

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer **DISTRICT** 9

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

PARTIAL COUNTIES
Dutchess: That part in Duchess County lying South of the North City line of Poughkeepsie.

WAGES
Feasibility and preliminary design surveying, any line and grade surveying for inspection or supervision of construction.

Per hour: Survey Classifications	07/01/2017
Party Chief	$ 42.29
Instrument Man	35.39
Rodman	31.04

SUPPLEMENTAL BENEFITS
Per Hour:

All Crew Members: $ 17.70

OVERTIME PAY
OVERTIME:.... See (B, E*, Q, V) ON OVERTIME PAGE.
*Doubletime paid on the 9th hour on Saturday.

HOLIDAY
Paid: See (5, 6, 7, 11, 16) on HOLIDAY PAGE
Overtime: See (5, 6, 7, 11, 16) on HOLIDAY PAGE

9-15dconsult

Operating Engineer - Trenchless Pipe Rehab — 01/01/2018

JOB DESCRIPTION Operating Engineer - Trenchless Pipe Rehab **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES

IMPORTANT NOTE: This Category & Classifications are now located in Operating Engineers/Heavy Highway & Laborers/ Heavy Highway.

Per Hour:

	07/01/2017 (SEE)
Robotic Unit Operator	Operator(class D)
Technician/Boiler, Generator	Operator(classes C&D)
AM Liner/Hydra Seal	Laborer(Grp#3)
Hobas Pipe, Polyethyene Pipe or Pull and Inflate Liner	Laborer(Grp#3)

OVERTIME PAY

HOLIDAY

4-138TrchPReh

Painter — 01/01/2018

JOB DESCRIPTION Painter **DISTRICT** 8

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2017
Brush	$ 46.85*
Abatement/Removal of lead based or lead containing paint on materials to be repainted.	46.85*
Spray & Scaffold	$ 49.85*
Fire Escape	49.85*
Decorator	49.85*
Paperhanger/Wall Coverer	50.03

*Subtract $ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour worked:	07/01/2017
Paperhanger	$ 26.19
All others	24.47
Premium	26.97**

**Applies only to "All others" catergory,not paperhanger journeyman.

OVERTIME PAY
See (A, H) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
One (1) year terms at the following wage rate.

Per hour:	07/01/2017
Appr 1st term...	$ 17.85*
Appr 2nd term...	23.26*
Appr 3rd term...	28.14*
Appr 4th term...	37.52*

*Subtract $ 0.10 to calculate premium rate.

Supplemental benefits:

Per Hour worked:	07/01/2017
Appr 1st term...	$ 12.77
Appr 2nd term...	15.62
Appr 3rd term...	18.06
Appr 4th term...	22.88

8-NYDC9-B/S

Painter — 01/01/2018

JOB DESCRIPTION Painter **DISTRICT** 8

ENTIRE COUNTIES
Putnam, Suffolk, Westchester

PARTIAL COUNTIES
Nassau: All of Nassau except the areas described below: Atlantic Beach, Ceaderhurst, East Rockaway, Gibson, Hewlett, Hewlett Bay, Hewlett Neck, Hewlett Park, Inwood, Lawrence, Lido Beach, Long Beach, parts of Lynbrook, parts of Oceanside, parts of Valley Stream, and Woodmere. Starting on the South side of Sunrise Hwy in Valley Stream running east to Windsor and Rockaway Ave., Rockville Centre is the boundary line up to Lawson Blvd. turn right going west all the above territory. Starting at Union Turnpike and Lakeville Rd. going north to Northern Blvd. the west side of Lakeville road to Northern blvd. At Northern blvd. going east the district north of Northern blvd. to Port Washington Blvd. West of Port Washington blvd.to St.Francis Hospital then north of first traffic light to Port Washington and Sands Point, Manor HAven, Harbour Acres.

WAGES

Per hour:	07/01/2017
Drywall Taper	$ 46.85

SUPPLEMENTAL BENEFITS

Per hour worked:	07/01/2017
Journeyman	$ 22.47

OVERTIME PAY
See (A, H) on OVERTIME PAGE

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages - Per Hour: 07/01/2017

1500 hour terms at the following wage rate:

1st term	$ 17.85
2nd term	$ 23.26
3rd term	$ 28.14
4th term	$ 37.52

Suppemental Benefits - Per hour:
One year term (1500 hours) at the following dollar amount.

1st year	$ 11.73
2nd year	$ 14.42
3rd year	$ 16.70
4th year	$ 21.20

8-NYDCT9-DWT

Painter - Bridge & Structural Steel — 01/01/2018

JOB DESCRIPTION Painter - Bridge & Structural Steel **DISTRICT** 8

ENTIRE COUNTIES
Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES
Per Hour Worked:
STEEL:

Bridge Painting:	07/01/2017	10/01/2017	10/01/2018
	$ 49.50 + 6.38*	$ 49.50 + 6.38*	$ 49.50 + 6.38*

ADDITIONAL $6.00 per hour for POWER TOOL/SPRAY, whether straight time or overtime.

NOTE: All premium wages are to be calculated on base rate per hour only.

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

NOTE: Generally, for Bridge Painting Contracts, ALL WORKERS on and off the bridge (including Flagmen) are to be paid Painter"s Rate; the contract must be ONLY for Bridge Painting.

SUPPLEMENTAL BENEFITS
Per Hour Worked:

Journeyworker:	07/01/2017	10/01/2017	10/01/2018
	$ 7.50 + 23.40*	$ 8.25 + 24.35*	$ 9.50 + 26.05*

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

OVERTIME PAY
See (A, F, R) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (4, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wage - Per hour worked:

Apprentices: (1) year terms

	07/01/2017	10/01/2017	10/01/2018
1st year	$ 22.35	$ 22.65	$ 23.13
2nd year	33.53	33.98	34.73
3rd year	44.70	45.30	46.30

Supplemental Benefits - Per hour worked:

1st year	$ 12.36	$ 12.76	$ 13.44
2nd year	18.54	19.14	20.16
3rd year	24.72	25.52	26.88

8-DC-9/806/155-BrSS

Painter - Line Striping — 01/01/2018

JOB DESCRIPTION Painter - Line Striping **DISTRICT** 8

ENTIRE COUNTIES
Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES
Per hour:

Painter (Striping-Highway):	07/01/2017

Striping-Machine Operator*	$ 27.11
Linerman Thermoplastic	$ 32.37

Note: * Includes but is not limited to: Positioning of cones and directing of traffic using hand held devices. Excludes the Driver/Operator of equipment used in the maintenance and protection of traffic safety.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour paid:	07/01/2017
Journeyworker:	
Striping-Machine operator	$ 14.18
Linerman Thermoplastic	$ 14.55

OVERTIME PAY
See (B, E, E2, F, S) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 20) on HOLIDAY PAGE
Overtime: See (5, 8, 11, 12, 15, 16, 17, 20, 21, 22) on HOLIDAY PAGE

8-1456-LS

Painter - Metal Polisher — 01/01/2018

JOB DESCRIPTION Painter - Metal Polisher **DISTRICT** 8

ENTIRE COUNTIES
Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

	07/01/2017	06/01/2018
Metal Polisher	$ 29.73	$ 30.58
Metal Polisher**	30.68	31.53
Metal Polisher***	33.23	34.08

**Note: Applies on New Construction & complete renovation
*** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2017	06/01/2018
Journeyworker:		
All classification	$ 7.55	$ 7.65

OVERTIME PAY
See (B, E, E2, P, T) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 9, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:
One (1) year term at the following wage rates:

	07/01/2017	06/01/2018
1st year	$ 12.14	$ 14.25
2nd year	13.44	15.50
3rd year	16.29	18.25

Supplentals benefits:
Per hour paid:

1st year	$ 5.62	$ 5.62
2nd year	5.62	5.62
3rd year	5.62	5.62

8-8A/28A-MP

Plumber **01/01/2018**

JOB DESCRIPTION Plumber **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES

Per Hour:	07/01/2017	05/10/2018
Plumber/ PUMP & TANK	$ 44.24	$ 44.49

SUPPLEMENTAL BENEFITS
Per Hour:

Plumber	$ 25.23	$ 26.98

OVERTIME PAY
See (B, Q, *V) on OVERTIME PAGE
(V) For Sundays & Holidays if Worked Only

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
One(1) Year Terms at the Following
Percentage of Journeymans wage:

1st Term	30%
2nd Term	40%
3rd Term	50%
4th Term	60%
5th Term	70%
6th Term	85%

Supplemental Benifits Per Hour:

1st Term	$13.31	$15.06
2nd Term	$13.95	$15.70
3rd Term	$14.77	$16.52
4th Term	$15.15	$17.40
5th Term	$18.38	$20.13

4-200 Pump & Tank

Plumber **01/01/2018**

JOB DESCRIPTION Plumber **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES

Per Hour:	07/01/2017	11/01/2017
Plumber	$ 51.48	$ 52.98

SUPPLEMENTAL BENEFITS
Per Hour:

Plumber	$ 38.72	$ 39.22

OVERTIME PAY
See (A, E, Q, *V) on OVERTIME PAGE
CODE "V" is only for SUNDAYS and HOLIDAYS THAT ARE WORKED

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
One(1) Year Terms at the following percentage of Plumbers Rate:

1st Term	2nd Term	3rd Term	4th Term	5th Term
30%	40%	50%	60%	70%

Supplemental Benefits per hour:

	07/01/2017	11/01/2017
1st Term	$ 25.16	$ 25.66
2nd Term	27.47	27.97
3rd Term	28.24	29.34
4th Term	30.33	30.83
5th Term	31.91	32.41

4-200

Plumber — 01/01/2018

JOB DESCRIPTION Plumber **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
Per Hour:

	07/01/2017	05/01/2018
Plumber		
MAINTENANCE ONLY	$ 30.30	$ 30.80

Maintenance: Correction of problem(s)with the existing fixture or group of fixtures, preventive repairs or servicing of said fixtures

SUPPLEMENTAL BENEFITS
SUPPLEMENTAL BENEFITS
Per Hour:

Plumber		
Maintenance	$ 15.15	$ 15.65

OVERTIME PAY
See (B, J) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE

4-200 Maintance

Roofer — 01/01/2018

JOB DESCRIPTION Roofer **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES

Per Hour	07/01/2017	05/01/2018
ROOFER/Waterproofer		
Total Wage to be Paid	$ 44.00	$1.50 Per Hour to be allocated
"Base" Wage	40.00**	

SUPPLEMENTAL BENEFITS
Per Hour:

ROOFER/Waterproofer	$ 31.62

OVERTIME PAY

Per Hour:
NEW ROOF SEE (B,E,Q)
RE-ROOF SEE (B,E,E2,Q)
NOTE:** Overtime Pay to be calculated on "BASE" Wage then add $4.00.
(Example: $40.00 x time and one half = $60.00 + $4.00 = $64.00)

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 13, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
(1) Year terms at the following Percentage of Roofers/Waterproofers Wage.

1st	2nd	3rd	4th
40%	50%	70%	80%

Supplemental Benefits per hour:

	07/01/2017
1st Term	$ 8.81
2nd Term	10.90
3rd Term	22.27
4th Term	25.38

4-154

Sheetmetal Worker — 01/01/2018

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES
Per Hour:

	07/01/2017
Sign Erector	$ 47.67

NOTE: Structurally Supported Overhead Highway Signs(See STRUCTURAL IRON WORKER CLASS)

SUPPLEMENTAL BENEFITS
Per Hour:

	07/01/2017
Sign Erector	$ 44.44

OVERTIME PAY
See (A, F, S) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
Per Hour:
6 month Terms at the following percentage of Sign Erectors wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
35%	40%	45%	50%	55%	60%	65%	70%	75%	80%

SUPPLEMENTAL BENEFITS
Per Hour:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$12.55	$14.23	$15.89	$17.57	$24.30	$26.84	$29.27	$31.47	$33.65	$35.83

4-137-SE

Sheetmetal Worker — 01/01/2018

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES
Per Hour: 07/01/2017

Sheetmetal Worker
$ 53.22
Temporary Operation or
Maintenace of Fans
42.58

SUPPLEMENTAL BENEFITS
Per Hour:
Sheetmetal Worker
$ 45.04
Maintenance Worker
45.04

OVERTIME PAY
See (B, E, E2, Q, V) on OVERTIME PAGE
For Maintenance See Codes B,E, Q & V

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES
Per Hour:Wages

Six(6) Month Terms As Follows:

1st & 2nd Term	$ 18.67
3rd & 4th Term	23.98
5th & 6th Term	29.29
7th Term	37.28
8th Term	39.83
9th Term	42.59

Per Hour: Supplemental Benifits

1st & 2nd Term	$ 16.49
3rd & 4th Term	22.75
5th & 6th Term	26.79
7th Term	32.84
8th Term	34.88
9th Term	36.84

4-28

Steamfitter 01/01/2018

JOB DESCRIPTION Steamfitter **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES
Per Hour: 07/01/2017

AC Service/Heat Service $ 39.50
Steamfitter Maintenance

Refrigeration, A/C, Oil Burner and Stoker Service and Repair.
Refrigeration Compressor installation up to 5hp (combined).
Air Condition / Heating Compressor installation up to 10hp (combined).

SUPPLEMENTAL BENEFITS
Per Hour

AC Service/Heat Service $ 12.75
Steamfitter Maintenance

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 11, 15, 25, 26) on HOLIDAY PAGE

4-638B-StmFtrRef

Steamfitter — 01/01/2018

JOB DESCRIPTION Steamfitter **DISTRICT** 4

ENTIRE COUNTIES
Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

WAGES
Per Hour:

	07/01/2017
Steam/Sprinkler Fitter	$ 61.81
Temporary Heat & AC	$ 46.99

NOTE: Add 30% to Hourly Wage for "Contracting Agency" Mandated Off Shift Work.

SUPPLEMENTAL BENEFITS
Per Hour:

Steam/Sprinkler Fitter	$ 49.18
Temporary Heat & AC	$ 40.23

OVERTIME PAY
See (C, *D, O, V) on OVERTIME PAGE
(*D) On all HVAC and Mechanical contracts that do not excedd $15,000,000. and on all fire protection/sprinklet contracts that do not exceed $1,500,000.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
1 year Terms at the Following:

WAGES per hour:

1st Term	2nd Term	3rd Term	4th Term	5th Term
$ 24.76	$ 30.94	$ 40.29	$ 49.46	$ 52.55

SUPPLEMENTAL BENEFIT per hour:

1st Term	2nd Term	3rd Term	4th Term	5th Term
$ 20.20	$ 25.04	$ 32.28	$ 39.52	$ 41.94

4-638A-StmSpFtr

Teamster - Asphalt Delivery — 01/01/2018

JOB DESCRIPTION Teamster - Asphalt Delivery **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
Per Hour:

Heavy Construction Work:
Shall include the supply of Asphalt for construction, improvement and modification of all or any part of Streets, Highways, Bridges, Tunnels,Railroads, Canals, Dams, Airports, Schools, Power Generation Plants, where distance between project and asphalt plant is not more than 50 miles.

TRUCK DRIVER

	07/01/2017
Asphalt Delivery	$ 35.535

Light Construction Work:
Shall include the supply of Asphalt for construction of Single & Multi Family Homes, Town Houses, Apartment Buildings, including Driveways, Streets and Curbs within those projects. Parking Lots, Office Buildings, where distance between project and asphalt plant is not more than 50 miles.

TRUCK DRIVER

	07/01/2017
Asphalt Delivery	$ 29.94

SUPPLEMENTAL BENEFITS
Per Hour:

Heavy Construction Work
TRUCK DRIVER

	07/01/2017
Asphalt Delivery	$ 41.76

Light Construction Work
TRUCK DRIVER

	07/01/2017
Asphalt Delivery	$ 11.55

OVERTIME PAY
See (B, *B2, E, **I, P, ***R, ****U) on OVERTIME PAGE
(NOTE) PREMIUM PAY of 25% on straight time hours for New York State D.O.T. and or other GOVERNMENTAL MANDATED off shift work.
Note: (B,E,P,T&*U) Apply to Heavy Construction.
Note: (B2,I,T&*U) Apply to Light Construction.
Note: (*U) Only applies after 8 hours worked on holiday.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, *16, **25) on HOLIDAY PAGE
NOTE:(*16) Paid at Double if Worked; (**25) Paid at Double if Worked.

4-282

Teamster - Building 01/01/2018

JOB DESCRIPTION Teamster - Building **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
Per Hour:
Truck Driver (Building Demolition & Debris)

	07/01/2017
Trailers	$ 33.61
Straight Jobs	$ 33.31

SUPPLEMENTAL BENEFITS
Per Hour:

All Classifications

	07/01/2017
	$ 33.20

OVERTIME PAY
See (B, E, S1) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 11, 12, 15, 25, 26) on HOLIDAY PAGE

4-282

Teamster - Delivery of Concrete 01/01/2018

JOB DESCRIPTION Teamster - Delivery of Concrete **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
Per Hour:

Heavy Construction Work:
Shall Include the supply of Ready-Mix Concrete for construction, improvement and modification of all or any part of Streets, Highways, Bridges, Tunnels, Railroads, Canals, Dams, Airports, Schools & Power Generation Plants, where distance between project and asphalt plant is not more than 50 miles.

TRUCK DRIVER

	07/01/2017
Concrete Delivery	$ 39.685

Light Construction Work:
Shall include the supply of Ready-Mix Concrete for construction of Single & Multi Family Homes, Town Houses, Apartment Buildings, including Driveways, Streets and Curbs within those projects. Parking Lots and Office Buildings, where distance between project and asphalt plant is not more than 50 miles.

TRUCK DRIVER

	07/01/2017
Concrete Delivery	$ 36.255

SUPPLEMENTAL BENEFITS
Per Hour:

Heavy Construction Work	07/01/2017
Concrete Delivery	$ 40.665
Light Construction Work	07/01/2017
Concrete Delivery	$ 12.775

OVERTIME PAY
NOTE: Heavy Construction:B2,I
Light Construction:B,E,P

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, *16, **25) on HOLIDAY PAGE
NOTE:(*16) Paid at Double if Worked. (**25) Paid at Double if Worked.

4-282ns

Teamster - Heavy&Highway — 01/01/2018

JOB DESCRIPTION Teamster - Heavy&Highway **DISTRICT** 4

ENTIRE COUNTIES
Nassau, Suffolk

WAGES
Per Hour:

Heavy Construction Work:
Shall include the construction, improvement or modification of all or any part of Streets, Highways, Bridges, Tunnels, Railroads, Canals, Dams, Airports, Schools, Power Generation Plants.

	07/01/2017
Site Excavating (Chauffeurs)	$ 37.545

Light Construction Work:
Shall include the construction, improvment and modification of Single & Multi Family Homes, Town Houses, Apartment Buildings, including Driveways, Streets and Curbs within those projects. Parking Lots and Office Buildings.

	07/01/2017
Site Excavating (Chauffeurs)	$ 32.42

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2017
Heavy Construction Work Chauffeurs	$ 44.3725
Light Construction Work Chauffeurs	$ 11.55

OVERTIME PAY

See (B, *B2, E, **I, P, ***R, ****U) on OVERTIME PAGE
(NOTE) PREMIUM PAY of 25% on straight time hours for NEW YORK STATE D.O.T. and or other GOVERMENTAL MANDATED off shift work.
Note: (B,E,P,T & *U) Apply to Heavy Construction.
Note: (B2,I,T & *U) Apply to Light Construction.
Note: (*U) Only applies after 8 hours work on holiday

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, *16, **25) on HOLIDAY PAGE
NOTE:(*16) Paid at Double if Worked. (**25) Paid at Double if Worked.

4-282

Welder 01/01/2018

JOB DESCRIPTION Welder **DISTRICT** 1

ENTIRE COUNTIES
Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES
Per hour 07/01/2017

Welder: To be paid the same rate of the mechanic performing the work.*

*EXCEPTION: If a specific welder certification is required, then the 'Certified Welder' rate in that trade tag will be paid.

OVERTIME PAY

HOLIDAY

1-As Per Trade

Overtime Codes

Following is an explanation of the code(s) listed in the OVERTIME section of each classification contained in the attached schedule. Additional requirements may also be listed in the HOLIDAY section.

NOTE: Supplemental Benefits are 'Per hour worked' (for each hour worked) unless otherwise noted

(AA)	Time and one half of the hourly rate after 7 and one half hours per day
(A)	Time and one half of the hourly rate after 7 hours per day
(B)	Time and one half of the hourly rate after 8 hours per day
(B1)	Time and one half of the hourly rate for the 9th & 10th hours week days and the 1st 8 hours on Saturday. Double the hourly rate for all additional hours
(B2)	Time and one half of the hourly rate after 40 hours per week
(C)	Double the hourly rate after 7 hours per day
(C1)	Double the hourly rate after 7 and one half hours per day
(D)	Double the hourly rate after 8 hours per day
(D1)	Double the hourly rate after 9 hours per day
(E)	Time and one half of the hourly rate on Saturday
(E1)	Time and one half 1st 4 hours on Saturday; Double the hourly rate all additional Saturday hours
(E2)	Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
(E3)	Between November 1st and March 3rd Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather, provided a given employee has worked between 16 and 32 hours that week
(E4)	Saturday and Sunday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
(E5)	Double time after 8 hours on Saturdays
(F)	Time and one half of the hourly rate on Saturday and Sunday
(G)	Time and one half of the hourly rate on Saturday and Holidays
(H)	Time and one half of the hourly rate on Saturday, Sunday, and Holidays
(I)	Time and one half of the hourly rate on Sunday
(J)	Time and one half of the hourly rate on Sunday and Holidays
(K)	Time and one half of the hourly rate on Holidays
(L)	Double the hourly rate on Saturday
(M)	Double the hourly rate on Saturday and Sunday
(N)	Double the hourly rate on Saturday and Holidays
(O)	Double the hourly rate on Saturday, Sunday, and Holidays
(P)	Double the hourly rate on Sunday
(Q)	Double the hourly rate on Sunday and Holidays
(R)	Double the hourly rate on Holidays
(S)	Two and one half times the hourly rate for Holidays, if worked

(S1) Two and one half times the hourly rate the first 8 hours on Sunday or Holidays One and one half times the hourly rate all additional hours.

(T) Triple the hourly rate for Holidays, if worked

(U) Four times the hourly rate for Holidays, if worked

(V) Including benefits at SAME PREMIUM as shown for overtime

(W) Time and one half for benefits on all overtime hours.

Holiday Codes

PAID Holidays:

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

OVERTIME Holiday Pay:

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays. The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Following is an explanation of the code(s) listed in the HOLIDAY section of each classification contained in the attached schedule. The Holidays as listed below are to be paid at the wage rates at which the employee is normally classified.

(1)	None
(2)	Labor Day
(3)	Memorial Day and Labor Day
(4)	Memorial Day and July 4th
(5)	Memorial Day, July 4th, and Labor Day
(6)	New Year's, Thanksgiving, and Christmas
(7)	Lincoln's Birthday, Washington's Birthday, and Veterans Day
(8)	Good Friday
(9)	Lincoln's Birthday
(10)	Washington's Birthday
(11)	Columbus Day
(12)	Election Day
(13)	Presidential Election Day
(14)	1/2 Day on Presidential Election Day
(15)	Veterans Day
(16)	Day after Thanksgiving
(17)	July 4th
(18)	1/2 Day before Christmas
(19)	1/2 Day before New Years
(20)	Thanksgiving
(21)	New Year's Day
(22)	Christmas
(23)	Day before Christmas
(24)	Day before New Year's
(25)	Presidents' Day
(26)	Martin Luther King, Jr. Day
(27)	Memorial Day

New York State Department of Labor - Bureau of Public Work
State Office Building Campus
Building 12 - Room 130
Albany, New York 12240

REQUEST FOR WAGE AND SUPPLEMENT INFORMATION

As Required by Articles 8 and 9 of the NYS Labor Law

Fax (518) 485-1870 or mail this form for new schedules or for determination for additional occupations.

This Form Must Be Typed

Submitted By: (Check Only One) ☐ Contracting Agency ☐ Architect or Engineering Firm ☐ Public Work District Office Date:

A. Public Work Contract to be let by: (Enter Data Pertaining to Contracting/Public Agency)

1. Name and complete address ☐ (Check if new or change)

Telephone: ( ) Fax: ( )
E-Mail:

2. NY State Units (see Item 5)

- ☐ 01 DOT
- ☐ 02 OGS
- ☐ 03 Dormitory Authority
- ☐ 04 State University Construction Fund
- ☐ 05 Mental Hygiene Facilities Corp.
- ☐ 06 OTHER N.Y. STATE UNIT
- ☐ 07 City
- ☐ 08 Local School District
- ☐ 09 Special Local District, i.e., Fire, Sewer, Water District
- ☐ 1O Village
- ☐ 11 Town
- ☐ 12 County
- ☐ 13 Other Non-N.Y. State (Describe)

3. SEND REPLY TO ☐ check if new or change)
Name and complete address:

Telephone:( ) Fax: ( )
E-Mail:

4. SERVICE REQUIRED. Check appropriate box and provide project information.

- ☐ New Schedule of Wages and Supplements.
  APPROXIMATE BID DATE :
- ☐ Additional Occupation and/or Redetermination

PRC NUMBER ISSUED PREVIOUSLY FOR THIS PROJECT :

OFFICE USE ONLY

B. PROJECT PARTICULARS

5. Project Title _____

Description of Work _____

Contract Identification Number _____

Note: For NYS units, the OSC Contract No. _____

6. Location of Project:
Location on Site _____

Route No/Street Address _____

Village or City _____

Town _____

County _____

7. Nature of Project - Check One:

- ☐ 1. New Building
- ☐ 2. Addition to Existing Structure
- ☐ 3. Heavy and Highway Construction (New and Repair)
- ☐ 4. New Sewer or Waterline
- ☐ 5. Other New Construction (Explain)
- ☐ 6. Other Reconstruction, Maintenance, Repair or Alteration
- ☐ 7. Demolition
- ☐ 8. Building Service Contract

8. OCCUPATION FOR PROJECT :

- ☐ Construction (Building, Heavy Highway/Sewer/Water)
- ☐ Tunnel
- ☐ Residential
- ☐ Landscape Maintenance
- ☐ Elevator maintenance
- ☐ Exterminators, Fumigators
- ☐ Fire Safety Director, NYC Only
- ☐ Guards, Watchmen
- ☐ Janitors, Porters, Cleaners, Elevator Operators
- ☐ Moving furniture and equipment
- ☐ Trash and refuse removal
- ☐ Window cleaners
- ☐ Other (Describe)

9. Has this project been reviewed for compliance with the Wicks Law involving separate bidding? YES ☐ NO ☐

10. Name and Title of Requester

Signature

SEE PAGE TWO FOR LAWS RELATING TO PUBLIC WORK CONTRACTS

NEW YORK STATE DEPARTMENT OF LABOR
Bureau of Public Work - Debarment List

LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE AWARDED ANY PUBLIC WORK CONTRACT

Under Article 8 and Article 9 of the NYS Labor Law, a contractor, sub-contractor and/or its successor shall be debarred and ineligible to submit a bid on or be awarded any public work or public building service contract/sub-contract with the state, any municipal corporation or public body for a period of five (5) years from the date of debarment when:

- Two (2) final determinations have been rendered within any consecutive six-year (6) period determining that such contractor, sub-contractor and/or its successor has WILLFULLY failed to pay the prevailing wage and/or supplements
- One (1) final determination involves falsification of payroll records or the kickback of wages and/or supplements

NOTE: The agency issuing the determination and providing the information, is denoted under the heading 'Fiscal Officer'. DOL = NYS Dept. of Labor; NYC = New York City Comptroller's Office; AG = NYS Attorney General's Office; DA = County District Attorney's Office.

A list of those barred from bidding, or being awarded, any public work contract or subcontract with the State, under section 141-b of the Workers' Compensation Law, may be obtained at the following link, on the NYS DOL Website:

https://dbr.labor.state.ny.us/EDList/searchPage.do

NYSDOL Bureau of Public Work Debarment List 11/17/2017

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	DOL		4618 FOSTER AVE LLC		C/O KAHAN & KAHAN 225 BROADWAY-SUITE 715NEW YORK NY 10007	02/05/2013	02/05/2018
DOL	DOL	*****0996	A-1 CONSTRUCTION & RENOVATION INC		1973 81ST ST - SUITE A-5 BROOKLYN NY 11214	01/08/2015	01/08/2020
DOL	NYC		ABDUL KARIM		C/O NORTH AMERICAN IRON W 1560 DECATUR STREETRIDGEWOOD NY 11385	05/15/2015	05/15/2020
DOL	DOL	*****8488	ABELCRAFT OF NEW YORK CORP		640 ASHFORD AVENUE ARDSLEY NY 10502	08/27/2013	08/27/2018
DOL	DOL	*****1219	ABSOLUTE GENERAL CONTRACTING INC		1229 AVENUE U BROOKLYN NY 11229	01/28/2013	01/28/2018
DOL	DOL	*****4539	ACCOMPLISHED WALL SYSTEMS INC		112 OSCAWANA HEIGHTS ROAD PUTNAM VALLEY NY 10542	08/27/2013	08/27/2018
DOL	DOL	*****8018	ACCURATE MECHANICAL LLC		9547 BUSTLETON AVENUE PHILADELPHIA PA 19115	02/05/2014	02/05/2019
DOL	DOL		ACCURATE MECHANICAL OF PHILADELPHIA LLC		9547 BUSTLETON AVENUE PHILADELPHIA PA 19115	02/05/2014	02/05/2019
DOL	DOL	*****3344	ACT INC		6409 LAND O LAKES BLVD LAND O LAKES FL 34638	11/10/2015	11/10/2020
DOL	NYC		ADRIANA SELA	C/O COLONIAL ROOFING COMPANY INC	247 48TH STREET BROOKLYN NY 11220	02/05/2014	02/05/2019
DOL	DOL	*****1687	ADVANCED SAFETY SPRINKLER INC		261 MILL ROAD P O BOX 296EAST AURORA NY 14052	07/29/2015	07/29/2020
DOL	DOL	*****2538	AGG MASONRY INC		160 72ND ST - SUITE 721 BROOKLYN NY 11209	03/19/2013	03/19/2018
DOL	DOL		AJ TORCHIA		10153 ROBERTS RD SAUQUOIT NY 13456	08/09/2016	08/09/2021
DOL	DOL		ALISHER KARIMOV		C/O AGG MASONRY INC 7105 3RD AVENUEBROOKLYN NY 11209	03/19/2013	03/19/2018
DOL	DOL	*****3344	ALL CATASTROPHE CONSTRUCTION TEAM INC	ACT INC	6409 LAND O LAKES BLVD LAND O LAKES FL 34638	11/10/2015	11/10/2020
DOL	DOL	*****8740	ALLSTATE ENVIRONMENTAL CORP		C/O JOSE MONTAS 27 BUTLER PLACEYONKERS NY 10710	03/18/2011	03/19/2020
DOL	DOL		AMADEO J TORCHIA	TORCHIA'S HOME IMPROVEMENT	10153 ROBERTS RD SAUQUOIT NY 13456	08/09/2016	08/09/2021
DOL	DOL	*****4274	AMERICAN STEEL MECHANICAL INC		693 PAINTER STREET MEDIA PA 19063	02/20/2013	02/20/2018
DOL	DOL		ANDREW DIPAUL		C/O CONSOLIDATED INDUSTRI 2051 ROUTE 44/55MODENA NY 12548	12/11/2012	12/11/2017
DOL	NYC		ANDRZEJ WROBEL		24 CONGRESS LANE SOUTH RIVER NJ 08882	05/01/2013	05/01/2018
DOL	NYC		ANISUL ISLAM		C/O RELIANCE GENERAL CONS 644 OCEAN PARKWAYBROOKLYN NY 11230	09/02/2015	09/02/2020
DOL	DOL	*****7004	ANNEX CONTRACTING LTD		3005 WYNSUM AVENUE MERRICK NY 11566	08/18/2014	08/18/2019
DOL	DOL	*****7004	ANNEX GENERAL CONTRACTING INC		3005 WYNSUM AVENUE MERRICK NY 11566	08/18/2014	08/18/2019
DOL	DA		ANTHONY CARDINALE		58-48 59TH STREET MASPETH NY 11378	05/16/2012	05/08/2020
DOL	DOL		ANTHONY J MINGARELLI JR		C/O T & T CONCRETE INC 2560 HAMBURG TURNPIKELACKAWANNA NY 14218	07/08/2015	07/08/2020
DOL	DOL		ANTHONY PERGOLA		3 WEST MAIN ST/SUITE 208 ELMSFORD NY 10323	01/23/2017	01/23/2022
DOL	DOL	*****3020	APCO CONTRACTING CORP		24 SOUTH MARYLAND AVENUE PORT WASHINGTON NY 11050	09/24/2012	09/02/2020
DOL	DOL	*****3219	APOLLO CONSTRUCTION SERVICES CORP	APOLLO PAINTING CO	157 TIBBETTS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL		APOLLO PAINTING CO		157 TIBBETTS ROAD YONKERS NY 10705	03/12/2014	03/12/2019

DOL	DOL	*****3295	APOLLO PAINTING CORP		3 ALAN B SHEPART PLACE YONKERS NY 10705	03/12/2014	03/12/2019
DOL	AG	*****0194	APPLIED CONSTRUCTION INC		46 RUGBY ROAD WESTBURY NY 11590	11/20/2013	11/20/2018
DOL	NYC	*****8403	AQUA JET PAINTING CORP		10 VIKING DRIVE WEST ISLIP NY 11795	04/16/2014	04/16/2019
DOL	NYC	*****9232	ARKAY CONSTRUCTION INC		102-104 GREYLOCK AVENUE BELLEVILLE NJ 07109	07/15/2015	07/15/2020
DOL	DOL	*****3953	ASCAPE LANDSCAPE & CONSTRUCTION CORP		634 ROUTE 303 BLAUVELT NY 10913	07/26/2012	11/19/2018
DOL	NYC	*****4779	ASTORIA GENERAL CONTRACTING CORP		35-34 31ST STREET LONG ISLAND CITY NY 11106	09/02/2015	09/02/2020
DOL	NYC	*****7217	ASTRO COMMUNICATIONS OF NY CORP		79 ALEXANDER AVE- STE 36A BRONX NY 10454	10/30/2015	10/30/2020
DOL	NYC	*****6046	ATLANTIC SUN CONTRUCTION CORP		58-46 59TH AVENUE MASPETH NY 11378	05/08/2015	05/08/2020
DOL	NYC		AUDLEY O'BRIEN		1273 NORTH AVENUE/#1 CP NEW ROCHELLE NY 10804	04/07/2015	04/07/2020
DOL	DOL		AVIS R HILL		3510 HICKORY WALK LANE ELLENWOOD GA 32094	01/22/2015	01/22/2020
DOL	AG		AVTAR SINGH		116-24 127TH STREET SOUTH OZONE PARK NY 11420	12/22/2015	12/22/2020
DOL	AG		BALDEV SINGH		116-24 127TH STREET SOUTH OZONE PARK NY 11420	12/22/2015	12/22/2020
DOL	DOL		BARBARA CASSIDY		7 BLENIS PLACE VALHALLA NY 10595	04/02/2015	04/02/2020
DOL	DOL		BARRY KINNEY		6409 LAND O LAKES BLVD LAND O LAKES FL 34638	11/10/2015	11/10/2020
DOL	NYC	*****3915	BEACON RESTORATION INC		SUITE B-8 782 PELHAM PARKWAY SOUTHBRONX NY 10462	04/21/2016	04/21/2021
DOL	DOL		BEVERLY F WILLIAMS		1238 PRESIDENT STREET BROOKLYN NY 11225	11/18/2013	11/18/2018
DOL	DOL	*****8551	BRANDY'S MASONRY		216 WESTBROOK STREET P O BOX 304SAYRE PA 18840	08/09/2016	08/09/2021
DOL	NYC	*****6555	BROOKLYN WELDING CORP		1273 NORTH AVENUE/ #1 CP NEW ROCHELLE NY 10804	04/07/2015	04/07/2020
DOL	DOL	*****1449	BRRESTORATION NY INC		140 ARCADIA AVENUE OSWEGO NY 13126	09/12/2016	09/12/2021
DOL	DOL		BRUCE MORSEY		C/O KENT HOLLOW SIDING LL 29A BRIDGE STREETNEW MILFORD CT 06776	01/15/2016	01/15/2021
DOL	DOL	*****6156	C & J LANDSCAPING & MAINTENANCE INC		520 PINE HILL ROAD CHESTER NY 10940	06/23/2014	06/23/2019
DOL	DOL	*****8809	C.B.E. CONTRACTING CORPORATION		310 MCGUINESS BLVD GREENPOINT NY 11222	03/07/2017	03/07/2022
DOL	DOL		CARIBBEAN POOLS		C/O DOUGLAS L MALARKEY 64 VICTORIA DRIVEBINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	NYC	*****9172	CASSIDY EXCAVATING INC		14 RAILROAD AVENUE VALHALLA NY 10595	05/15/2014	04/02/2020
DOL	DOL	*****6745	CATSKILL FENCE INSTALLATIONS INC		5445 ROUTE 32 CATSKILL NY 12414	08/22/2014	08/22/2019
DOL	DOL	*****8530	CAZ CONTRACTING CORP		37-11 35TH AVENUE LONG ISLAND CITY NY 11101	08/26/2013	08/26/2018
DOL	DOL	*****8809	CBE CONTRACTING CORP		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	DOL	*****5556	CERTIFIED INSTALLERS INC		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL	*****7655	CHAMPION CONSTRUCTION SERVICES CORP		2131 SCHENECTADY AVENUE BROOKLYN NY 11234	11/18/2015	11/18/2020
DOL	NYC		CHARLES CASSIDY JR		14 RAILROAD AVENUE VALHALLA NY 10595	05/15/2014	04/02/2020
DOL	DOL		CHARLES ZIMMER JR		216 WESTBROOK STREET P O BOX 304SAYRE PA 18840	08/09/2016	08/09/2021
DOL	DOL		CHRISTINE J HEARNE		C/O CJ-HEARNE CONSTRUCTIO 131 PONCE DE LEON AVE NEATLANTA GA 30308	12/01/2015	12/01/2020
DOL	DOL	*****3360	CITY LIMITS GROUP INC		2279 HOLLERS AVENUE BRONX NY 10475	01/07/2014	06/23/2019
DOL	DOL	*****0671	CJ-HEARNE CONSTRUCTION CO		SUITE 204 131 PONCE DE LEON AVENUEATLANTA GA 30308	12/01/2015	12/01/2020
DOL	NYC	*****2905	COLONIAL ROOFING COMPANY INC		247 48TH STREET BROOKLYN NY 11220	02/05/2014	02/05/2019

DOL	NYC	*****3182	COLORTECH INC		5990 58TH AVENUE MASPETH NY 11378	11/18/2013	11/18/2018
DOL	DOL	*****2703	CONKLIN'S TECH-MECHANICAL INC		5 PARKER AVENUE POUGHKEEPSIE NY 12601	03/25/2014	03/25/2019
DOL	DOL	*****4175	CONSOLIDATED INDUSTRIAL SERVICES INC		2051 ROUTE 44/55 MODENA NY 12548	12/11/2012	01/28/2018
DOL	DOL		CONSTANTINOS ZERVAS		37-11 35TH AVENUE LONG ISLAND CITY NY 11101	08/26/2013	08/26/2018
DOL	NYC	*****4468	CRAFT CONTRACTING GROUP INC		3256 BRUNER AVENUE BRONX NY 10469	07/29/2014	07/29/2019
DOL	NYC	*****8507	CRAFT FENCE INC		3256 BRUNER AVENUE BRONX NY 10469	07/29/2014	07/29/2019
DOL	NYC	*****2164	CREATIVE TRUCKING INC		58-83 54TH STREET MASPETH NY 11378	02/26/2016	02/26/2021
DOL	DOL	*****7761	D L MALARKEY CONSTRUCTION		64 VICTORIA DRIVE BINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DOL	*****7888	D L MALARKEY CONSTRUCTION INC		64 VICTORIA DRIVE BINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DOL	*****5629	DAKA PLUMBING AND HEATING LLC		2561 ROUTE 55 POUGHQUAG NY 12570	02/19/2016	02/19/2021
DOL	DOL		DANICA IVANOSKI		61 WILLETT ST. PASSAIC NJ 07503	10/26/2016	10/26/2021
DOL	DOL		DARYL T RIEKS		C/O RIEKS CONTRACTING LLC 4804 GAHWILER ROADAUBURN NY 13021	05/01/2015	05/01/2020
DOL	NYC	*****7707	DASSLE CONTRACTING INC		213-37 39TH AVE/SUITE 120 BAYSIDE NY 11360	05/08/2015	05/08/2020
DOL	DOL		DAVID MARTINEZ		C/O EMPIRE TILE INC 6 TREMONT COURTHUNTINGTON STATION NY 11746	03/08/2016	03/08/2021
DOL	NYC		DAWN AVILA AKA DAWN BECHTOLD		1ST FLOOR STORE FRONT 88-10 LITTLE NECK PARKWAYFLORAL PARK NY 11001	06/24/2014	06/24/2019
DOL	NYC		DAWN BECHTOLD AKA DAWN AVILA		1ST FLOOR STORE FRONT 88-10 LITTLE NECK PARKWAYFLORAL PARK NY 11001	06/24/2014	06/24/2019
DOL	DOL		DEAN ROBBINS III		212 OXFORD WAY SCHENECTADY NY 12309	12/11/2012	09/16/2018
DOL	DOL		DEBBIE STURDEVANT		29 MAPLEWOOD DRIVE BINGHAMTON NY 13901	02/21/2017	02/21/2022
DOL	NYC	*****3865	DECOMA BUILDING CORPORATION		134 EVERGREEN PL/STE 101 EAST ORANGE NJ 07018	12/30/2013	12/30/2018
DOL	DOL		DEDA GAZIVODAN		C/O DAKA PLUMBING AND H 2561 ROUTE 55POUGHQUAG NY 12570	02/19/2016	02/19/2021
DOL	DOL	*****1446	DELTA CONTRACTING PAINTING AND DECORATING INC		437 SUNRISE HIGHWAY WEST BABYLON NY 11707	08/12/2013	08/12/2018
DOL	DOL	*****3538	DELTA CONTRACTING PAINTING AND DESIGN INC		75 MCCULLOCH DRIVE DIX HILLS NY 11746	10/19/2010	08/12/2018
DOL	DOL		DENNIS SCHWANDTNER		C/O YES SERVICE AND REPAI 145 LODGE AVEHUNTINGTON STATION NY 11476	08/09/2016	08/09/2021
DOL	DOL	*****9868	DESANTIS ENTERPRISES		161 OSWEGO RIVER ROAD PHOENIX NY 13135	09/24/2013	11/18/2018
DOL	DOL		DF CONTRACTORS OF ROCHESTER, INC.		1835 DAANSEN RD. PALMYRA NY 14522	05/16/2017	05/16/2022
DOL	DOL		DF CONTRACTORS, INC.		1835 DAANSEN RD. PALMYRA NY 14522	05/16/2017	05/16/2022
DOL	DOL	*****9252	DI BERNARDO TILE AND MARBLE CO INC		15 WALKER WAY ALBANY NY 12205	03/21/2014	03/21/2019
DOL	DOL		DIANE DEAVER		731 WARWICK TURNPIKE HEWITT NJ 07421	06/25/2012	12/11/2017
DOL	NYC		DIMITRIOS KOUTSOUKOS		C/O ASTORIA GENERAL CONTR 35-34 31ST STREETLONG ISLAND CITY NY 11106	09/02/2015	09/02/2020
DOL	DOL	*****3242	DONALD R. FORSAY	DF LAWN SERVICE	1835 DAANSEN RD. PALMYRA NY 14522	05/16/2017	05/16/2022
DOL	DOL		DONALD R. FORSAY		1835 DAANSEN RD. PALMYRA NY 14522	05/16/2017	05/16/2022
DOL	DOL		DORIS SKODA		C/O APCO CONTRACTING CORP 24 SOUTH MARYLAND AVENUEPORT WASHINGTON NY 11050	09/24/2012	09/02/2020

DOL	NYC	*****7404	DOSANJH CONSTRUCTION CORP		9439 212TH STREET QUEENS VILLAGE NY 11428	02/25/2016	02/25/2021
DOL	DOL		DOUGLAS L MALARKEY	MALARKEY CONSTRUCTION	64 VICTORIA DRIVE B INGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DOL	*****6982	DUFOUR GROUP INC	DUFOUR MASONRY	353 WEST 56TH STREET #7M NEW YORK NY 10019	06/10/2014	06/10/2019
DOL	DOL		DUFOUR MASONRY		353 WEST 56TH ST #7M NEW YORK NY 10019	06/10/2014	06/10/2019
DOL	DOL		DUFOUR MASONRY & RESTORATION INC		353 WEST 56TH STREET #7M NEW YORK NY 10019	06/10/2014	06/10/2019
DOL	DOL	*****5840	DYNA CONTRACTING INC		363 88TH STREET BROOKLYN NY 11209	11/18/2013	11/18/2018
DOL	DOL		E C WEBB		6409 LAND O LAKES BLVD LAND O LAKES FL 34638	11/10/2015	11/10/2020
DOL	DOL		EARL GALBREATH		640 ASHFORD AVENUE ARDSLEY NY 10502	08/27/2013	08/27/2018
DOL	DOL		EARL L WILSON	WILSON BROTHER DRYWALL CONTRACTORS	36 ABERSOLD STREET ROCHESTER NY 14621	08/31/2015	08/31/2020
DOL	DOL	*****1496	EAST COAST DRYWALL INC		1238 PRESIDENT STREET BROOKLYN NY 11225	11/18/2013	11/18/2018
DOL	NYC		EDWARD MENKEN		C/O AQUA JET PAINTING 10 VIKING DRIVEWEST ISLIP NY 11795	04/16/2014	04/16/2019
DOL	NYC	*****0900	EF PRO CONTRACTING INC		147 BROOME AVENUE ATLANTIC BEACH NY 11509	03/03/2014	03/03/2019
DOL	NYC		EFSTRATIOS BERNARDIS		23-73 48TH STREET LONG ISLAND CITY NY 11103	04/24/2014	04/24/2019
DOL	DOL		ELIZABETH RAMADANI		C/O RAMADA CONSTRUCTION 80 SAVO LOOPSTATEN ISLAND NY 10309	01/07/2014	01/07/2019
DOL	DOL		ELLEN DESANTIS	DESANTIS ENTERPRISES	161 OSWEGO RIVER ROAD PHOENIX NY 13135	09/24/2013	11/18/2018
DOL	DOL	*****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	AG		EMILIO FRANZA		90 JUNIUS STREET BROOKLYN NY 11212	01/23/2014	01/23/2019
DOL	DOL		EMPIRE CONCRETE SERVICES LLC		101 SULLYS TRAIL/SUITE 20 PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL	*****0511	EMPIRE CONCRETE SYSTEMS LLC		101 SULLYS TRAIL/ SUITE 2 PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL	*****2353	EMPIRE CONSTRUCTORS LLC		101 SULLYS TRAIL/SUITE 20 PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL		EMPIRE PRECAST LLC		101 SULLYS TRAIL/SUITE 20 PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL	*****3270	EMPIRE TILE INC		6 TREMONT COURT HUNTINGTON STATION NY 11746	03/08/2016	03/08/2021
DOL	DOL		ERIKA BARNETT		253 BEACH BREEZE LANE UNIT BARVERNE NY 11692	02/05/2013	02/05/2018
DOL	DOL		ESTEVES & FRAGA CONSTRUCTION CO INC		986 MADISON AVENUE PATERSON NJ 07501	01/03/2013	01/03/2018
DOL	DOL		ESTEVES & FRAGA INC		986 MADISON AVENUE PATERSON NJ 07501	01/03/2013	01/03/2018
DOL	NYC		EVERTON CARLESS		134 EVERGREEN PL/STE 101 EAST ORANGE NJ 07018	12/30/2013	12/30/2018
DOL	DOL	*****7403	F & B PAINTING CONTRACTING INC		2 PARKVIEW AVENUE HARRISON NY 10604	09/26/2016	09/26/2021
DOL	DOL		F KALAFATIS		2279 HOLLERS AVENUE BRONX NY 10475	01/07/2014	06/23/2019
DOL	DOL		FANTASTIC PAINTING		493 LANSING ROAD FULTONVILLE NY 12072	11/18/2013	11/18/2018
DOL	DOL		FAY MATTHEW		C/O CHAMPION CONSTRUCTION 2131 SCHENECTADY AVENUEBROOKLYN NY 11234	11/18/2015	11/18/2020
DOL	DOL		FAZIA GINA ALI-MOHAMMED	C/O CHAMPION CONSTRUCTION	2131 SCHENECTADY AVENUE BROOKLYN NY 11234	11/18/2015	11/18/2020
DOL	DOL	*****1311	FLOZ-ON PAINTING & DECORATING INC		12 DUNDERBERG ROAD TOMKINS NY 10986	10/16/2013	10/16/2018
DOL	DOL	*****8961	FLOZ-ON PAINTING INC		12 DUNDERBERG ROAD TOMKINS NY 10986	10/16/2013	10/16/2018

DOL	DOL		FMS		4 LEGHORN COURT NEW YORK NY 11746	11/28/2012	11/28/2017
DOL	DOL		FRAN MICELI		2279 HOLLERS AVENUE BRONX NY 10475	01/07/2014	06/23/2019
DOL	DOL		FRANCES KALAFATIS		2279 HOLLERS AVENUE BRONX NY 10475	01/07/2014	06/23/2019
DOL	DOL		FRANCES KALAFATIS-MICELI		2279 HOLLERS AVENUE BRONX NY 10475	01/07/2014	06/23/2019
DOL	DOL		FRANK BENEDETTO		C/O F & B PAINTING CONTRA 2 PARKVIEW AVENUEHARRISON NY 10604	09/26/2016	09/26/2021
DOL	DOL		FRANK DEMARTINO		101-61 99TH STREET OZONE PARK NY 11416	02/15/2017	02/15/2022
DOL	DOL		FRANK DEMARTINO		101-61 99TH STREET OZONE PARK NY 11416	02/15/2017	02/15/2022
DOL	DOL		FRANK J MERCANDO		134 MURRAY AVENUE YONKERS NY 10704	12/11/2009	02/03/2019
DOL	DOL		FRANK MICELI JR	C/O FRANK MICELI JR CONTRACTIN G INC	19 CLIFF STREET NEW ROCHELLE NY 10801	10/16/2013	10/16/2018
DOL	DOL	*****1321	FRANK MICELI JR CONTRACTING INC		19 CLIFF STREET NEW ROCHELLE NY 10801	10/16/2013	10/16/2018
DOL	DOL	*****2724	FRESH START PAINTING CORP		157 TIBBETS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL		G FUCCI CONSTRUCTION SERVICES		3 ALAN B SHEPARD PLACE YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL	*****6767	G FUCCI PAINTING INC		C/O SPIEGEL & UTRERA 1 MAIDEN LANE - 5TH FLNEW YORK NY 10038	03/12/2014	03/12/2019
DOL	DOL	*****4546	GAF PAINTING LLC		157 TIBBETS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL		GALINDA ROTENBERG		C/O GMDV TRANS INC 67-48 182ND STREETFRESH MEADOWS NY 11365	06/24/2016	06/24/2021
DOL	DOL		GARDEN STATE PAINTING		157 TIBBETTS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL		GARY MCDOWELL	GM CONSTRUCTI ON & LAWN CARE SERVICE	76 PLEASANT STREET WELLSVILLE NY 14895	06/11/2013	06/11/2018
DOL	DOL		GEORGE DI BERNARDO		C/O DI BERNARDO TILE 15 WALKER WAYALBANY NY 12205	03/21/2014	03/21/2019
DOL	DA		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DOL	*****1075	GLOBAL TANK CONSTRUCTION LLC		P O BOX 1238 SALINA OK 74365	11/28/2012	11/28/2017
DOL	DOL	*****0878	GM CONSTRUCTION & LAWN CARE SERVICE		76 PLEASANT STREET WELLSVILLE NY 14895	06/11/2013	06/11/2018
DOL	DOL	*****5674	GMDV TRANS INC		67-48 182ND STREET FRESH MEADOWS NY 11365	06/24/2016	06/24/2021
DOL	DOL	*****0090	GOLDS FLOORING INSTALLATIONS INC		25 HAMILTON ROAD MONTICELLO NY 12701	10/16/2013	10/16/2018
DOL	DOL		GREGORY A FUCCI		C/O PAF PAINTING SERVICES 157 TIBBETTS ROADYONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL		GREGORY FUCCI JR		C/O APOLLO CONSTRUCTION 157 TIBBETTS ROADYONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL	*****9456	GUILLO CONTRACTING CORP		P O BOX 229 CALVERTON NY 11933	07/08/2013	07/08/2018
DOL	NYC	*****0346	H N H CONTRACTORS CORP		4558 BROADWAY # 6 NEW YORK NY 10040	08/04/2014	08/04/2019
DOL	DOL		HALSSAM FOSTOK		5 HANSEN PLACE WAYNE NJ 07470	09/18/2013	09/18/2018
DOL	NYC		HAMEEDUL HASAN		240 HOME STREET TEANECK NJ 07666	08/04/2014	08/04/2019
DOL	AG	*****9918	HARA ELECTRIC CORP		2461 47TH STREET ASTORIA NY 11103	09/26/2013	09/26/2018
DOL	NYC		HARMEL SINGH		15 CLINTON LANE HICKSVILLE NY 11801	02/25/2016	02/25/2021
DOL	NYC		HAROLD KUEMMEL		58-83 54TH STREET MASPETH NY 11378	02/26/2016	02/26/2021
DOL	AG		HARVINDER SINGH PAUL		90 JUNIUS STREET BROOKLYN NY 11212	01/23/2014	01/23/2019

DOL	DOL		HENRY VAN DALRYMPLE		2663 LANTERN LANE ATLANTA GA 30349	12/01/2015	12/01/2020
DOL	DOL	*****6370	HILLIANO CONSTRUCTION & ELECTRICAL INC		354 MAGNOLIA STREET ROCHESTER NY 14611	01/22/2015	01/22/2020
DOL	DOL	*****8282	IDEMA DEVELOPMENT INC		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	DOL	*****8282	IDEMA GENERAL CONTRACTORS INC		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	DOL	*****7001	INTEGRATED CONSTRUCTION & POWER SYSTEMS INC		SUITE 100 2105 W GENESEE STREETSYRACUSE NY 13219	01/06/2016	01/06/2021
DOL	DOL		ISABEL FRAGA		C/O THREE FRIENDS CONSTR 986 MADISON AVENUEPATERSON NJ 07501	01/03/2013	01/03/2018
DOL	AG	*****0000	J A M CONSTRUCTION CORP		SUITE 125 265 SUNRISE HIGHWAYROCKVILLE CENTRE NY 10457	04/07/2016	04/07/2021
DOL	DOL	*****7598	J M RICH LLC		P O BOX 268 STILLWATER NY 12170	09/16/2013	03/21/2019
DOL	DOL	*****3478	J N P CONSTRUCTION CORP		50 LOUIS COURT P O BOX 1907SOUTH HACKENSACK NY 07606	03/21/2014	03/21/2019
DOL	DOL		J N RICH LLC		P O BOX 268 STILLWATER NY 12170	09/16/2013	03/21/2019
DOL	DOL	*****4910	J V MAGIC TOUCH CORPORATION		94-25 57TH AVENUE, APT 5G ELMHURST NY 11373	01/12/2015	01/12/2020
DOL	DOL		JACQUELINE HOWE		C/O FLOZ-ON PAINTING INC 12 DUNDERBERG ROADTOMKINS NY 10986	10/16/2013	10/16/2018
DOL	DOL	*****8627	JAG I LLC		635 LUZERNE ROAD QUEENSBURY NY 12804	09/16/2013	09/16/2018
DOL	DOL	*****2868	JAG INDUSTRIES INC		175 BROAD ST - SUITE 320 GLENS FALLS NY 12801	09/16/2013	09/16/2018
DOL	DOL		JAMES B RHYNDERS		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	DOL		JAMES BOYCE		C/O EMPIRE CONCRETE SYST 101 SULLYS TRAIL/SUITE 20PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DOL		JAMES E RHYNDERS		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	AG		JAMES FALCONE		SUITE 125 265 SUNRISE HIGHWAYROCKVILLE CENTRE NY 10457	04/07/2016	04/07/2021
DOL	DOL		JAMES RHYNDERS SR		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	DOL		JAMES SICKAU		3090 SHIRLEY ROAD NORTH COLLINS NY 14111	04/19/2011	07/08/2020
DOL	DOL		JASON M RICH		P O BOX 268 STILLWATER NY 12170	09/16/2013	03/21/2019
DOL	DOL		JASON W MILLIMAN		C/O ROCHESTER ACOUSTICAL P O BOX 799HILTON NY 14468	02/19/2016	02/19/2021
DOL	DOL		JAY PRESUTTI		C/O CONSOLIDATED INDUSTRI 2051 ROUTE 44/55MODENA NY 12548	01/28/2013	01/28/2018
DOL	DOL		JEFF P BRADLEY		520 PINE HILL ROAD CHESTER NY 10940	06/23/2014	06/23/2019
DOL	NYC		JEFFREY CASSIDY		14 RAILROAD AVENUE VALHALLA NY 10595	05/15/2014	04/02/2020
DOL	DOL		JERALD HOWE		C/O FLOZ-ON PAINTING INC 12 DUNDERBERG ROADTOMKINS NY 10986	10/16/2013	10/16/2018
DOL	DOL		JEROME LACITIGNOLA		C/O CATSKILL FENCE INSTAL 5445 ROUTE 32 CATSKILL NY 12414	08/22/2014	08/22/2019
DOL	DOL		JESSICA WHITESIDE		C/O BRRESTORATION NY INC 140 ARCADIA AVENUEOSWEGO NY 13126	09/12/2016	09/12/2021
DOL	DOL		JOHN DESCUL		437 SUNRISE HIGHWAYA WEST BABYLON NY 11704	08/12/2013	08/12/2018
DOL	DOL		JOHN H LEE	JOHN LEE QUALITY PAVING	67 WILER ROAD HILTON NY 14468	01/28/2013	01/28/2018
DOL	DOL	*****1749	JOHN LEE QUALITY PAVING		67 WILER ROAD HILTON NY 14468	01/28/2013	01/28/2018

DOL	DOL		JON E DEYOUNG		261 MILL ROAD P O BOX 296EAST AURORA NY 14052	07/29/2015	07/29/2020
DOL	DOL		JORGE VILLALOBOS		94-25 57TH AVENUE - APT 5 ELMHURST NY 11373	01/12/2015	01/12/2020
DOL	DOL		JOSE MONTAS		27 BUTLER PLACE YONKERS NY 10710	03/18/2011	03/19/2020
DOL	AG		JOSEPH FALCONE		SUITE 125 265 SUNRISE HIGHWAYROCKVILLE CENTRE NY 10457	04/07/2016	04/07/2021
DOL	DOL	*****9273	JOSEPH M LOVETRO		P O BOX 812 BUFFALO NY 14220	08/09/2016	08/09/2021
DOL	DOL		JOSEPH MARTONE		112 OSCAWANA HEIGHTS ROAD PUTNAM VALLEY NY 10542	08/27/2013	08/27/2018
DOL	DOL		JOSHUA DEBOWSKY		9547 BUSTLETON AVENUE PHILADELPHIA PA 19115	02/05/2014	02/05/2019
DOL	DOL		JOYA MUSCOLINO		10 ST CHARLES STREET THORNWOOD NY 10594	09/03/2013	09/03/2018
DOL	DOL		JUANA MARTINEZ		C/O LEAD CONSTRUCTION 27 BUTLER PLACEYONKERS NY 10710	03/19/2015	03/19/2020
DOL	DOL	*****4340	JUBCO SITE DEVELOPMENT LLC		462 LAKEVIEW AVENUE VALHALLA NY 10595	12/16/2013	12/16/2018
DOL	DOL		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	DOL	*****5062	K R F SITE DEVELOPMENT INC		375 LAKE SHORE DRIVE PUTNAM VALLEY NY 10579	01/23/2017	01/23/2022
DOL	DOL		KAREN HARTMAN		C/O GUILLO CONTRACTING P O BOX 229CALVERTON NY 11933	07/08/2013	07/08/2018
DOL	NYC		KATHLEEN SELA	C/O COLONIAL ROOFING COMPANY INC	247 48TH STREET BROOKLYN NY 11220	02/05/2014	02/05/2019
DOL	DOL		KEITH SCHEPIS		C/O KJS HAULING AND HOME 95 MAPLE AVENUENEW CITY NY 10956	04/15/2013	04/15/2018
DOL	DOL		KEN DEAVER		731 WARWICK TURNPIKE HEWITT NJ 07421	06/25/2012	12/11/2017
DOL	DOL		KENNETH FIORENTINO		375 LAKE SHORE DRIVE PUTNAM VALLEY NY 10579	01/23/2017	01/23/2022
DOL	DOL	*****9732	KENT HOLLOW SIDING LLC		29A BRIDGE STREET NEW MILFORD CT 06776	01/15/2016	01/15/2021
DOL	DOL		KEVIN BABCOCK JR		P O BOX 46 THOMPSON RIDGE NY 10985	08/22/2014	08/22/2019
DOL	DOL		KEVIN M BABCOCK		P O BOX 46 THOMPSON RIDGE NY 10985	08/22/2014	08/22/2019
DOL	DOL		KIM SOROCENSKI		C/O SOLUTION MATTERS INC 198 NORWOOD ROADPORT JEFFERSON NY 11776	11/19/2015	11/19/2020
DOL	DOL	*****2463	KJS HAULING AND HOME IMPROVEMENT INC		95 MAPLE AVENUE NEW CITY NY 10956	04/15/2013	04/15/2018
DOL	AG		KOSTAS "GUS" ANDRIKOPOULOS		2461 47TH STREET ASTORIA NY 11103	09/26/2013	09/26/2018
DOL	DA	*****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL	*****6224	LAKESIDE FIRE SPRINKLERS LLC		125 CHAUTAUQUA AVENUE LAKEWOOD NY 14750	06/24/2015	06/24/2020
DOL	AG	*****4643	LALO DRYWALL, INC.		221 OLD FORD ROAD NEW PLATZ NY 12561	05/20/2016	05/20/2021
DOL	DOL	*****4505	LARAPINTA ASSOCIATES INC		29 MAPLEWOOD DRIVE BINGHAMTON NY 13901	02/21/2017	02/21/2022
DOL	DOL		LAURI MARTONE		112 OSCAWANA HEIGHTS ROAD PUTNAM VALLEY NY 10542	08/27/2013	08/27/2018
DOL	DOL		LAVERN GLAVE		C/O RAW POWER ELECTRIC 3 PARK CIRCLEMIDDLETOWN NY 10940	09/15/2014	09/15/2019
DOL	DOL		LAWRENCE J RUGGLES		P O BOX 371 ROUND LAKE NY 12151	05/12/2014	05/12/2019
DOL	DOL	*****1364	LEAD CONSTRUCTION SERVICES INC		3 ALAN B SHEPARD PLACE YONKERS NY 10705	03/19/2015	03/19/2020
DOL	DOL	*****4388	LEN.J CONSTRUCTION LLC		PO BOX 10007 ALBANY NY 12201	08/14/2017	08/14/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	06/24/2016	01/30/2022

DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	06/24/2016	01/30/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	AG		LEONID FRIDMAN		APT 5 200 BRIGHTON, 15TH STBROOKLYN NY 11235	01/23/2014	01/23/2019
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	08/14/2017	08/14/2022
DOL	DOL		LINDSEY R CRILL		143 FILLMORE AVENUE BUFFALO NY 14210	01/08/2015	01/08/2020
DOL	DOL	*****8453	LINPHILL ELECTRICAL CONTRACTORS INC		523 SOUTH 10TH AVENUE MOUNT VERNON NY 10553	01/07/2011	04/15/2018
DOL	DOL		LINVAL BROWN		523 SOUTH 10TH AVENUE MOUNT VERNON NY 10553	01/07/2011	04/15/2018
DOL	AG		LUIS MARTINEZ	LALO DRYWALL	211 MAIN ST. NEW PALTZ NY 12561	05/20/2016	05/20/2021
DOL	NYC	*****2850	M A 2 FLAGS CONTRACTING CORP		25-18 100TH STREET EAST ELMHURST NY 11369	08/21/2013	08/21/2018
DOL	DOL		M ANVER BEIG		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	AG	*****6957	M B DIN CONSTRUCTION INC		8831 20TH AVENUE/SUITE 6E BROOKLYN NY 11214	11/17/2015	11/17/2020
DOL	NYC	*****6317	M S QUALITY CONSTRUCTION LLC		27 MAPLEWOOD AVENUE COLONIA NJ 07067	02/04/2015	02/04/2020
DOL	DOL		M. ANVER BEIG		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	NYC		MACIEJ SONTOWSKI		27 MAPLEWOOD AVENUE COLONIA NJ 07067	02/04/2015	02/04/2020
DOL	NYC	*****9590	MACK GLASSNAUTH IRON WORKS INC		137 LIBERTY AVENUE BROOKLYN NY 11212	12/21/2015	12/21/2020
DOL	NYC	*****3141	MACKEY REED ELECTRIC INC		1ST FLOOR STORE FRONT 88-10 LITTLE NECK PARKWAYFLORAL PARK NY 11001	06/24/2014	06/24/2019
DOL	DOL	*****1784	MADISON AVE CONSTRUCTION CORP		39 PENNY STREET WEST ISLIP NY 11795	11/02/2016	11/02/2021
DOL	DOL		MALARKEY'S BAR & GRILL LLC		64 VICTORIA DRIVE BINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DOL	*****0705	MALARKEY'S PUB & GRUB LLC		64 VICTORIA DRIVE BINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DA		MANUEL P TOBIO		150 KINGS STREET BROOKLYN NY 14444	08/19/1998	08/19/2998
DOL	DA		MANUEL TOBIO		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		MARIA ESTEVES AKA MARIA MARTINS		C/O THREE FRIENDS CONSTR 986 MADISON AVENUEPATERSON NJ 07501	01/03/2013	01/03/2018
DOL	DOL		MARIA MARTINS AKA MARIA ESTEVES		C/O THREE FRIENDS CONSTR 986 MADISON AVENUEPATERSON NJ 07501	01/03/2013	01/03/2018
DOL	DOL		MARIACHI'S PIZZERIA		C/O DOUGLAS L MALARKEY 64 VICTORIA DRIVEBINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DOL		MARK MIONIS		6409 LAND O LAKES BLVD LAND O LAKES FL 34638	11/10/2015	11/10/2020
DOL	DOL	*****5533	MARQUISE CONSTRUCTION & DEVELOPMENT CORP		10 ST CHARLES STREET THORNWOOD NY 10594	09/03/2013	09/03/2018
DOL	DOL	*****8810	MARQUISE CONSTRUCTION ASSOCIATES INC		20 BOSWELL ROAD PUTNAM VALLEY NY 10579	09/03/2013	09/03/2018
DOL	DOL	*****1134	MARQUISE CONSTRUCTION CORP		10 ST CHARLES STREET THORNWOOD NY 10594	09/03/2013	09/03/2018

DOL	DOL		MARVIN A STURDEVANT		29 MAPLEWOOD DRIVE BINGHAMTON NY 13901	02/21/2017	02/21/2022
DOL	DOL		MATTHEW IDEMA GENERAL CONTRACTORS INC		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	DOL	*****6416	MCCALL MASONRY		P O BOX 304 SAYRE PA 18840	08/09/2016	08/09/2021
DOL	DOL	*****9028	MCINTOSH INTERIORS LLC		8531 AVENUE B BROOKLYN NY 11236	02/05/2013	02/05/2018
DOL	DOL	*****4259	MERCANDO CONTRACTING CO INC		134 MURRAY AVENUE YONKERS NY 10704	12/11/2009	02/03/2019
DOL	DOL	*****0327	MERCANDO INDUSTRIES LLC		134 MURRAY AVENUE YONKERS NY 10704	12/11/2009	02/03/2019
DOL	NYC	*****5330	METRO DUCT SYSTEMS INC		1219 ASTORIA BOULEVARD LONG ISLAND CITY NY 11102	04/16/2014	11/19/2020
DOL	DOL	*****3368	MICEK CONSTRUCTION CO INC		20 CROSS STREET FALCONER NY 14733	12/02/2014	12/02/2019
DOL	DOL		MICHAEL A PASCARELLA		SUITE 100 2105 WEST GENESEE STREET SYRACUSE NY 13219	01/06/2016	01/06/2021
DOL	DOL	*****9198	MICHAEL CZECHOWICZ	OCTAGON CO	37-11 35TH AVENUE-2ND FL LONG ISLAND CITY NY 11101	01/08/2013	01/08/2018
DOL	DOL		MICHAEL F LEARY JR		3813 SNOWDEN HILL ROADNEW HARTFORD NY 13413	06/19/2013	06/19/2018
DOL	DOL		MICHAEL F LEARY JR METAL STUD & DRYWALL		3813 SNOWDEN HILL ROAD NEW HARTFORD NY 13413	06/19/2013	06/19/2018
DOL	NYC		MICHAEL HIRSCH		C/O MZM CORP 163 S MAIN STREETNEW CITY NY 10956	01/28/2016	01/28/2021
DOL	DOL		MICHAEL KTISTAKIS		363 88TH STREET BROOKLYN NY 11209	11/18/2013	11/18/2018
DOL	DOL		MICHAEL MARGOLIN		4 LEGHORN COURT NEW YORK NY 11746	11/28/2012	11/28/2017
DOL	DOL		MICHAEL WILSON	WILSON BROTHER DRYWALL CONTRACTORS	36 ABERSOLD STREET ROCHESTER NY 14621	08/31/2015	08/31/2020
DOL	DOL		MICHELLE L BARBER		635 LUZERNE ROAD QUEENSBURY NY 12804	09/16/2013	09/16/2018
DOL	NYC		MIGUEL ACOSTA		25-18 100TH STREET EAST ELMHURST NY 11369	08/21/2013	08/21/2018
DOL	NYC		MILANCE HADZIC		22 CALIFORNIA AVE - STE 1 PATERSON NJ 07503	03/11/2015	03/11/2020
DOL	AG		MOHAMMAD RIAZ		46 RUGBY ROAD WESTBURY NY 11590	11/20/2013	11/20/2018
DOL	AG		MOHAMMED N CHATHA		8831 20TH AVENUE/SUITE 6E BROOKLYN NY 11214	11/17/2015	11/17/2020
DOL	DOL	*****2737	MOUNTAIN'S AIR INC		2471 OCEAN AVENUE- STE 7A BROOKLYN NY 11229	09/24/2012	09/18/2020
DOL	DOL		MUHAMMAD BEIG		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	DOL		MUHAMMAD BEIG		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	DOL		MUHAMMAD PERVAIZ		C/O CHAMPION CONSTRUCTION 2131 SCHENECTADY AVENUEBROOKLYN NY 11234	11/18/2015	11/18/2020
DOL	DOL		MUZAFFAR HUSSAIN		C/O ABSOLUTE GENERAL CONT 1129 AVENUE UBROOKLYN NY 11229	01/28/2013	01/28/2018
DOL	NYC	*****3613	MZM CORP		163 S MAIN STREET NEW CITY NY 10956	01/28/2016	01/28/2021
DOL	NYC	*****1284	NEW AMERICAN RESTORATION INC		22 CALIFORNIA AVE - STE 1 PATERSON NJ 07503	03/11/2015	03/11/2020
DOL	DA	*****6988	NEW YORK INSULATION INC		58-48 59TH STREET MASPETH NY 11378	05/16/2012	05/08/2020
DOL	NYC	*****4839	NEW YORK RIGGING CORP		58-83 54TH STREET MASPETH NY 11378	02/26/2016	02/26/2021
DOL	DOL		NICHOLAS DEGREGORY JR	NJ DEGREGORY & COMPANY	1698 ROUTE 9 GLENS FALLS NY 12801	05/23/2013	05/23/2018
DOL	NYC		NICHOLAS PROVENZANO		147 BROOME AVENUE ATLANTIC BEACH NY 11509	03/03/2014	03/03/2019
DOL	NYC		NICHOLAS PROVENZANO		147 BROOME AVENUE ATLANTIC BEACH NY 11509	03/03/2014	03/03/2019

DOL	DOL	*****5279	NJ DEGREGORY & COMPANY		1698 ROUTE 9 GLENS FALLS NY 12801	05/23/2013	05/23/2018
DOL	DOL		NJ DEGREGORY & SONS CONSTRUCTION		1698 ROUTE 9 GLENS FALLS NY 12801	05/23/2013	05/23/2018
DOL	NYC	*****1968	NORTH AMERICAN IRON WORKS INC		1560 DECATUR STREET RIDGEWOOD NY 11385	05/15/2015	05/15/2020
DOL	DOL	*****6966	NORTH COUNTRY DRYWALL AND PAINT		23167 COUNTY ROUTE 59 DEXTER NY 13634	10/24/2016	10/24/2021
DOL	DOL	*****0065	NORTHEAST LANDSCAPE AND MASONRY ASSOC		3 WEST MAIN ST/SUITE 208 ELMSFORD NY 10523	01/23/2017	01/23/2022
DOL	DOL	*****9198	OCTAGON CO		37-11 35TH AVENUE-2ND FL LONG ISLAND CITY NY 11101	01/08/2013	01/08/2018
DOL	NYC	*****8337	OPTIMUM CONSTRUCTION INC		23-73 48TH STREET LONG ISLAND CITY NY 11103	04/24/2014	04/24/2019
DOL	NYC		ORSON ARROYO		C/O METRO DUCT SYSTEMS 12-19 ASTORIA BOULEVARDLONG ISLAND CITY NY 11102	04/16/2014	11/19/2020
DOL	DOL	*****4546	PAF PAINTING CORP		161 TIBBETTS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL	*****5242	PAF PAINTING SERVICES INC	GARDEN STATE PAINTING	157 TIBBETTS ROAD YONKERS NY 10103	03/12/2014	03/12/2019
DOL	DOL		PAF PAINTING SERVICES OF WESTCHESTER INC		C/O SPIEGEL & UTRERA 1 MAIDEN LANE - 5TH FLNEW YORK NY 10038	03/12/2014	03/12/2019
DOL	DOL	*****8802	PAT'S HEATING AND AIR CONDITIONING LTD		P O BOX 371 ROUND LAKE NY 12151	05/12/2014	05/12/2019
DOL	DOL		PATRICIA M RUGGLES		P O BOX 371 ROUND LAKE NY 12151	05/12/2014	05/12/2019
DOL	DOL		PAUL VERNA		C/O AMERICAN STEEL MECHA 693 PAINTER STREETMEDIA PA 19063	02/20/2013	02/20/2018
DOL	DOL		PETER M PERGOLA		3 WEST MAIN ST/SUITE 208 ELMSFORD NY 10523	01/23/2017	01/23/2022
DOL	NYC		PETER TRITARIS		5990 58TH AVENUE MASPETH NY 11378	11/18/2013	11/18/2018
DOL	DOL		PIERRE LAPORT		224 COUNTY HIGHWAY 138 BROADALBIN NY 12025	03/07/2017	03/07/2022
DOL	DOL	*****1543	PJ LAPORT FLOORING INC		224 COUNTY HIGHWAY 138 BROADALBIN NY 12025	03/07/2017	03/07/2022
DOL	DOL	*****2989	PROFESSIONAL ESTIMATING & BUSINESS CORP		157 TIBBETS ROAD YONKERS NY 10705	03/12/2014	03/12/2019
DOL	DOL	*****6895	PROLINE CONCRETE OF WNY INC		3090 SHIRLEY ROAD NORTH COLLINS NY 14111	04/19/2011	07/08/2020
DOL	DA	*****6817	QUADRANT METAL BUILDINGS LLC		2740 SW MARTIN DOWNS BLVD PALM CITY FL 34990	08/25/2016	08/25/2021
DOL	DOL	*****0015	RAMADA CONSTRUCTION CORP		80 SAVO LOOP STATEN ISLAND NY 10309	01/07/2014	01/07/2019
DOL	NYC		RAMESHWAR ASU		137 LIBERTY AVENUE BROOKLYN NY 11212	12/21/2015	12/21/2020
DOL	DOL		RANA A KAHN		1973 81ST ST - SUITE A-5 BROOKLYN NY 11214	01/08/2015	01/08/2020
DOL	NYC		RANTIK PARIKH		13 LORIANN ROAD WARREN NJ 07059	07/15/2015	07/15/2020
DOL	DOL	*****2633	RAW POWER ELECTRIC CORP		3 PARK PLACE MIDDLETOWN NY 10940	09/16/2013	09/15/2019
DOL	NYC		RAYMOND PEARSON		P O BOX 957 PORT JEFFERSON STA NY 11776	03/12/2014	03/12/2019
DOL	DOL		REBECCA THORNE		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL		REGINALD WARREN		C/O RAW POWER ELECTRIC 3 PARK CIRCLEMIDDLETOWN NY 10940	09/15/2014	09/15/2019
DOL	NYC	*****3461	RELIANCE GENERAL CONSTRUCTION INC		644 OCEAN PARKWAY BROOKLYN NY 11230	09/02/2015	09/02/2020
DOL	DOL		REVOLUTIONARY FLOORS LLC		P O BOX 268 STILLWATER NY 12170	09/16/2013	03/21/2019
DOL	DOL		RHINO CONCRETE LLC		101 SULLYS TRAIL/SUITE 20 PITTSFORD NY 14534	11/18/2013	01/07/2019
DOL	DA		RIANN MULLER		2740 SW MARTIN DOWNS BLVD PALM CITY FL 34990	08/25/2016	08/25/2021

DOL	DOL		RICHARD WILSON		C/O DUFOUR GROUP INC 353 WEST 56TH STREET #7MNEW YORK NY 10019	06/10/2014	06/10/2019
DOL	DOL	*****8618	RIEKS CONTRACTING LLC		4804 GAHWILER ROAD AUBURN NY 13021	05/01/2015	05/01/2020
DOL	DOL		ROBBYE BISSESAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL	*****1855	ROBERT D BISHOP JR	ROBERT D BISHOP JR	P O BOX 112 MORRISSONVILLE NY 12962	07/15/2014	07/15/2019
DOL	DOL		ROBERT D BISHOP JR		P O BOX 112 MORRISONVILLE NY 12962	07/15/2014	07/15/2019
DOL	NYC		ROBERT GUIDO		3256 BRUNER AVENUE BRONX NY 10469	07/29/2014	07/29/2019
DOL	DOL		ROBERT L EVANS		128A NORTH STAMFORD ROAD STAMFORD CT 06903	05/23/2013	05/23/2018
DOL	DOL		ROBERT TORDELLA		125 CHAUTAUQUA AVENUE LAKEWOOD NY 14750	06/24/2015	06/24/2020
DOL	DOL	*****3859	ROCHESTER ACOUSTICAL CORP		P O BOX 799 HILTON NY 14468	02/19/2016	02/19/2021
DOL	NYC		RODNEY SCOTT		201 HEMPSTEAD AVENUE WEST HEMPSTEAD NY 11552	10/30/2015	10/30/2020
DOL	DOL		ROMEO WARREN		C/O RAW POWER ELECTR CORP 3 PARK PLACEMIDDLETOWN NY 10940	09/16/2013	09/15/2019
DOL	DOL		ROSS J MUSCOLINO		10 ST CHARLES STREET THORNWOOD NY 10594	09/03/2013	09/03/2018
DOL	DOL		RYAN ALBIE		21 S HOWELLS POINT ROAD BELLPORT NY 11713	02/21/2017	02/21/2022
DOL	DOL	*****3347	RYAN ALBIE CONTRACTING INC		21 S HOWELLS POINT ROAD BELLPORT NY 11713	02/21/2017	02/21/2022
DOL	DOL		S & S ELECTRIC		235 BROADWAY SCHENECTADY NY 12306	06/19/2013	06/19/2018
DOL	NYC		SABIR MUHAMMED		SUITE B-8 782 PELHAM PARKWAY SOUTHBRONX NY 10462	04/21/2016	04/21/2021
DOL	NYC		SAEED HASAN		4558 BROADWAY #6 NEW YORK NY 10040	08/04/2014	08/04/2019
DOL	DOL	*****4923	SCHENLEY CONSTRUCTION INC		731 WARWICK TURNPIKE HEWITT NJ 07421	06/25/2012	12/11/2017
DOL	NYC	*****2117	SCOTT ELECTRICAL LLC		201 HEMPSTEAD AVENUE WEST HEMPSTEAD NY 11552	10/30/2015	10/30/2020
DOL	DOL		SCOTT LEONARD	GLOBAL TANK CONSTRUCTION LLC	P O BOX 1238 SALINA OK 74365	11/28/2012	11/28/2017
DOL	DOL	*****9751	SCW CONSTRUCTION		544 OLD ROUTE 23 ACRE NY 12405	02/14/2017	02/14/2022
DOL	DOL		SEAKCO CONSTRUCTION COMPANY LLC		128A NORTH STAMFORD ROAD STAMFORD CT 06903	05/23/2013	05/23/2018
DOL	DOL	*****9030	SEAKCO NEW YORK LLC	SEAKCO CONSTRUCTION COMPANY	128A NORTH STAMFORD ROAD STAMFORD CT 06903	05/23/2013	05/23/2018
DOL	DOL		SEAN BURBAGE	C/O SEAN BURBAGE CORP	445 ROOSA GAP ROAD BLOOMINGBURG NY 12721	04/14/2014	04/14/2019
DOL	DOL	*****6586	SEAN BURBAGE CORP		445 ROOSA GAP ROAD BLOOMINGBURG NY 12721	04/14/2014	04/14/2019
DOL	AG		SERGIO RAYMUNDO		109 DUBOIS RD. NEW PALTZ NY 12561	05/20/2016	05/20/2021
DOL	DOL	*****6904	SIGNING STAR LIMITED LIABILITY COMPANY		5 HANSEN PLACE WAYNE NJ 07470	09/18/2013	09/18/2018
DOL	DOL	*****4025	SOLUTION MATTERS INC		198 NORWOOD ROAD PORT JEFFERSON NY 11776	11/19/2015	11/19/2020
DOL	NYC	*****4934	SPHINX CONTRACTING CORP		240 HOME STREET TEANECK NJ 07666	08/04/2014	08/04/2019
DOL	DOL		SPORTSCRAFTERS INC		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL	*****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL		STEPHEN BIANCHI		462 LAKEVIEW AVENUE VALHALLA NY 10595	12/16/2013	12/16/2018
DOL	DOL	*****9751	STEPHEN C WAGAR		544 OLD ROUTE 23 ACRE NY 12405	02/14/2017	02/14/2022
DOL	DOL		STEPHEON SHELDON	FANTASTIC PAINTING	493 LANSING ROAD FULTONVILLE NY 12072	11/18/2013	11/18/2018

DOL	DOL		STEVEN P SUCATO		15-68 208TH STREET BAYSIDE NY 11360	06/23/2016	06/23/2021
DOL	DOL		STEVEN SAGGESE		3005 WYNSUM AVENUE MERRICK NY 11566	08/18/2014	08/18/2019
DOL	DOL		STEVEN TESTA		50 SALEM STREET - BLDG B LYNNFIELD MA 01940	01/23/2017	01/23/2022
DOL	DOL		STUART CHAITIN		634 ROUTE 303 BLAUVET NY 10913	07/26/2012	11/19/2018
DOL	NYC	*****9432	SUBLINK LTD		346 THIRD AVENUE PELHAM NY 10803	11/19/2015	11/19/2020
DOL	DOL	*****3210	SUPER SWEEP	FMS	4 LEGHORN COURT NEW YORK NY 11746	11/28/2012	11/28/2017
DOL	DOL		SUZANNE G GOLD	C/O GOLDS FLOORING INSTALLATIONS INC	25 HAMILTON ROAD MONTICELLO NY 12701	10/16/2013	10/16/2018
DOL	DOL	*****7441	T & T CONCRETE INC		2560 HAMBURG TURNPIKE P O BOX 367LACKAWANNA NY 14218	07/08/2015	07/08/2020
DOL	DOL	*****9676	T D CONTRACTORS CORP	T D CONTRACTORS INC	113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL		T D CONTRACTORS INC		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL	*****7417	TADCO CONSTRUCTION		101-61 99TH STREET OZONE PARK NY 11416	02/15/2017	02/15/2022
DOL	DOL		TADCO CONSTRUCTION		101-61 99TH STREET OZONE PARK NY 11416	02/15/2017	02/15/2022
DOL	DOL	*****7417	TADCO CONSTRUCTION CORP		101-61 99TH STREET OZONE PARK NY 11416	02/15/2017	02/15/2022
DOL	DOL		TAMMY LACITIGNOLA		C/O CATSKILL FENCE INSTAL 5445 ROUTE 32CATSKILL NY 12414	08/22/2014	08/22/2019
DOL	DOL	*****9852	TAP STEEL INC		ROUTE 26 3101 P O BOX 457CONSTABLEVILLE NY 13325	01/28/2016	01/28/2021
DOL	DOL		TECH-MECHANICAL FAB DC INC		5 PARKER AVENUE POUGHKEEPSIE NY 12601	03/25/2014	03/25/2019
DOL	DOL	*****5570	TESTA CORP		50 SALEM STREET - BLDG B LYNNFIELD MA 01940	01/23/2017	01/23/2022
DOL	DOL	*****0887	THE BRINSON PAINTING CORPORATION		72 TAUNTON PLACE BUFFALO NY 14216	04/14/2015	04/14/2020
DOL	DOL	*****8174	THE DALRYMPLE CORPORATION		UNIT 278 541 10TH STREET NWATLANTA GA 30318	12/01/2015	12/01/2020
DOL	DOL	*****8174	THE DALRYMPLE GROUP LLC		289 JONESBORO RD/ STE 216 MCDONOUGH GA 30253	12/01/2015	12/01/2020
DOL	DOL		THE THORNE GROUP INC		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL	*****2070	THE UNIVERSAL GROUP OF NEW YORK INC		212 OXFORD WAY SCHENECTADY NY 12309	12/11/2012	09/16/2018
DOL	DOL	*****9243	THE WELCOME MAT PROPERTY MANAGEMENT LLC		P O BOX 268 STILLWATER NY 12170	09/16/2013	03/21/2019
DOL	DOL		THOMAS DESANTIS	DESANTIS ENTERPRISES	161 OSWEGO RIVER ROAD PHOENIX NY 13135	09/24/2013	11/18/2018
DOL	NYC		THOMAS SCARINCI		130-43 92ND AVENUE RICHMOND HILLS NY 11418	11/27/2013	11/27/2018
DOL	DOL	*****2734	THREE FRIENDS CONSTRUCTION CORP		986 MADISON AVENUE PATERSON NJ 07501	01/03/2013	01/03/2018
DOL	NYC	*****6253	THUNDER BROTHERS CORP		24 CONGRESS LANE SOUTH RIVER NJ 08882	05/01/2013	05/01/2018
DOL	DOL		TIMOTHY A PALUCK		C/O TAP STEEL INC RTE 26 3101/ P O BOX 457CONSTABLEVILLE NY 13325	01/28/2016	01/28/2021
DOL	DOL		TIMOTHY F BARBER		635 LUZERNE ROAD QUEENSBURY NY 12804	09/16/2013	09/16/2018
DOL	NYC	*****1523	TM MECHANICAL CORP		130-43 92ND AVENUE RICHMOND HILLS NY 11418	11/27/2013	11/27/2018
DOL	DOL	*****0600	TOMSON ALLOYS RECYCLING INC		143 FILLMORE AVENUE BUFFALO NY 14210	01/08/2015	01/08/2020
DOL	DOL	*****3453	TORCHIA'S HOME IMPROVEMENT		10153 ROBERTS RD SAUQUOIT NY 13456	08/09/2016	08/09/2021
DOL	DOL	*****6914	TRI-COUNTY RESTORATIONS & CONSTRUCTION INC		13 SUMMERSET DRIVE WALLKILL NY 12589	08/22/2014	08/22/2019
DOL	DOL		TRI-COUNTY RESTORATIONS INC		392 ROCK CUT ROAD WALDEN NY 12586	08/22/2014	08/22/2019

DOL	DOL	*****8311	TRIPLE B FABRICATING, INC.		61 WILLETT ST. PASSAIC NJ 07503	10/26/2016	10/26/2021
DOL	DOL	*****9407	TURBO GROUP INC		15-68 208TH STREET BAYSIDE NY 11360	06/23/2016	06/23/2021
DOL	AG	*****6490	UNIVERSAL STEEL FABRICATORS INC		90 JUNIUS STREET BROOKLYN NY 11212	01/23/2014	01/23/2019
DOL	NYC	*****7174	V&R CONTRACTING		P O BOX 957 PORT JEFFERSON STA NY 11776	03/12/2014	03/12/2019
DOL	NYC		VALERIE VISCONTI		346 THIRD AVENUE PELHAM NY 10803	11/19/2015	11/19/2020
DOL	NYC		VEAP SELA	C/O COLONIAL ROOFING COMPANY INC	247 48TH STREET BROOKLYN NY 11220	02/05/2014	02/05/2019
DOL	NYC		VICK CONSTRUCTION		21 DAREWOOD LANE VALLEY STREAM NY 11581	12/31/2013	12/31/2018
DOL	NYC		VICKRAM MANGRU	VICK CONSTRUCTI ON	21 DAREWOOD LANE VALLEY STREAM NY 11581	12/31/2013	12/31/2018
DOL	DOL		VICTOR ROTENBERG		C/O GMDV TRANS INC 67048 182ND STREETFRESH MEADOWS NY 11365	06/24/2016	06/24/2021
DOL	NYC		VINCENT PIZZITOLA		P O BOX 957 PORT JEFFERSON STA NY 11776	03/12/2014	03/12/2019
DOL	DOL		WAYNE LIVINGSTON JR	NORTH COUNTRY DRYWALL AND PAINT	23167 COUNTY ROUTE 59 DEXTER NY 13634	10/24/2016	10/24/2021
DOL	DOL		WESLEY J STAROBA		206 TALLY HO COURT SCHENECTADY NY 12303	06/19/2013	06/19/2018
DOL	DOL	*****0078	WESLEY J STAROBA INC	S & S ELECTRIC	235 BROADWAY SCHENECTADY NY 12306	06/19/2013	06/19/2018
DOL	DOL		WILLIAM CONKLIN		5 PARKER AVENUE POUGHKEEPSIE NY 12601	03/25/2014	03/25/2019
DOL	DOL		WILLIAM DEAK		C/O MADISON AVE CONSTR CO 39 PENNY STREETWEST ISLIP NY 11795	11/02/2016	11/02/2021
DOL	DOL		WILLIAM MAZZELLA		134 MURRAY AVENUE YONKERS NY 10704	02/03/2014	02/03/2019
DOL	DOL		WILLIAM THORNE		113 N MAPLE AVENUE GREENSBURG PA 15601	02/21/2013	02/21/2018
DOL	DOL		WILLIE BRINSON		72 TAUNTON PLACE BUFFALO NY 14216	04/14/2015	04/14/2020
DOL	DOL	*****6195	WILSON BROTHER DRYWALL CONTRACTORS		36 ABERSOLD STREET ROCHESTER NY 14621	08/31/2015	08/31/2020
DOL	DOL	*****7345	YES SERVICE AND REPAIRS CORPORATION		145 LODGE AVE HUNTINGTON STATION NY 11476	08/09/2016	08/09/2021
DOL	DOL		YURIY IVANIN		C/O MOUNTAIN'S AIR INC 2471 OCEAN AVENUE-STE 7ABROOKLYN NY 11229	09/24/2012	09/18/2020

PART 1 - GENERAL

1.01 BRIEF PURPOSE OF PROJECT / GENERAL

A. The purpose of the project is to construct a new booster pumping station and install all associated systems as shown in the Project Documents at the Riverhead Water Districts Plant No. 15 Facility on Tuthills Lane in Jamesport.

B. All work shown and specified in the Contract Documents shall be the work of this Construction Contract.

C. This Section provides an abbreviated summary of the work for the Construction Contracts 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 GENERAL & MECHANICAL CONSTRUCTION CONTRACTOR may be referred to as the "General Contractor," "Prime General Contractor," "Contract G Contractor" or similar wording.

C. The terms "Contractor" and/or "Prime Contractor" where used within the body of a specific Construction Contract, (i.e.; Contract G, Contract E, and Contract T), shall refer to the individual or company who has entered into an agreement with the Owner to perform the work contained within those Contract Documents. The lack of word capitalization shall be incidental.

D. The Electrical Construction Contractor may be referred to as the "Electrical Contractor", "Prime Electrical Contractor", "Contract E Contractor" or similar wording. The lack of word capitalization shall be incidental. This Construction Contract shall be known as Contract E.

1.03 ABBREVIATED SUMMARY OF CONTRACT G 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. Tree removal, site clearing, sheeting, bracing, excavation, soil erosion protection, slope protection, earth movement, subgrade preparation, removal of excess and/or unsuitable excavated material, and import of suitable material, as necessary to install and construct all the work defined within the Contract Documents.
   2. New site piping and valving including buried site piping, valves, and fittings as shown in the project documents
   3. Construction of cast-in-place concrete slabs, foundations, and floors.
   4. New electric unit heaters.
   5. New exhaust fans, louvers, supports, and associated equipment.
   6. New interior large mechanical piping, valves, and accessories for the booster pumping system.
   7. Pipe support systems for exposed piping.

8. New pumps, motors, and accessories.
9. Surface preparation and coating of all mechanical piping.
10. New calcium hypochlorite tablet chlorinator, pumps, and injection piping.
11. New water service lines and valving.
12. New interior drainage piping, valves, and accessories.
13. Testing and adjusting of mechanical systems.
14. Disinfection and water quality testing.
15. New sampling lines and valving.
16. Preliminary site work including: erection of safety fencing, erosion control facilities, clearing and grubbing.
17. New site drainage structures and piping.
18. Excavation, removal of excess and/or unsuitable excavated material, sheeting reinforcement, import of suitable material, soil compaction and testing.
19. Site restoration including final grading and placement of topsoil and seeding.
20. Asphalt removal, re-paving, new paving of driveway areas, and new concrete walks.
21. New chain-link fence
22. New concrete building foundation, CMU building walls, doors, wood truss roof support system, and asphalt shingle roofing system.
23. Startup participation for the various equipment and systems of the project and provide complete service to troubleshoot and assist manufacturer service representatives in obtaining a completely functional installation.
24. Project closeout submittals.

D. All other work shown and specified within the Contract Documents for Contract G.

1.04 ABBREVIATED SUMMARY OF CONTRACT E 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. Re-routing secondary feed to new booster station and backfeed existing well treatment building.
2. Run site conduit
3. Provide power and control wiring
4. Main secondary feeders, power distribution, and instrumentation control wiring. Provide, mount, and install electrical conduit, wire, fittings, boxes, panels, and electrical accessories.
5. Relocation of existing emergency generator including the construction of its concrete slab.
6. Motor control centers, local control stations, transfer switches, power distribution panels, breakers, lights, and switches.
7. Furnish, install and power transmitters, flow recorders and install interconnecting wiring where said devices are to be provided as work of Contract E. Install and power primary flow elements, transmitters, flow recorders and install interconnecting wiring where said devices are to be provided as work of other contracts.
8. Power primary flow elements.
9. Electrical connections (final termination) to all equipment, control panels, ventilating equipment and electrical devices.
10. New lighting fixtures, wiring and associated equipment.

11. New instrumentation including switches, transmitters, and recorders for flow and pressure
12. All excavation, trenching, backfilling, and rough grading associated with the installation of pull-boxes, underground conduit, and wiring. Final restoration by Contract G.
13. Wiring connections to all electrical equipment (including equipment furnished by others).
14. Connections to PLC for all control and telemetry equipment and devices.
15. Testing, programming and adjusting of all electrical systems.
16. 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.
17. Project closeout submittals.

D. All other work shown and specified in the Contract Documents for Contract E.

1.05 PARTIAL LISTING OF SPECIFIC CONTRACT REQUIREMENTS

A. The Contract Documents detail the work included in the Contract. Related requirements and conditions covered by the Contract Documents include, but are not limited to, the following:
   1. Guidelines and requirements of the Occupational Safety and Health Administration.
   2. Guidelines and requirements of the New York State Department of Environmental Conservation (NYSDEC).
   3. Guidelines and requirements of the Suffolk County Department of Health Services.
   4. Guidelines and requirements of the Town of Riverhead.

1.06 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. Coordination with the Owner and other contractors who have been awarded work by the Owner.
   3. Site utilization and management so as not to disrupt the Owner’s ability to operate the existing facilities in a safe and efficient manner.
   4. 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.
   5. Product and equipment storage and handling requirements.
   6. Starting and adjusting of the equipment and systems required under the project.
   7. Site safety in accordance with all applicable federal, state, and local regulations.
   8. 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.
   9. Site utilization and management so as to allow other prime contractors to perform work in conjunction with this project and to afford them equal opportunity and space to complete their contractual obligations with the Owner as solely defined by the Engineer.
   10. To not hinder the Owner’s ability to deliver a safe and potable water supply.

B. The Owner has or will award other construction contracts associated with this project.

C. It is anticipated that work of all the contracts will coincide with work of this Contract.

1.07 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. Dewatering and trash pumps and portable heaters will not be permitted.
   3. Sump pumps, if less than 1/3 horsepower will be allowed. Only two (2) sump pumps will be permitted to operate at the same time.
   4. Power to the Owner/Engineer's trailer, if applicable.
   5. Power to help cure concrete or painting systems will not be permitted.
   6. 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.

1.08 EXISTING CONDITIONS

A. The Drawings show certain information that has been obtained by the Owner regarding various pipelines, 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

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.

F. Suggested construction sequence.

1.02 SITE ACCESS AND CONTROL

A. Contractors shall use the designated entrance to the site as shown on the drawings. If no site entrance is designated, Contractors shall use an entrance designated by the Owner's Construction Representative.
   1. The Owner may permit, solely at the Owner's discretion, the temporary use of another entrance for site access.
   2. The Owner will only review requests made by the Contractors for an exception to the designated site entrance if made in writing at least 72 hours in advance of each of the times desired for use.

B. All contractors 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. All Contractors are responsible to employ methods to prevent construction materials and/or debris from leaving the site. All Contractors are 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.

D. The Contractors shall employ methods to prevent the transmission of dirt from vehicles driving on exposed areas of the site from reaching the surrounding roadways. The Contractors will be responsible to immediately clean the roadway, should the measures being taken by the Contractors not satisfactorily control the transmission of any dirt to the roadway.

E. 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.

F. The Contractors shall comply with all state and local requirements for allowable weight limits of vehicles on all roads.

G. The Owner reserves the right to back charge the Contractors for all costs associated with maintaining the grounds as well as maintaining areas outside the site, which may be disturbed by the Contractors should the Contractors fail to maintain or repair the aforementioned in a condition acceptable to the Owner.

H. The Contractors 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 responsibly of the Contractor.

I. 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 Contractors 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 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. Contractors 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 as specified in Section 015000.

D. Contractors 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.

E. Contractors 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.

F. Limit use of the site to the areas shown on the Contract Drawings and the adopted Site Utilization Plan. Confine operations to permit others working on the site easy access to all areas of Work.

G. 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 selected under the Site Utilization Plan or as 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.

H. Immediately remove excess excavated material or relocate to areas on the site requiring placement of fill. Do not stockpile excess material on the site.

I. The construction site space is limited and it shall be the General Contractor's responsibility to manage the site during the entire construction period with input from all concerned parties as to meeting their needs. Equal consideration of the needs of others with that of the Contractor's shall be provided as judged by the Owner.

J. Due to the limited site area available for construction, staging areas shall be relocated several times during the various stages of construction. Additional compensation for relocating staging areas, equipment and material storage, and trailers are not to be considered an extra cost to the Contractor as this is an anticipated expense that shall be considered at the time of the bid.

K. Should it become necessary to access the existing building during construction hours for measurements or other non-disruptive work, the contractor shall be escorted by an Owner's Construction Representative.

L. Refer to Section 015000 - Temporary Facilities and Controls for minimum rubbish removal requirements.

M. Do not discard or dispose of any waste on-site.

N. Open fires will not be permitted on the site.

O. Install erosion control measures as indicated in the Contract. The Contractor shall confine stormwater runoff to the site.

P. The General Contractor shall be responsible for managing dust as specified in Section 015719.

1.04 CONTRACTOR STORAGE, PARKING AND DELIVERIES

A. Contractors 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. Contractors 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. Contractors 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 Contractors 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 7:00 am - 5:00 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 Contractors shall schedule working days and hours as specified. The Contractors 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.

C. It is the Contractor's responsibility to determine the dollar amount to be included in the bid to pay for the services of one (1) inspector to be present during the entire time work is being performed during low flow periods or beyond a normal 8-hour day. If the Owner elects to have more than one representative present, then the cost of the additional inspector will not be paid for by the Contractor. The maximum hourly billing rate applies for all instances where excess engineering is performed beyond a normal 8-hour work day, not just work to be performed during low flow periods.

1.07 SUGGESTED CONSTRUCTION SEQUENCE

A. The following is one suggested general, not all-inclusive, sequence of construction that may be used to complete all the work under the Contract within the time specified.

B. Work restrictions may be noted throughout the suggested sequence provided below. The Contractor shall comply with all noted work restrictions that appear.

C. The following suggested sequence is provided for information only:
   1. Submit shop drawings, construction schedule, schedule of values, etc.
   2. Establish storage areas as required.
   3. Perform site clearing and removals, excavate unsuitable material, and perform soil compaction and testing.
   4. Construct building foundation.
   5. Disconnection of utilities
   6. Install yard piping and fittings.
   7. Construct building walls and roofing system.
   8. Install mechanical piping, mechanical and electrical equipment, and chemical systems.
   9. Paint and pressure test piping.
   10. Disinfect and test samples.
   11. Final grade and clean up.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 011400

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Site Utilization Plan requirements

1.02 SITE UTILIZATION PLAN REQUIREMENTS

A. The Contractors shall prepare a Site Utilization Plan (SUP) showing staging areas, parking areas, stockpile areas, debris container areas, unloading areas, and trailer areas for review by the Engineer, Owner's Construction Representative, and other Prime Contractors. The length and number of meetings necessary to develop and adopt a SUP shall be as required.

B. Meetings will be held at the site with all concerned parties to assist the Contractors in developing the criteria for the plan. During these meetings, all parties will present their needs and requirements for site utilization. Representatives from the local municipality or utility companies may be attending. The requirements of the local municipality and utility companies shall be incorporated into the SUP.

C. The Contractors shall then prepare a draft site plan that attempts to incorporate the needs of all concerned parties. Another meeting will then be held at the site to review and present the plan. The plan shall then be revised at that meeting and adopted for use if it is acceptable to all relevant parties. If all parties cannot agree on an acceptable plan, then the Owner's Construction Representative will establish the Site Utilization Plan without any claims from any contractor.

D. Each Contractor, by submitting a bid, understands the importance of a workable Site Utilization Plan and also understands that the Owner's Construction Representative may be required to select a plan for each contractor to adopt that is not ideal to the planned construction activities anticipated before the bid was submitted. There shall be no claims for damages associated with site utilization.

E. If the Contractors fails to prepare the Site Utilization Plan as stipulated above, then the Owner reserves the right to back charge the Contractors for the costs associated with having a Site Utilization Plan developed.

F. If a Prime Contractor fails to participate or attend the meetings scheduled to develop the Site Utilization Plan then the Prime Contractor will forfeit any right to comment on the plan that is developed.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 011419

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Allowance pricing for the following items:
   1. Additional Work / Unforeseen Conditions

B. This Section covers the requirements for use of the cash allowances listed above contained in the proposal (Bid Forms, Price Schedule) and included in the Contract Price bid by the Contractor and defines and stipulates the charges that will be paid for out of the stipulated allowances.

C. The Contractors shall include the cash allowances stipulated in this Section in the amount bid.

D. Eligible costs described in this Section, and Sections referenced herein, will be the only costs paid for out of the stipulated allowances.

E. All other costs associated with the project as specified and/or shown, including but not limited to the delivery, installation and all Contractor overhead and/or collateral expenses are to be distributed among the other portions of the work and shall be included in other bid items.

1.02 SUBMITTALS

A. Make all submissions under the provisions of Section 013300.

B. For each type of product/material specified to be furnished under allowance pricing provide documentation of the unit pricing on manufacturer's letterhead certifying pricing of the product/material.

C. Submit additional backup information to substantiate the invoiced amount(s) as the Engineer may require for review and approval, prior to order or payment of item.

D. Provide written breakdowns for extra work as the Owner may require.

1.03 CHANGES TO STIPULATED (CASH) ALLOWANCE

A. If the actual cost of services differs from the cash allowance, then the Contract Price will be adjusted accordingly.

1.04 PAYMENTS TO BE MADE OUT OF QUALITY CONTROL TESTING ALLOWANCE

A. Include the cash allowance of $5,000.00 (Five Thousand Dollars and Zero Cents) in the amount bid for independent testing laboratory services specified in Section 014500.

B. Include the cash allowance amount indicated in the proposal for independent testing laboratory services specified in Section 014500.

C. The actual invoiced charges of the testing laboratory, including toning companies where called for, incurred for field and laboratory tests, as specified only in Section 014500 - Quality Control, shall be paid for out of the cash allowance.
   1. Any other requirement specified herein throughout these specifications for providing the services of an independent testing laboratory, underground utility location company, or similar outside independent service are to be borne by the Contractor.
   2. All costs for quality control services are to be included as part of the Contract Price (as-bid).

D. One (1) week prior to each partial payment, submit a certified invoice from each company listing and detailing the total costs incurred since the last invoice.
   1. The invoice shall be on company letterhead signed by an authorized representative of the company and shall include man-hours, tests conducted, date of tests and associated costs and fees.
   2. Payment for costs will not be made unless the information is provided and certified. Payment for costs will not be made unless the typed test data reports have been received by the Engineer.
   3. In the case of pipe toning, flags must be set to delineate the route of underground pipes and utilities prior to submission of partial payment request.

E. If in the event test results (provided by the independent testing laboratory) show non-compliance with these specifications, then at the option of the Contractor and only with the approval of the Owner, he may re-test samples to verify the original test results at his/her own expense.

F. Costs for re-testing failed components of the work, when ordered by the Engineer, will not be paid for out of the cash allowance and will be directly borne by the Contractor.

G. Show as separate line in the Schedule of Values.

1.05 PAYMENTS TO BE MADE OUT OF ADDITIONAL WORK ALLOWANCE

A. Eligible costs described in this Section will be the only costs paid for out of the stipulated allowance.

B. Include the cash allowance of $25,000 (Twenty Five Thousand Dollars and Zero Cents) in the amount bid for additional improvements beyond those identified in the plans and specifications. Include allowance in lump sum amount in proposal statement. Show as separate line item in Schedule of Values.

C. Should any additional work be required due to unforeseen conditions or owner requests, the cost shall be negotiated by the engineer and paid for out of the allowance.

D. One (1) week prior to each partial payment, submit a certified invoice listing and detailing the total costs incurred since the last invoice. The invoice shall be on company letterhead signed by an authorized representative of the company and shall include man-hours, work conducted, date of work and associated costs and fees.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 012100

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* ***thirty (30)*** *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 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.

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: Booster Pumping Station at Plant No. 15 Substitution Request Number:_____

Contractor:_____

Address:_____

To:_____ Date:_____

H2M Project Number: RDWD 17-02 Owner: Town of Riverhead

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

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. In as much 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. Not withstanding 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. Provide Riverhead Town Voucher for each request submitted.

E. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

F. The payment application shall include a Contractor Invoice and an Owner Claim Voucher.

G. 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).

H. 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.

I. 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.

J. Contractor shall pay all workers and have all subcontractors pay all workers the prevailing New York State Wage Rates.

K. Owner may conduct on-site interviews with all workers to verify payments of prevailing wage rates are enforced.

L. The Engineer shall submit the documentation along with an Engineer’s Payment Report to the Owner for payment.

M. 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

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Schedule of Values

1.02 SCHEDULE OF VALUES

A. Submit for approval prior to the start of the work a Schedule of Values that indicates a breakdown of the labor, materials and equipment and other costs used in the preparation of the bid. This schedule shall be in sufficient detail to indicate separate figures for such items as excavation, concrete, equipment and all other items making up the lump sum price. The cost breakdown shall be separately itemized for each lump sum bid item in the project.

B. Where the cost breakdown includes items for bond payment, insurance payment, job set-up, or job mobilization, these items will be paid based on paid invoices and copies of cancelled checks.

C. Submit a Schedule of Values to the Engineer for review and approval within fifteen (15) calendar days from the date shown on the Notice to Proceed.

1.03 FORM OF SUBMITTAL

A. Submit typewritten Contract Cost Breakdown on AIA Form G703 - Application and Certificate for Payment Continuation Sheet or EJCDC 1910-8-E. The Engineer reserves the right to revise the form or provide a form prepared by the Engineer.

B. Use the Table of Contents of the Contract Specifications as a basis for format for listing costs of work for Sections under Divisions 1-48 as sections apply to work. Not all Sections need be assigned a breakout price as determined by the Engineer.

C. Identify each line item with number and title as listed in Table of Contents.

D. Provide dollar values for each line item for labor, overhead, profit, material, and equipment components for each category of work if requested by the Engineer.

E. List quantities of materials specified under unit price allowances.

F. The Schedule of Values, after approval by the Engineer, shall be the basis for the Contractor's Application for Payment.

G. The first Application for Payment will not be reviewed prior to an approved breakdown.

1.04 PREPARATION OF SCHEDULE OF VALUES

A. Breakdown schedule of values based on bid items in proposals with further breakdown below each item. In addition to the above, provide a separate line item cost below each bid item, as applicable, for each of the following items which shall be supported by proof where requested by Engineer:
   1. Performance and payment bonds.
   2. Insurance (submit proof of this amount)
   3. Mobilization and Demobilization (Amounts shall be equal in value).
   4. Temporary facilities and measures as specified in Section 015000.
   5. Preparation of the Project Construction Schedule, and updates, as specified in Section 013216.

6. Rubbish removal and daily cleaning up. (Provide a total dollar amount and a daily rate for each calendar day during the contract period.)
7. Surveyor used for layout (submit proof of this amount)
8. A total dollar amount for furnishing all the Operations and Maintenance Manuals specified throughout the specifications.
9. Record Drawing retainage amount specified in Section 017839.
10. Final cleaning.

B. Show total costs including overhead and profit.

C. Provide additional details and data to substantiate the cost breakdown as requested by the Engineer.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 012973

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Work of this Section includes:
   1. Requests for Interpretation or for information
   2. Coordination between contractors, if applicable
   3. Administration of subcontracts
   4. Coordination of work with other Contractors, utility companies, and the Owner/Engineer
   5. Communication and coordination requirements
   6. Qualifications of Contractor's job site superintendent

B. Site staffing requirements for Each Contractor's superintendent are also specified herein, the costs for which shall be included in the Contract price.

1.02 REQUEST FOR INTERPRETATION OR INFORMATION

A. Each Contractor shall use the Request for Interpretation/Information Form included within this Section when Each 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 each Contractor's formal requests, if provided, shall not constitute an official response and if acted upon by Each Contractor are done so at Each 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 COORDINATION BETWEEN CONTRACTORS

A. During the progress of the Work, other Contractors may be engaged in performing other work or may be awarded other contracts for other work on this Project. Each Contractor shall coordinate all the work to be done with the work of each Contractor(s) through the Owner.

B. Each Contractor shall fully cooperate with each other Contractor(s) and carefully fit its own work to that provided under other contracts as shown or specified in the Contract Documents and as may be coordinated by the Owner/Engineer.

C. Each Contractor shall not commit or permit any act that will interfere with the timely performance of work by any other Contractor.

D. Each Contractor shall conduct his/her own operations, and to cooperate with such other parties, so as to cause as little interference as possible with the work by others.

E. Each Contractor agrees to make no claim against the Owner/Engineer for additional payment due to delays or other conditions created by the operation of others.

F. If there is a difference of opinion as to the respective project rights of each Contractor doing the work, within the limits of or adjacent to the Project, the Owner/Engineer shall decide as to the respective rights of the various parties involved in order to secure completion of the work in a satisfactory manner. The Owner/Engineer's decision shall be final and binding on each Contractor.

G. If any portion of the work of each Contractor, or any of his/her subcontractors, depends upon the proper execution of the work by others, each Contractor shall promptly give written notice to the Engineer of all purported defects in the installed work as renders it unsuitable for proper execution and completion of his own work. each Contractor shall further notify the Engineer of all supposed delays, in the performance of his/her work, as will affect the timely performance of his own work or the project.

H. Each Contractor's lack of notice shall constitute an acceptance by him/her that the work of others is fit and proper for the reception of each Contractor's own work, except as to defects developing in the work that could not have been reasonably foreseen.

I. Each Contractor's lack of notice shall also constitute an acceptance by him/her and an acknowledgement of the timely performance of work by other Contractors or the Owner and that no claims for additional compensation may result.

J. If the Owner/Engineer determines that each Contractor is failing to coordinate his own work with the work of others, then the Owner shall have the right to enforce the provisions of the Contract as related to non-performance.

K. The Owner/Engineer shall not be liable for any damages suffered by this Contractor by reason of any other Contractor's failure to comply with the directions so issued by the Owner/Engineer, or by reason of another Contractor's default in performance; it being understood that the Owner does not guarantee the continued efficiency or work production of any Contractor and by execution of the Contract, Each Contractor fully understood the potential coordination problems associated with projects involving multiple prime construction contracts.

L. Each Contractor's attention is specifically directed to the fact that he may not have exclusive occupancy of the work area within the limits of the Contract. Each Contractor shall afford the Owner, other Contractors, and utilities reasonable opportunity for the storage of their materials and equipment, and the execution of their work, and shall connect and coordinate his work with theirs as required by the Contract Documents.

1.04 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. Each 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 each Contractor.

E. Each Contractor's on-site project superintendent shall inspect all the work of all of his/her subcontractors, as it is being constructed. Each Contractor's subcontractor shall not be permitted to do any work on the site without each Contractor's job site superintendent also being there to inspect the work as it is being performed.

1.05 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.

1.06 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.

1.07 SPECIFIC COORDINATION REQUIREMENTS

A. Each Contractor shall sequence and schedule work so as not to interfere with the work by others and to afford each Contractor the time to complete their contractual obligations with the Owner. Coordinate the work of this Contract with the work by others. Coordination includes, but is not limited to, the following:
   1. Schedule work with all trades throughout the project to prevent interference.
   2. Accomplish work in coordination with the other Contractors in a manner that will allow each Contractor adequate time (at the proper stage of construction as determined by the Owner/Engineer) to perform and complete the work of their contract.
   3. Each Contractor shall annotate on each of his own shop drawings and submittals, information that is relevant to the work of others or where potential conflicts in the installed work may occur. Each Contractor shall “bubble” in green ink the area of potential conflict so as to alert the reviewer.
   4. Each prime Contractor shall provide the Engineer with a list of shop drawings that they may require to properly coordinate the work. If a list is not provided to the Engineer within fifteen (15) calendar days from the date of the Notice to Proceed, then it shall be taken that shop drawings of other prime Contractors are not required. Each prime Contractor shall be responsible for providing the list within the time specified.
   5. In case of conflicts due to improper coordination by any Contractor, the Owner/Engineer’s resolution will be final. No compensation will be awarded for extra work required to resolve conflicts or to coordinate the work of all contracts.
   6. 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.
   7. 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.

B. Shop Drawings and Submittals Coordination Procedure:
   1. The Engineer will forward copies of relevant shop drawings to all prime Contractors, whose work may be subject to that of others, as solely determined by the Engineer.
   2. Each Contractor shall then, within five (5) calendar days of receipt, review said shop drawings provided by the Engineer for the purposes of resolving field and fabrication problems and as a way to coordinate the work.

3. Immediately notify the Engineer should a purported conflict in the work be discovered so that the Engineer can investigate and take appropriate action.
4. If a shop drawing was so provided by the Engineer and a conflict in the work was not brought to the attention of the Engineer, then the conflict shall be immediately corrected by Each Contractor submitting the shop drawing.

C. Each Contractor shall also coordinate the work by complying with the following:
   1. Construction Schedule: Each Contractor shall provide a construction schedule as specified in Section 013216 - Construction Schedules.
   2. Weekly Schedule: By 3:00 PM of each Friday during the construction period, each Contractor shall email a typed memo addressed to the Engineer/Owner's resident field engineer/inspector and designated office project manager summarizing the work for the following week. The memo shall also be faxed or emailed to the Owner. The memo shall briefly itemize the planned activities for the coming week. The memo shall also include a summary of expected material/equipment deliveries, concrete pours, utility tie-ins, excavated material removals and other heavy construction traffic that may impact the work activities for the coming week.
   3. Email Account: Each Contractor shall maintain an email account that shall be used to improve communication. An email shall not constitute a formal advisement regarding the terms and conditions of the contract. Email shall only be considered an informal way of notifying relevant parties of project related activities.
   4. Email List: Each Contractor, within five (5) calendar days from the Notice To Proceed, shall provide a list of email addresses for each major equipment supplier and local representative, if such exists. A contact person shall be provided for each email address.

D. Project Coordination Meetings: All Contractors shall participate in and attend the Project Coordination Meetings as specified below:
   1. Up to three (3) project coordination meetings will be held at the Engineer's or Owner's office as specified herein and in Section 013216.
   2. The meetings will be held when so called for by the Engineer.
   3. Each meeting may last up to eight (8) hours with one hour for lunch.
   4. The Engineer will prepare the final agreed version of the schedule and distribute it to all Contractors.
   5. The Engineer reserves the right not to hold these meetings if in his/her opinion they are not needed.
   6. All Prime Contractors shall be required to attend the meetings.

1.08 CONTRACTOR'S JOB SITE SUPERINTENDENT

A. Each Contractor shall employ an on-site superintendent as specified herein below. He/She shall be a full-time employee of Each Contractor.

B. 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.

C. 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.

D. Each Superintendent shall have a minimum of five (5) years of experience as a job site superintendent for projects of equal size and complexity.

E. Contract T superintendent shall not be a foreman or crew supervisor and shall be qualified and experienced person who shall act to schedule and sequence the work on a daily basis.

F. Contract G superintendent may be a foreman or crew supervisor.

G. Contract E superintendent may be a foreman or crew supervisor.

H. Each superintendent shall be qualified to perform the duties so required to successfully complete the work in accordance with the Contract Documents.

I. The superintendent for Contract G and E shall be on the site for each work day, full time, starting within twenty one (21) calendar days from the date of the Notice To Proceed through the date of Final Completion, including all punch list items.

J. All other construction superintendents shall be on the project site while work under his/her contract is being performed, either by direct forces or by subcontractors as stipulated above for subcontractor coordination.

K. Each superintendent shall also visit the site daily when work is not being performed under their Contract for coordination purposes, through the Owner/Engineer. He/She shall remain on the site for a minimum of one (1) hour, if work is being performed by others. He shall telephone the Engineer/Architect's designated field representative to advise him/her that they are on the site to discuss matters related to coordination.

L. Each superintendent shall speak English. If required by the Engineer, provide a resume for the proposed superintendent that shall be typed and shall list the qualifications of the superintendent. Prior to Each Contractor assigning a superintendent to the project, he may wish to arrange an interview with the Engineer to determine the proposed superintendent's ability to properly coordinate the work through the Owner/Engineer. Each Contractor shall employ a superintendent acceptable to the Owner.

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REQUEST FOR INTERPRETATION/INFORMATION (RFI)

OWNER'S NAME: Town of Riverhead

PROJECT NAME & CONTRACT DESIGNATION: Booster Pumping Station at Plant No. 15

CONSTRUCTION CONTRACT NO.: RDWD 17-02

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	*Response Accepted By Contractor* *Contractor's Signature & Date*
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

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Work of this Section includes the requirements for progress meetings.

1.02 PRE-CONSTRUCTION CONFERENCE

A. Each Contractor is required to attend the pre-construction conference at a location, date, and time selected by the Owner.

B. The owner, a partner, or a corporate officer representing each Contractor shall attend the conference. The job site superintendent and office project manager for each Contractor shall also attend.

C. The Engineer will prepare an agenda for the conference.

1.03 PROGRESS MEETINGS

A. Progress meetings will be held approximately once every two (2) weeks during the project. The Owner may elect to hold meetings more or less frequently.

B. At least seven (7) calendar days advance notice will be given by the Engineer or the date for the upcoming meeting will be set during the progress meeting.

C. Attendance at progress meetings shall be mandatory. An amount of $1,000 shall be deducted from the Contract Amount for each announced meeting not attended by the Contractor.

D. The owner, a partner, or a corporate officer representing the Contractor shall attend each announced progress meeting. The job site superintendent and office project manager for each Contractor shall also attend.

E. Subcontractors shall attend when requested by the Owner or Engineer at no cost to the Owner.

F. Meetings will be conducted by Engineer at a location selected by the Owner, normally at or adjacent to the project site.

G. The minimum agenda will cover:
   1. Review minutes of previous meetings.
   2. Identify present problems and resolve them.
   3. Plan work progress during next work period.
   4. Review the status of off-site fabrication and delivery schedule.
   5. Review shop drawings and submittal schedules.
   6. Review change order status.
   7. Review status of construction progress schedule.
   8. Coordinate access requirements.
   9. Other business related to the work.

1.04 OTHER MEETINGS

A. Attend special meetings which may be required or called for by Federal, State or Local authorities, utility companies, Owner, Engineer or any other firm, person or organization related to the project.

1.05 CONDUCTING MEETINGS

A. General - This paragraph covers Owner and/or Engineer meetings with Contractor and/or his subcontractors. Neither Owner nor Engineer wishes to meet solely with a subcontractor and requests for such meetings will be discouraged. If a meeting is deemed necessary, every effort will be made to have Contractor attend. If, for some reason, circumstances do not allow such, the meeting may be held, minutes of the meeting will be sent to contractor and decisions on any major questions will be reserved until contractor has been consulted. Subcontractors may accompany contractor to meetings provided contractor notifies Engineer in advance.

B. Chairman - When Engineer/Owner attend meetings, Engineer, or his duly authorized representative, will act as chairman. Should Owner-Contractor meetings be necessary, Owner will chair such meetings.

C. Notices - Engineer or Owner will issue notices of meetings to all parties concerned and will note, thereof, who must attend and who may attend if they so desire. When a Contractor desires a formal meeting, make a request through Engineer. Except when Engineer determines that a prompt meeting is essential, all notices will be issued at least one week in advance of the meeting date.

D. Agenda - All parties shall inform Engineer of items desired to be discussed and Engineer will notify all parties of all items to be considered. This is to allow each party to fully prepare for the meeting. This shall not be construed to mean that other items cannot be brought up at the meetings.

E. Time Limits - It is the intent to hold productive and efficient meetings and to keep them as short as is reasonably possible. The Chairman will be the sole judge as to whether or not further discussion on any matter is warranted and all discussions shall cease when he so orders.

F. Minutes - Minutes of meetings will be kept, written and distributed by the Chairman or his duly authorized representative. Minutes of all meetings will be available upon request to the Chairman.

G. Conduct - It is the intent to conduct all meetings in an orderly manner, to reasonably discuss all items and to hear and observe the rights and opinions of all parties. The Chairman will allow each party to speak, however, he reserves the right to order any individual to leave the meeting at any time for any reason.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 013119

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This Section specifies the requirements for preparing construction schedules and for keeping them up to date.

B. Prepare a Gantt Chart type schedule and keep it up to date as specified hereinafter.

C. All schedules shall be submitted in accordance with the requirements contained herein in Section 013300.

D. Refer to Section 013100 regarding the requirements for attendance at Project Coordination Meetings and additional requirements concerning the submission of other project coordination and sequencing information.

1.02 PRIME CONTRACTORS SCHEDULE TYPES

A. Gantt Chart Type: The General Contractor shall prepare a Gantt Chart type schedule as specified hereinafter.
   1. Contractor E shall prepare a Gantt Chart type schedule as specified hereinafter.
   2. Contractor G shall prepare a Gantt Chart type schedule as specified hereinafter.

1.03 CONSTRUCTION SCHEDULE - GENERAL

A. Coordinate the work and maintain the construction schedule. In the event actual progress begins to lag the schedule, promptly employ additional means and methods of construction to make up the lost time.

B. Keep the construction schedule current and revise and resubmit as often as necessary to accurately reflect the conditions of the work, past progress and anticipated future progress.

C. The construction schedule shall be completed, submitted, and deemed received by the Engineer prior to the first payment application.

D. The schedule, when approved by the Engineer and the Owner, shall establish the dates for starting and completing work for the various portions of the Contract. It shall be the duty of the Contractor to conform to his/her own schedule and to perform the work within the time limits indicated. Failure to adhere to the approved schedule shall expose the Contractor to disputes, claims and additional costs incurred by others.

E. Coordinate letting of subcontracts, material purchases, shop drawing submissions, delivery of materials, and sequence of operations, to conform to the schedule.

F. Coordinate the construction schedule with the proposed schedules of the equipment suppliers and subcontractors.

G. The schedule shall show the critical sequence items where new units must come online before existing facilities go offline, if applicable to the project. The schedule shall also show, in detail, the proposed sequence of the work and the estimated date of starting and completing each stage of the work in order to complete the project within the contract time.

1.04 CONSTRUCTION SCHEDULE - GANTT CHART TYPE

A. The schedule shall show, in detail, the proposed sequence of the work and the estimated date of starting and completing each stage of the work in order to complete the project within the contract time.

B. Prepare the schedule in a manner so that the actual progress of the work can be recorded and compared with the expected progress.

C. Coordinate the construction schedule with the proposed schedules of the equipment suppliers and subcontractors.

D. The schedule shall be plotted out in color and shall be 11-inch by 17-inch. It shall contain as many sheets as are necessary to show all rolled down tasks. Partially printed schedules will not be accepted. Each Contractor shall arrange to have it plotted on a color plotter suitable for the intended application.

E. The schedule shall show the following:
   1. Task links/task dependency in blue ink.
   2. Work under the Contract in green ink.
   3. Work by others in blue ink.
   4. Milestone dates (zero duration) by a red diamond.
   5. The end date for each task and subtask at the end of a bar.
   6. The description of all major tasks within the bar. The bar shall be red.
   7. Critical path.

1.05 REVISION OF PROJECT PROGRESS SCHEDULE

A. Each Prime Contractor shall evaluate and provide updated construction schedules monthly in accordance with job requirements. Each update shall be submitted to the Engineer for information purposes and be provided by the last Friday of every month

B. Each Contractor shall modify his construction schedule to accommodate coordination of the construction contracts by the Owner/Engineer without claims for additional compensation or delay.

C. Provide editable schedule to Engineer for inclusion of other trades.

D. The Engineer will provide an electronic version of the Final Combined Construction Schedule for use in keeping the schedule up to date.

E. From time to time, and at stages deemed appropriate by the Engineer, the Engineer may request an updated schedule from the Contractor to reflect the project's status. The percent complete for each task may be shown, as determined by the Contractor and Engineer.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 013216

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Project record documents shall be prepared as specified herein.

B. Building foundation locations and elevations shall be stacked, verified, etc by the General Contractor's surveyor in accordance with the requirements of this specification section.

1.02 QUALITY ASSURANCE

A. The Contractor shall employ a land surveyor licensed in the State where the project is located. The surveyor shall be acceptable to the Engineer in terms of experience and qualifications.
   1. Submit evidence of the surveyor's errors and omissions (professional liability) insurance coverage in the form of an insurance certificate.
   2. The surveyor shall maintain a minimum coverage of $1,000,000 for professional liability.
   3. The Owner, Engineer, and Contractor shall be named as insurance certificate holders.
   4. A thirty-day cancellation notice shall be provided.
   5. Physical work shall not be performed until the certificate is provided and approved by the Owner.

B. All instruments used on the project shall be of professional quality and in first class condition.
   1. All instruments shall have been calibrated by a manufacturer's service station within the last twelve (12) months.
   2. Submit certificate of calibration or paid invoice showing that the unit has been calibrated, if so required by the Engineer.

1.03 SUBMITTALS FOR REVIEW

A. Submit name, address, and telephone number of Surveyor before starting survey work.

B. Surveyor's professional liability insurance certificate.

C. On request, submit documentation verifying accuracy of survey work.

D. Submit a copy of the site drawing signed by the land surveyor showing locations of other benchmarks set by the surveyor, baseline location and offset hubs. If requested, the Engineer will provide a reproducible drawing or a drawing in digital format for use by the surveyor.

1.04 EXAMINATION

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Engineer of any discrepancies discovered.

1.05 SURVEY REFERENCE POINTS

A. The Contractor's surveyor shall locate and protect survey control and reference points located throughout the project site.

B. Control datum for survey is that indicated on the Drawings or will be provided by the Engineer.

C. The Contractor shall protect survey control points prior to starting any site work. Preserve permanent reference points during construction.

D. Promptly report to the Engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
   1. The surveyor shall replace dislocated survey control points based on original survey control when directed by the Engineer.
   2. Make no changes without prior written notice to Engineer.

E. The surveyor shall set control lath for rough and final grading purposes. Lath shall be placed at sufficient intervals to control grade or as directed by the Engineer.

F. All new structures, pits, chambers, drainage pools, curbs, roads, swales, and other physical elements shall be located by survey control.

G. Underground pipelines need not be located using survey control but shall be located using standard survey equipment operated by persons experienced in their operation.

1.06 SURVEY REQUIREMENTS

A. The Engineer will provide one (1) benchmark.

B. The Contractor shall, with his own forces, obtain working or construction lines or grades as needed subject to the check of the surveyor. The surveyor shall set offsets.

C. Establish elevations, lines, offsets and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements, stakes for grading, curbs, fill and topsoil placement, utility locations, slopes and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations, and equipment foundations.

D. Provide tie distances on record drawings to all underground structures, valves, pipes, and utilities installed as work of this Contract.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 013223

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.

B. Refer to Section 013216 - Construction Schedule for the requirements concerning the submission of construction schedules and for making updates thereto.

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 competed 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".

C. Where a layout drawing, containing different elements of the project, is being submitted and there is a question as to what the log number might be, then the Contractor shall contact the Engineer so that an agreed upon log number can be assigned.

D. It is incumbent on the Contractor to initially assign the submission log number designation to each submission. Submissions not containing a log number, as specified above, will be returned to the Contractor un-reviewed by the Engineer.

E. Every submittal shall also be accompanied by a Transmittal Letter (or "Speed Form") addressed to the Engineer's Project Manager as hereinafter defined.

1.03 COORDINATION OF SUBMITTALS

A. Prior to submitting to the Engineer, fully coordinate all interrelated work. As a minimum, do the following:
   1. Determine and verify all field dimensions and conditions by field measuring existing conditions and the installed work of this Contract and work by others.
   2. Coordinate with all trades, subcontractors, vendors, system and equipment suppliers and manufacturers, public agencies, and utility companies and secure all necessary approvals, in writing.

B. Make submittals in groups containing all associated items that in some way depend upon each other.

1. This also applies to color charts, as one color may not be able to be selected without the selection of other colors so as to form a color-coordinated group.
2. The Engineer may elect not to review partial or incomplete submissions, whereupon he will notify the Contractor of the additional submissions that are required before a review can be made.

1.04 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 **FORTY FIVE (45)** 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.

1.05 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 (Named at Pre-Construction Conference or in the Notice to Proceed)

1.06 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.

1.07 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.

1.08 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.

1.09 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.

1.10 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.

1.11 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.

1.12 MISCELLANEOUS SUBMITTALS

A. Provide a Submittal Schedule within seven (7) calendar days from the date of the Notice to Proceed. The Submittal Schedule shall list all submittals for the project referenced by draft log number. Provide the estimated date that the submittal will be transmitted to the Engineer for review.

B. Within seven (7) calendar days from the date of the Pre-Construction Meeting, submit a Proposed Products List. This list shall be a complete listing of all products proposed for use, with name of manufacturer, service headquarters, trade name and model number of each product. Partial listings will not be accepted.

C. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.13 SUBCONTRACTOR LIST

A. The Contractor shall submit, on AIA Form G705, within THIRTY (30) 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.

1.14 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.

1.15 SHOP DRAWINGS

A. Submit shop drawings for all fabricated work, for all manufactured items and for items specifically required by the specifications.

B. 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.

C. 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.

D. 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.

E. The Contractor shall make all measurements, confirm existing conditions, and include them on the shop drawings before making a submission to the Engineer.

F. Submissions for a single item, or group of related items shall be complete.

G. When submitting manufacturers' catalogs, pamphlets or other data sheets, in lieu of prepared shop drawings, clearly mark the items being submitted for review.

H. If the shop drawings contain any departures from the contract requirements, specifically describe them in the letter of transmittal.
   1. Where such departures require revisions to layouts, structural, architectural, electrical, HVAC or any other changes to the work as shown, Contractor shall, at his own expense, prepare and submit revised drawings accordingly.
   2. Make drawings the same size as the Contract Drawings and to the same scale.

1.16 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.

1.17 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.

1.18 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.

1.19 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.

1.20 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.

1.21 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.

1.22 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.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

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CONTRACTOR'S COMPANY NAME
ADDRESS

SUBMISSION TRANSMITTAL FORM
CLIENT NAME: Town of Riverhead
PROJECT TITLE: Booster Pumping Station at Plant No. 15

H2M PROJECT NO.: RDWD 17-02

Product, Item, or System Submitted:			
Submission Date:		Submission Log No.:	
Specification Section:		Paragraph Reference:	
Contract Drawing Reference(s):			
Manufacturer's Name:			
Manufacturer's Mailing Address:			
Manufacturer's Contact Information:	*Name*	( ) *Tel. no.*	*Email*
Supplier's Name:			
Supplier's Mailing Address:			
Supplier's Contact Information:	*Name*	( ) *Tel. no.*	*Email*
This item is a substitution for the specified item:		____ No	____ Yes
Contractor's Approval Stamp with Signature & Date		Contractor's Brief Comments or Remarks (attach separate letter as needed): By making this submission, we represent that we have determined and verified all field measurements and dimensions, field construction criteria, site and building constraints in terms of limitations in moving the item into the enclosed space, materials, catalog and model numbers and similar data and that we have checked and coordinated this submission with other work at or adjacent to the installed location in accordance with the requirements contained in the Contract Documents.	

END OF SECTION 013300

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. State Plumbing Code
   8. New York State Energy Code
   9. County Department of Health
   10. Town Codes, Rules, Laws and Ordinances
   11. Sewer District Sewer Use Code
   12. Local Water District
   13. Electric Utility
   14. Gas Utility
   15. Town Codes

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.

C. The following permits and/or certifications will be obtained by the Owner from the appropriate permitting agencies:
   1. Suffolk County Department of Health Services 348 – Public Water Supply Improvement.

2. Suffolk County Department of Health Services 347 – Backflow Prevention Devices.
3. Suffolk County Department of Health Services Article XI – Chemical Storage (for tablet chlorinator).

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.

1.06 FIRE RESISTANT CONSTRUCTION MATERIALS AND ASSEMBLIES

A. Conform to the fire rating classifications based upon the test methods and acceptance criteria in the Standard, Fire Tests of Building Construction and Materials for which Underwriters' Laboratories, Inc. (UL) provides listings.

B. Materials and assemblies shall comply with the acceptance criteria, detailed description of the assembly, its performance in the fire test and other pertinent details such as specification of materials, Classification coverage, and alternate assembly details.

C. Alternatively, fire resistance rating classifications by other issuing organizations listed in the Fire and Building Codes are acceptable.

1.07 COORDINATION WITH ELECTRIC UTILITY COMPANY

A. Comply with the utility company requirements for the incoming electric service.
   1. Pay the utility company's charges in connection with the installation of the incoming service.

B. Comply with the utility company requirements for the incoming electric service. There are no utility company charges associated with the installation of the incoming service.

1.08 COORDINATION WITH WATER UTILITY

A. Comply with the water utility requirements for water and fire service connections. Obtain and pay for all necessary permits from the water utility. Obtain authority to connect to the existing water mains.
   1. Make necessary connections to existing public water mains under supervision of the water utility representative.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 014100

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements for monitoring the quality of the constructed project.

B. Work of this Section also includes services of an independent testing laboratory for quality assurance testing.

C. The services of the testing laboratory will be paid for out of the cash allowance included by the Contractor in the price as bid in accordance with the requirements contained herein and in Section 012100 - Allowances.

1.02 REFERENCES

A. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

B. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

C. ASTM D4561 - Practice for Quality Control Systems for an Inspection and Testing Agency for Bituminous Paving Materials.

D. ASTM E699 - Practice for Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

1.03 QUALITY ASSURANCE - CONTROL OF INSTALLATION

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

B. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or workmanship that is more precise.

C. Perform work by persons qualified to produce workmanship of specified quality.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

E. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

1.04 QUALITY ASSURANCE - TESTING LABORATORY

A. In order to establish compliance with the Contract Documents, materials shall be tested, examined and evaluated before they are incorporated into the work. During and after installations, additional tests, examinations, and evaluations shall be made to determine continued compliance throughout the course of the work.

B. Testing laboratory shall be a reputable, experienced firm that is capable of performing all of the required testing and authorized to operate in the state in which the project is located.

C. Perform all sampling and testing in accordance with specified procedures and use the materials, instruments, apparatus, and equipment required by the codes, regulations and standards. Where specific testing requirements or procedures are not described, perform the testing in accordance with all pertinent codes and regulations and with recognized standards for testing.

D. In the event that samples and test specimens are not properly taken, handled, stored or delivered or if other requirements of this Section are not complied with, Engineer reserves the right to delegate any or all of this work to others, or to take whatever action deemed necessary to ensure that sampling and testing are properly accomplished, for which all costs shall be borne by Contractor.

E. Engineer reserves the right to disapprove the use of a specific testing laboratory, even after prior approval, if the laboratory fails to meet or comply with the requirements of this Section. If this should occur, immediately discharge the testing laboratory and retain the services of a different laboratory acceptable to Engineer.

F. The testing laboratory shall meet the following criteria:
   1. Be capable of performing all of the required tests.
   2. Be regularly engaged in performing the types of services required.
   3. Have adequate facilities, materials, equipment, and personnel to perform the services.
   4. Have an adequately trained, experienced and qualified staff.
   5. Have at least one registered professional engineer licensed in the state in which the project is located who shall be capable of performing field tests, supervising laboratory testing and interpreting test results. The professional engineer shall be thoroughly knowledgeable in materials, soils, asphalt paving and concrete.
   6. Shall be able to be on the Project site within two hours after being notified.
   7. Comply with the requirements of ASTM C1077, ASTM D3740, ASTM D4561, ASTM E548 and ASTM E699.
   8. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.05 REFERENCE STANDARDS

A. Conform to reference standards by date that the project was last bid.

B. Obtain copies of standards when required by Contract Documents.

C. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 SUBMITTALS

A. Within fifteen (15) calendar days from the date of the Notice to Proceed, submit documentation from three (3) testing laboratories that clearly indicates experience, location, qualifications of staff, and descriptions of any limitations or restrictions of the firm.
   1. Include a price schedule for standard tests and a billing rate schedule for technician classifications.
   2. Based upon this information, the Engineer will select one firm to be the primary testing laboratory and one firm to act as a standby.

B. Certified copies of each test report shall be mailed directly to the Engineer. The Contractor shall arrange with the laboratory to secure copies.

C. Each report shall be in writing and shall include the testing method used, the test results, the specified results, the exact location of where the test specimens were taken, the date taken, Project identification, Contractor's name and other pertinent information required for a complete and meaningful test report.

D. Each report shall be signed and certified by a responsible officer of the testing laboratory.

E. E-mail reports directly to Engineer within 24 hours after the sample is taken, except in those instances when tests cannot be immediately performed because of required curing, incubation periods, or lengthy testing procedures.

F. The laboratory shall verbally communicate test results when requested by the Engineer. This does not eliminate nor replace the requirements for a written report.

1.07 TESTING REQUIREMENTS

A. Dry Paint Thickness Measurement: Perform dry paint thickness using calibrated SSPC Type 2 fixed probe gages.

B. Compaction Testing - Soil:
   1. Perform compaction testing in accordance with ASTM D2922, Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth) or ASTM D1556 Density and Unit Weight of Soil In Place by the Sand Cone Method.
   2. Perform tests and analysis of fill material in accordance with ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb. Rammer and 12-inch Drop.

C. Concrete Testing:
   1. Collect samples in accordance with ASTM C172, Practice for Sampling Freshly Mixed Concrete.
   2. Make test cylinders in accordance with ASTM C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   3. Test concrete cylinders in accordance with ASTM C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   4. Test slump and air entrainment.

D. Asphalt Testing:
   1. Collect samples at point of delivery in accordance with ASTM D979, Standard Practice for Sampling Bituminous Paving Mixtures.
   2. Perform extraction test in accordance with ASTM D2172, Standard Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures.
   3. Perform gradation test in accordance with ASTM C136, Method for Sieve Analysis of Fine and Coarse Aggregates.

E. Water Quality Testing:
   1. In accordance with Section 331140 - Disinfection of Water Facilities.

1.08 TESTING SCHEDULE

A. Dry Paint Thickness Measurement:
   1. Make five (5) separate spot measurements spaced evenly over 100 square feet of area.

2. For structures exceeding 1000 square feet of finished surface, three 100 square feet areas shall be randomly selected by the Engineer plus one 100 square foot area for each additional 1000 square feet of finished surface. This requirement shall be subject to change as required by the Engineer.

B. Compaction Testing of Soil:
   1. Pipe Installation: As directed by the Engineer.
   2. Concrete flatwork: As directed by the Engineer.
   3. Pavement subgrade: As directed by the Engineer.

C. Concrete Testing: Make six (6) concrete test cylinders for each 50 c.y. or fraction thereof.
   1. Test two (2) cylinders at 7 days.
   2. Test two (2) cylinders at 28 days.
   3. The remaining cylinders shall be tested at a time to be determined by the Engineer. This requirement shall be subject to change as required by the Engineer.

D. Asphalt Testing: As directed by the Engineer.

E. Compaction Testing of Pavement: As directed by the Engineer.

F. Water Quality Testing: As directed by the Engineer.

1.09 FIELD OBSERVATION OF CONTRACTOR'S WORK

A. The Engineer will provide periodic observation of the Contractor's work.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions. Verify that the existing substrate is capable of structural support or attachment of new Work being applied or attached. Examine and verify specific conditions described in individual specification sections. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance. Seal cracks or openings of substrate prior to applying next material or substance.

B. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 FIELD QUALITY CONTROL

A. Allow representatives of the testing laboratory access to the work at all time. Provide all equipment, labor, materials, and facilities required by the laboratory to properly perform its functions. Cooperate with and assist laboratory personnel during the performance of their work.

B. Test specimens and samples shall be taken by the person(s) designated in other Sections, or as directed by Engineer. Conduct field sampling and testing in the presence of Engineer. Provide all materials, equipment, facilities and labor for securing samples and test specimens and for performing all field-testing.

END OF SECTION 014500

TOWN OF RIVERHEAD **BUILDING DEPARTMENT** **1295 Pulaski Street** **Riverhead,NY 11901**	**STATEMENT OF SPECIAL INSPECTIONS AND TESTS** As required by the International Building Code(IBC)

IBC § 1704.3 requires the project Design Professional to complete the Statement of Special Inspections and Tests. Completion of the Statement of Special Inspections & Tests and submission to the Building Department with the Construction Permit Application is a condition for issuance of the Building Permit.

Owner Riverhead Water District		Building Plant No. 5	
Project Title GST at Plant No. 5			
Project # RDWD1702	Project Address Tuthills Lane		
Architect/Engineer H2M architects + engineers			
Name of Person Completing this Statement Michael W. McKeown, PE		Phone (631) 756-8000	Date February 2018
Comments			

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	**CONTINUOUS**	**PERIODIC**	**REFERENCE STANDARD**	**BCNYS REFERENCE**	**CHECK IF REQUIRED**	**IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY**
A. Steel Construction						
1. Material verification of high-strength bolts, nuts and washers.		X	Applicable ASTM material specifications. AISC ASD, Section A3.4; AISC LRFD, Section A3.3	1704.3	☐	
2. Inspection of high-strength bolting.	X	X	AISC LRFD, Section M2.5	1704.3, 1704.3.3	☐	
3. Material verification of structural steel.			ASTM A 6 or A 568	1704.3, 1708.4	☐	051200
4. Material verification of weld filler materials.			AISC, ASD, Section A3.6; AISC LRFD, Section A3.5	1704.3	☐	051200
5. Inspection of welding:			AWS D1.1, D1.3, D1.4; ACI 318: 3.5.2	1704.3, 1704.3.1, 1903.5.2	☐	051200
a. Structural steel	X	X			☐	051200
b. Reinforcing steel	X	X			☐	
6. Inspection of steel frame joint details.		X		1704.3, 1704.3.2	☐	
B. Concrete Construction						
1. Inspection of reinforcing steel, including prestressing tendons, and placement.		X	ACI 318: 3.5, 7.1-7.7	1704.4, 1903.5, 1907.1, 1907.7, 1914.4	X	033000

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
2. Inspection of reinforcing steel welding.			AWS D1.4; ACI 318: 3.5.2		1704.4, 1903.5.2	☐	
3. Inspection of bolts to be installed in concrete prior to and during placement.	X				1704.4, 1912.5	☐	033000
4. Verify use of required design mix.		X	ACI 318: Ch. 4, 5.2-5.4		1704.4, 1904, 1905.2-1905.4, 1914.2, 1914.3	X	033000
5. Sampling fresh concrete: slump, air content, temperature, strength test specimens.	X		ASTM C 172, C 31; ACI 318: 5.6, 5.8		1704.4, 1905.6, 1914.10	X	033000
6. Inspection of placement for proper application techniques.	X		ACI, 318: 5.9, 5.10		1704.4, 1905.9, 1905.10, 1914.6, 1914.7, 1914.8	X	033000
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI, 318: 5.11, 5.13		1704.4, 1905.11, 1905.13, 1914.9	X	033000
8. Inspection of prestressed concrete.	X		ACI 318: 18.18, 18.164		1704.4	☐	
9. Erection of precast concrete members.		X	ACI 318: Ch. 16		1704.4	☐	
10. Verification of in-situ concrete strength prior to stressing of tendons and prior to removal of shores and forms from beams and slabs.		X	SVI 318: 6.2		1704.4, 1906.2	☐	033000
C. Masonry Construction L1 = Level 1 Inspection required for nonessential facilities. L2 = Level 2 Inspection required for essential facilities. In general, schools are not considered essential facilities unless they are a designated emergency shelter.			ACI 530/ ASCE 5/TMS 402, Ch. 35	ACI 530.1/ ASCE 6/TMS 602, Ch. 35			
1. Verify to ensure compliance:							
a. Proportions of site prepared mortar and grout.		X L1 L2		2.6A	1704.5	X	042200
b. Placement of masonry units and construction of mortar joints.		X L1 L2		3.3B	1704.5	X	042200
c. Location and placement of reinforcement, connectors, tendons, anchorages.		X L1 L2		3.4, 3.6A	1704.5	X	042200

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
d. Prestressing technique and installation.		X L1 L2		3.6A, 3.6B	1704.5	☐	
e. Grade and size of tendons and anchorages.		X L1 L2		2.4B, 2.4H	1704.5	☐	042200
f. Grout space prior to grouting.	X L2			3.2D	1704.5	X	
g. Placement of grout.	X L2			3.5	1704.5	X	
h. Grouting of tendons.	X L2			3.6C	1704.5	☐	
2. Inspection shall verify:					1704.5	☐	
a. Size and location of structural elements.		X L1 L2		3.3G	1704.5	☐	042200
b. Type, size, and location of anchors.	X L2	X L1	1.15.4, 2.1.1		1704.5	X	042200
c. Specified size, grade, and type of reinforcement.		X L1 L2	1012	2.4, 3.4	1704.5	X	042200
d. Welding of reinforcing bars.	X L1 L2		2.1.8.6, 2.1.8.6		1704.5, 2108.9.2.11	☐	
e. Cold/hot weather protection of masonry construction.		X L1 L2		108	1704.5, 2104.3, 2104.4	X	042200
f. Prestressing force measurement and application.	X L2	X L1		3.6B	1704.5	☐	
3. Inspection prior to grouting.		X L1 L2	1.12	3.2D, 3.4, 2.6B, 3.3B	1704.5	X	042200
4. Grout placement.	X L1 L2			3.5, 3.6C	1704.5	X	042200
5. Preparation of grout specimens, mortar specimens, and/or prisms.	X L1 L2			1.4	1704.5	X	042200
6. Compliance with documents and submittals.		X L1 L2		1.5	1704.5	X	042200
D. Wood Construction: Fabrication of wood structured elements and assemblies.					1704.6, 1704.2	X	061753
E. Soils							
1. Site preparation.					1704.7.1	X	312317
2. During fill placement.					1704.7.2	X	312317
3. Evaluation of in-place density.					1704.7.3	X	312317

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
F. Pile Foundations: Installation and load tests.				1704.8	☐	
G. Pier Foundations: Seismic Design Category C, D, E. F.				1704.9, 1616.3	☐	
H. Wall Panels and Veneers: Seismic Design Category E, F.				1704.10, 1616.3, 1704.5	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
I. Sprayed Fire-Resistant Materials						
1. Structural member surface conditions.				1704.11.1	☐	
2. Application.				1704.11.2	☐	
3. Thickness.			ASTM E 605	1704.11.3	☐	
4. Density.			ASTM E 605	1704.11.4	☐	
5. Bond strength.			ASTM E 736	1704.11.5	☐	
J. Exterior Insulation and Finish Systems (EIFS)				1704.12	☐	
K. Special Cases				1704.13	☐	
L. Smoke Control				1704.14	☐	
M. Special Inspections for Seismic Resistance: Applicable to specific structures, systems, and components.						
1. Structural steel.	X		AISC Seismic	1707.2	☐	
2. Structural wood.	X			1707.3	☐	
3. Cold-formed steel framing.		X		1707.4	☐	
4. Storage racks and access floors.		X		1707.5	☐	
5. Architectural components.		X		1707.6	☐	
6. Mechanical and electrical components.		X		1707.7	☐	
7. Seismic isolation system.		X		1707.8	☐	
N. Structural Testing for Seismic Resistance: Applicable to specific structures, systems, and components.						
1. Testing and verification of masonry materials and assemblies.				1708.1	☐	
2. Testing for seismic resistance.				1708.2	☐	
3. Reinforcing and prestressing steel.			ACI 318	1708.3, 1903.5.2	☐	
4. Structural steel.			AISC Seismic	1708.5	☐	
5. Mechanical and electrical equipment.				1708.5	☐	
6. Seismically isolated structures.				1708.6, 1623.8	☐	
O. Structural Observations				1709.1	☐	
Applicable to specific structures.						
P. Test Safe Load				1712.1	☐	
Q. In-Situ Load Tests				1713.1	☐	
R. Preconstruction Load Tests				1714.1	☐	
S. Other (list)						

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
1. Firestopping	X		ASTM E 1274		X	078400
2. Painting		X	ASTM D 7091		X	099100.02

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This Section supplements the General Conditions.

B. The Work of this Section includes temporary facilities, utilities, and controls to be furnished by the Contractors for this project as it is specified herein.

C. This Section is made a part of all Construction Contracts associated with the project. It contains specific references to the particular Contractor supplying said product or service. If no reference is provided then the requirement applies to all Prime Construction Contractors.

D. Temporary electric shall be provided by the Prime Electrical Contractor as specified in Section 015113 located in the Contract Documents for Contract E except as required herein.

1.02 CARE AND PLACEMENT

A. All temporary and permanent facilities and controls and all other elements on the project site shall meet all standards of the Occupational Safety and Health Act of 1970 and subsequent revisions. Each Contractor shall comply with all requirements of the Act.

B. Each Contractor shall take every precaution and shall provide such equipment and facilities as are necessary or required for the safety of its employees and persons at the site.

C. In the event of damage to existing and/or temporary facilities then immediately make all repairs and replacements to an equal condition prior to the event.

1.03 QUALITY PERFORMANCE

A. Comply with and perform all work in accordance with the requirements of local authorities and utility companies having jurisdiction, and all applicable codes, regulations and ordinances.

B. Secure approvals from the appropriate jurisdictions and utility companies on all repairs, relocations, connections, disconnections and the Work.

C. All barricades, warning signs, lights, temporary signals and other protective devices shall conform with "Manual on Uniform Traffic Control Devices for Streets and Highways", US Government Printing Office.

1.04 SUBMITTALS

A. Each Contractor shall provide a list of contact numbers as follows:
   1. Contractor's superintendent and office project manager (home, beeper, cellular, office, fax, trailer, and email address).
   2. All subcontractors.
   3. All utility companies.
   4. Emergency services such as fire department, police, and ambulance.
   5. Contractor shall also submit the following:
      a. Name and qualifications of person or persons who shall be available to render first aid.
      b. Names, addresses and telephone numbers of personnel who can be telephoned and act on behalf of Contractor in the event of emergencies or other problems requiring prompt attention during winter shutdown, holidays, nights and other periods when the Contractor's superintendent may be absent from the project site.

B. The Contractor shall provide a sketch showing routing of temporary water service for construction purposes and for exfiltration tank testing. Provide cuts and plumber's certification for backflow device(s).

1.05 CONTRACTOR'S RESPONSIBILITY

A. Each Contractor shall be responsible for the installation, performance, maintenance, and repair of all temporary facilities and controls specified herein this Section as originally provided.

B. The Owner reserves the right to immediately correct a Contractor caused action, if in the opinion of the Owner, the situation may result in the immediate loss of life, property, and degradation of the environment. The costs for actions taken by the Owner shall be deducted from money due or to become due each Contractor. Amounts in excess shall be paid by each Contractor.

C. If the Contractor caused situation is not deemed immediate, then the Contractor shall, within 24 hours of receipt of written and/or verbal notice, correct the defect or unsatisfactory condition.

D. The Owner may repair, correct, replace, or install temporary facilities to correct the situation if the Contractor fails to perform within the allowed time. The costs to make the corrections shall be deducted from money due or to become due the Contractor. Amounts in excess shall be paid by the Contractor.

PART 2 - PRODUCTS

2.01 GENERAL

A. The Owner may use temporary power lines, pipes, roadways or other facilities that each Contractor furnishes, installs, and maintains (then removes at the completion of the work), during the period of construction.

B. The location of all temporary power lines, roadways, and other necessary temporary facilities shall be subject to the approval of the Engineer, and these shall be located and operated so as not to interfere with the operation of the facilities.

2.02 WATER FOR CONSTRUCTION PURPOSES

A. Each Contractor shall obtain water from the nearest potable water source as designated by the Owner.

B. The Owner will pay for water usage for general construction activities such as dust control and for sanitary purposes, like hand washing.

C. Each Contractor shall install his or her own backflow prevention device at the supply point where it is connected to the Owner's system.
   1. The water surveyor shall approve the device.
   2. The device shall be tested and certified as functioning properly.
   3. Post the certification in a location acceptable to the water purveyor.

D. Each Contractor shall exercise measures to conserve water.

E. Provide insulation and heat tracing to prevent freezing of temporary piping. Drain hoses at the end of each use.

F. All Contractors, subcontractors, and personnel involved in the project shall be permitted to use water for construction purposes as provided under this paragraph.

2.03 SANITARY FACILITIES

A. Each Contractor shall provide and maintain his or her own temporary toilet facilities and enclosures.

B. These facilities shall be maintained in a strictly sanitary manner and be screened from the general public.

C. All facilities shall be in accordance with the Occupational Safety and Health Act (OSHA) standards and all other applicable local codes.

D. The locations of such facilities shall be determined by the Engineer or the Owner and be shown on the General Contractor's Site Utilization Plan.

E. All applicable codes and regulations regarding the maintenance and method of waste disposal for these facilities will be strictly enforced. These facilities shall be of the portable type.

F. The Owners sanitary facility will not be available for use by any contractor.

2.04 HEAT

A. Each Contractor shall provide and pay for heating devices and fuel as required to maintain adequate heat for specific construction operations; i.e. painting, application of coatings, etc. where so specified elsewhere in these specifications.

B. Maintain minimum ambient temperature of 40 degrees F in areas where construction is in progress, unless otherwise indicated in specifications or as required by proposed working conditions and manufacturer's installation/application instructions.

2.05 VENTILATION

A. Each Contractor shall ventilate enclosed areas to assist in the curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors or gases.

B. The General Contractor shall ventilate buildings to safely apply paint in accordance with Section 099100 requirements.

2.06 BARRIERS AND PROTECTION

A. Each Contractor shall provide railings, barricades, signs, fences and other protective devices to prevent unauthorized entry to construction areas, to allow for the Owner's safe use of the site and to protect existing facilities and adjacent structures from damage from the work.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing buildings.

C. Provide protection for plant life designated to remain.

D. Protect vehicular traffic, stored materials, public utilities, site and structures from damage.

E. Provide warning signs, detour signs and other traffic control devices to insure the safety of plant operators and to adequately direct traffic around the work. Illuminate barricades, obstructions, and warning signs from sunset to sunrise.

2.07 TEMPORARY FENCING

A. Each Contractor is responsible for performance compliance with OSHA standards.

B. Each Contractor shall provide temporary safety fence around all open excavations or other dangerous conditions on the construction site.
   1. All temporary safety fencing shall be designed and erected in compliance with OSHA standards, but in no case less stringent than these specifications for fencing.
   2. Fence is to be bright orange in color, a minimum of 4 feet high, and properly secured using 1" diameter steel pipe at 4'-0" on-center as support posts.
   3. Stake each support post to a depth of 18" and tamp securely into place.
   4. Each post shall be plumb.
   5. Secure fencing to posts using heavy-duty 12" long cable ties or tie wire.
   6. The fence and supports shall remain the property of the Contractor and be promptly removed at the appropriate time.

2.08 TEMPORARY HANDRAILS AND SCAFFOLDS

A. All temporary handrailing and scaffolds shall be designed and erected in compliance with OSHA standards. Each Contractor is responsible for performance compliance with OSHA standards.

B. Handrails shall be securely installed and maintained in accordance with OSHA regulations until the permanent railing or grating has been permanently installed and approved by the Engineer.

C. All scaffolding and platforms shall be erected in a safe and substantial manner complying with OSHA requirements.

D. All temporary handrails and scaffolds shall be designed by a professional engineer licensed in the state where the project is being constructed.
   1. The design drawings and details shall be stamped by the licensed engineer and submitted for record purposes.
   2. Each Contractor's design engineer shall visit the site to certify that the handrailing and/or scaffolds have been erected pursuant to the stamped design.

2.09 EROSION CONTROL

A. Each Contractor shall provide measures to keep the ground surface well drained, but avoid erosion of embankments, excavations, the project site, and adjacent areas.

B. Each Contractor shall comply with all local codes, rules, and regulations concerning soil erosion.
   1. Use hay bales or silt fences to control erosion to the satisfaction of the Engineer and regulatory agencies. Use hay bales or silt fences to stop silt and sediment from reaching surface waters, parking lots and roads.
   2. Leave erosion control methods in place until ground cover is established or until date of substantial completion.

C. The Contractor shall install erosion control measures as shown on the Drawings.

2.10 DUST CONTROL

A. Each Contractor shall provide measures to control dust resulting from the work.

B. Control dust at locations and in such quantities and frequencies as required to prevent dust from becoming a nuisance to the surrounding area.

C. In the event the Contractor does not adequately provide for dust control, or should insufficient quantities of dust control agents be placed and Contractor fails to place additional quantities within 4 hours after Engineer's direction, Owner will perform the required work by whatever means deemed expedient and all expenses incurred by Owner will be charged to and paid by Contractor.

D. Take care in selecting and applying dust control agents so as not to make roadways or walkways slippery, muddy or hazardous. Dust control agents shall be acceptable to the Engineer.

E. The Contractor shall provide all roadways with dust control.

2.11 RUBBISH REMOVAL

A. The Contractor shall be responsible for overall rubbish removal.

B. Burning of rubbish and trash will not be permitted.

C. The Contractor shall clean up trash as specified in Section 011400 - Work Restrictions or more often if the trash interferes with the work of others, presents a hazard or if directed by the Engineer.

D. Dispose of rubbish and waste materials in accordance with state regulations and local ordinances.

E. The Contractor shall also place rubbish containers at locations selected by the Engineer.
   1. Furnish adequately sized rubbish containers from the date of initial mobilization to the date of final payment.
   2. As a minimum, each Contractor shall furnish two (2) 55-gallon general trash containers. Secure the top of each container to the container.
   3. Secure the container itself so that it does not get blown about the site.

F. The Contractor shall be responsible for maintaining the site free of trash.

G. Each Contractor shall assist the General Contractor in maintaining the site free of trash and debris.
   1. It shall be the sole responsibility of the General Contractor to prevent trash from being blown about the site.
   2. Provide a worker to police the site at least for 1 hour at the end of each day that work is being undertaken by the General Contractor.

2.12 SNOW REMOVAL

A. The Contractor shall be responsible for maintaining roads, walkways, sidewalks, and parking areas/lots free of snow. Provide snow plowing during and after each snow fall equal to or greater than 1.0 inch as reported by the local weather service.

B. Any damage resulting from the Contractor's snow clearing operations shall be immediately repaired at no additional cost to the Owner.

2.13 ENCLOSURES

A. Each Contractor shall provide and maintain temporary enclosures, sheds, or fenced-in areas to accommodate protection for products, material and equipment.

B. Store equipment that cannot be exposed to outdoors in accordance with Section 016500 - Product Delivery, Storage and Handling.

2.14 SECURITY

A. Each Contractor shall provide security and facilities to protect work from unauthorized entry, vandalism and theft.

B. Coordinate with Owner's security program, if applicable.

C. Each Contractor has full responsibility for the working area until final acceptance and payment.

D. The Contractor shall maintain the perimeter fence that pre-existed prior to the start of construction. A temporary perimeter fence shall be required at all times during the construction and until the new perimeter fence is installed, or until the project is accepted by the Owner.

E. It shall be the Contractor's responsibility to lock all gates to the site, and on the access road, at the end of each work day.

F. All on-site employees shall bear, at all times, an identification badge, conspicuously worn, which shall include, at a minimum, a passport or similar size photograph, the name of the employee and the name of the company.

G. Any employee working on site without a photo identification badge will be instructed to leave the site.

H. All company vehicles shall be conspicuously identified, through sufficiently sized lettering on both the passenger and driver sides, with the company name, address and telephone number.
   1. All employee owned vehicles shall have an 8-1/2 inch by 11 inch sign with the company name, address and telephone number placed on the dashboard on the driver side.
   2. Vehicles may be subject to search by the Owner or owner's representatives.
   3. Any vehicle that does not have the company name, address and telephone number will not be permitted on the Owners' property.

I. Submit to the Owner a complete listing of all employees that will or might be performing work at the project site.
   1. Furthermore, provide sufficient information as may be required for the Owner to conduct background checks, in accordance with the Fair Credit Reporting Act.
   2. Background checks may be performed at the discretion of the Owner due to the sensitive nature of the work and the extensive, and sometimes unsupervised, access to Owner property and buildings.
   3. Each Contractor shall be required, on request from the Owner, at any time prior to or during the work, to provide releases from its employees and officers to the Owner, H2M, and a background search firm, hired by either the Owner or H2M, to conduct background checks in accordance with the Fair Credit Reporting Act and applicable state law.

2.15 PARKING

A. Do not allow heavy construction vehicle parking on existing pavement, if existing pavement is not scheduled for replacement or restoration.

B. Provide and maintain access to fire hydrants, building entrances, process tanks, doors and the work in general.

C. Each Contractor shall have his or her employees and subcontractors park in areas designated by the Owner/Engineer.

D. If designated on the Contract Drawings, then only use those areas for parking.

E. Where trades work from their trucks, then coordinate the parking of trucks with other prime contractors.

F. If a Site Utilization Plan has been specified, then parking shall be as sited in the plan.

2.16 DAMAGES

A. Each Contractor, with the prior approval of the Owner/Engineer, shall promptly repair any damage, directly or indirectly caused by the Contractor's operations.

B. All repairs shall be to the complete satisfaction of the Owner and equal in quality to that which pre-existed.

2.17 FIRST AID FACILITIES & EMERGENCY TELEPHONE NUMBERS

A. Each Contractor shall provide and maintain adequately equipped first aid facilities in a location or at locations that are readily accessible to workmen, Engineer and visitors to the site.

B. Provide at least one on-site employee who is properly trained in first aid and who shall be available to render first aid whenever construction is in progress.

C. Provide a list of emergency telephone numbers as specified above.

D. Post the list of emergency telephone numbers as directed by the Engineer.

2.18 POLLUTION CONTROL

A. Do not permit pollutants, such as chemicals, fuels, lubricants, calcium chloride, sewage, water containing sediments and other deleterious, poisonous, toxic or oxygen demanding substances to enter or leach into streams, lakes, wetlands, other surface waters, into groundwater, or into the air.

B. In waters used for public water supply or used for trout, salmon or other game or forage fish spawning or nursery, control measures must be adequate to assure that turbidity in the receiving water will be increased not more than 10 standard turbidity units (s.t.u.) in the absence of other more restrictive locally established limitations, unless otherwise permitted by the State.

C. In no case shall the classification for the surface water be violated, unless otherwise permitted by the State.

D. In water used for other purposes, the turbidity shall not exceed State limits.

2.19 REMOVALS

A. Remove all items provided under this Section except as otherwise specified.

PART 3 - EXECUTION

3.01 PROTECTION OF EXISTING UTILITIES AND PUBLIC WORKS

A. Maintain and protect existing utilities and public works including, but not limited to, conduits, sewers, water mains, electric and telephone conductors or conduits, and gas mains encountered during the construction.

B. In the event that it is not possible to cross over, under, around or otherwise avoid the existing utility, the owner of the utility shall be notified that the utility must be altered or moved.

C. In the event that damage shall result to any service pipe for water or gas, or any private or public sewer or conduit, the Contractor shall immediately, and at its own expense, repair same to the satisfaction of the Engineer.

D. Any contents from the pipes, sewers or conduits shall be immediately removed and disposed in accordance with applicable laws.

3.02 REMOVAL OF UTILITIES, FACILITIES AND CONTROLS

A. Remove temporary above grade or buried utilities, equipment, facilities and materials, immediately following substantial completion and prior to release of retainage.

B. Remove underground installations to a minimum depth of 2 feet.

C. Regrade site to restore to existing slope and elevation, and restore the surface.

D. Clean and repair damage caused by installation or use of temporary work.

E. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

F. Remove temporary parking and access roads.

G. Regrade area to existing slope and elevation and restore the surface to its existing condition.

H. Final payment will not be processed until all removals have been completed to the satisfaction of the Owner/Engineer.

3.03 PROTECTION OF EXISTING PROPERTY

A. Protect existing structures and finishes during performance of the work.

B. Protect existing trees and plants during performance of the work.

C. Do not deposit excavated materials or store materials around trees or plants or attach guy wires to trees.

END OF SECTION 015000

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. Pumps shall conform to the requirements of the Hydraulic Institute.
3. 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 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, disfiguration and damages shall be repaired and touched-up so as to provide a neat, clean finish, and be uniform in color.

3.05 UNCOVERING WORK

A. Unless otherwise specified or directed by Engineer, no work shall be covered until it has been observed, tested, photographed, measured, and authorized to be covered by Engineer.

B. Tie distances to above ground physical structures as reference points to all underground utilities, conduits, pits, manholes, valves, and pipelines shall be obtained by the Contractor prior to covering the work. Immediately comply with the Engineer's direction to uncover the work if tie distances were not obtained.

C. If any work has been covered with Engineer's consent and Engineer considers it necessary or advisable that covered work be observed or tested, the Contractor, at Engineer's request, shall uncover, expose or otherwise make available for observation, or testing as Engineer may require, that portion of the work in question, furnishing all necessary labor, material and equipment.
   1. If it is found that such work is defective, the Contractor shall bear all the expenses of such uncovering, exposure, observation, and testing of satisfactory reconstruction, including compensation for additional engineering services and an appropriate deductive change order shall be issued.
   2. If, however, such work is not found to be defective, the Contractor shall be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to such uncovering, exposure, observation, testing and reconstruction if he makes a claim therefore as provided in the General Conditions.

3.06 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

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

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Cleaning during the progress of the work

B. Cleaning prior to final payment

1.02 SCHEDULING

A. Sequence, schedule, and coordinate final cleaning work with the final cleaning work to be performed by other prime contractors.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cleaning materials shall be appropriate to the surface and materials being cleaned.

B. Provide pads to protect finished surfaces from cleaning materials.

PART 3 - EXECUTION

3.01 PREPARATION

A. Post signs to advise building occupants if wet and/or slippery floor conditions exist during cleaning operations.

3.02 PROGRESS CLEANING

A. Keep all buildings, enclosures, and confined areas where work is being performed under the Contract free from unattended combustible materials.

B. Remove rust spots as they develop.

3.03 FINAL CLEANING

A. Remove dust, dirt, grease, stains, paint drips and runs, plastic, labels, tape, glue, rope, and other foreign materials from visible interior and exterior surfaces.

B. Do not move dust from spot to spot. Remove directly from the surface on which it lies by the most effective mean such as appropriately treated dusting cloths or vacuum tools. When doing high cleaning, do not allow dust to fall from high areas onto furniture and equipment below.

C. Dismantle and remove all temporary structures, scaffolding, fencing, and equipment. Remove waste materials, rubbish, lumber, block, tools, machinery, and surplus materials.

D. Perform the following prior to final payment:
   1. Broom clean all exterior concrete surfaces and vacuum clean all interior concrete surfaces.
   2. Repair, patch, and touch-up marred surfaces to specified finish and to match adjacent surfaces.
   3. Replace all damaged insect screens.
   4. Polish bright metal by damp wiping and drying with a suitable cloth. If a polished appearance is not thereby produced, apply appropriate metal polish.

5. Clean and polish all stainless steel surfaces, including control panels supplied under this Contract.
6. Clean all paved roads, lots and drives which were paved as work under this Contract and all existing paved surfaces using a mechanical street cleaner.
7. Remove all rust spots and stains from new and pre-existing concrete, painted surfaces, and all other surfaces.
8. Wash all existing floors that were in any way impacted by the construction operations.
9. Inspect interior and exterior surfaces, and all work areas, to verify that the entire work is clean and ready for use by the Owner. The project will not be considered substantially complete until all final cleaning has been performed.
10. Polish all new handrail installed as work of this contract with a commercially available aluminum cleaner recommended by the railing manufacturer.
11. Fill in all holes in concrete that remain after temporary handrail is removed. Non-shrink grout shall be used.
12. Thoroughly clean all pits, galleries, manholes, pipes, channels, tanks, wells and all structures entered upon.

END OF SECTION 017423

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Work of this Section includes the following:
   1. Testing, adjusting, and balancing

1.02 STARTING SYSTEMS

A. The Contractor shall coordinate, schedule, and sequence the start-up of various equipment and systems.

B. Where the start-up of a system or piece of equipment is dependent upon the start-up of other system(s) or equipment, then the Contractor shall schedule and sequence the start-ups to coincide.

C. Notify the Engineer at least 14 calendar days prior to the start-up of each item or system so that he can schedule the startup with the Owner, utilities, and other Prime Contractors.

D. Where applicable, verify that each piece of equipment or system has been checked for proper:
   1. lubrication,
   2. drive rotation,
   3. belt tension,
   4. motor starter heater size,
   5. fuse size,
   6. water pressures,
   7. terminal connections,
   8. control sequence,
   9. for conditions which may cause damage or delay the start-up procedure.

E. Verify that the equipment has been installed in accordance with the manufacturer's requirements.

F. Complete all pre-startup checklists that may be required by the system vendor.
   1. In the event that start-up activities are delayed as a result of the Contractor's failure to properly check the completed installation and a manufacturer's representative is on the job site waiting for corrections to be made, then the Engineer may, at his/her sole discretion, postpone start-up until such time as the corrections have been made without any extra costs.
   2. The Owner may deduct from money due the Contractor the excess cost of engineering associated with having the Engineer present during the start-up.
   3. The deduction shall be equal to the Engineer's effective billing rate times the total number of hours delayed during the start-up activities.

G. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

H. Verify that wiring and support components for equipment are complete and tested.

I. Execute start-up under supervision of applicable Contractor's personnel in accordance with manufacturer's instructions.

J. The Contractor shall have the job site superintendent present during all start-up activities.

K. Provide manufacturer's authorized technician at the site when specified and in accordance with the requirements contained in Section 014500 - Quality Control.

L. Submit manufacturer's start-up reports (MSR's) in accordance with Section 013300.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 017500

PART 1 - GENERAL

1.01 SUMMARY

A. Testing of piping.

B. Pipe leakage testing shall comply with the conditions noted in the Schedule.

1.02 DEFINITIONS

A. Leakage (or exfiltration) - The quantity of water to be supplied into the newly laid pipe, any valved section thereof, manhole, or other appurtenance, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.

B. Infiltration - The quantity of water that enters into any pipe, manhole, or other appurtenance when the static groundwater elevation is at the maximum elevation above the pipe or appurtenance as specified hereinafter.

1.03 QUALITY ASSURANCE

A. Prior to Substantial Completion, pressure pipes and non-pressure pipes shall meet specific leakage requirements. These leakage requirements shall be satisfied by the basic materials alone. Where joint fillers and the like have been specified, primarily to protect jointing materials, and secondarily to provide a factor of safety, they shall not be applied until after leakage tests have been completed and have been accepted by Engineer.

B. Engineer will witness tests. Tests not witnessed will be considered as not having been performed.

C. Do not close or cover up work until it has been observed for proper and satisfactory construction and installation in compliance with the Contract Documents. Should incomplete or unacceptable work be covered, the Contractor shall, at his/her own expense, uncover all work so that it may be properly observed. After such observations, repair and replace the work that was found defective, unsatisfactory, and not in accordance with the Contract Documents. After such repair and replacement, bring all work to completeness and status as it was before it was closed and covered, all at the Contractor's own expense. Submit for review and approval proposed corrective action to correct failed systems.

D. Successful completion of required tests shall be in no way interpreted as relieving the Contractor of responsibility for defects that become apparent subsequent to the time of testing. It shall be the sole right of the Engineer to determine whether defects exist. Retest all portions of the work deemed necessary by the Engineer prior to Substantial Completion.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Provide details and specifications on testing apparatus.

C. Provide certified test results on forms approved by the Engineer.

1.05 SEQUENCING AND SCHEDULING

A. Notify Engineer and governing agencies, if necessary, at least 48 hours in advance of a scheduled test so that the test may be witnessed.

B. Test underground pipe and ground storage tank after backfilling.

C. At Engineer's discretion, additional sections of pipelines may be required to be tested as soon as pipe is laid and prior to backfilling when working conditions or the standard of workmanship have been altered.

PART 2 - PRODUCTS

2.01 TESTING APPARATUS

A. Provide labor, plugs, measuring equipment, and other apparatus, complete, to perform testing.

B. Provide clean water, air, nitrogen, and other materials as required to accomplish testing.

C. Provide plugs and caps capable of withstanding test pressures.

D. Provide temporary flanges, plugs, bulkheads, thrust blocks, weighing, bracing and other items necessary to prevent joints from separating, and to prevent injuries or damage.

PART 3 - EXECUTION

3.01 PREPARATION

A. Plug open ends, adequately block bends, tees, ends, and other fittings, and do whatever is necessary to brace piping system so that it will safely withstand the pressures developed under the tests and so that no damage or injury shall occur to the pipeline, people or property.

B. Before tests are conducted, isolate, or remove any regulator, gauge, trap, or other apparatus or equipment that may be damaged by test pressures.

3.02 GENERAL

A. Trapped Air: Trapped air may cause a false indication of the rate of leakage. Points of concern include ends of lines, stubs, house connections and high points in pipelines. No credit will be made for this condition and no adjustment will be made to the allowable leakage. When trapped air is suspected of causing a test failure, do whatever is necessary to evacuate the air and repeat tests until the actual leakage is equal to or less than allowable rate of leakage.

B. Water Absorption: No credit will be given for absorption of water in pipe and manhole walls. If necessary, fill pipes and manholes with water well in advance of testing and allow them to soak in order to eliminate or minimize the effects of absorption.

3.03 TESTS FOR PRESSURE PIPES

A. Leakage testing shall include the main exiting pipe, service connections, and other appurtenances on the section of pipeline being tested.

B. Test pipes prior to applying insulation and before they are concealed or furred-in.

C. Provide all necessary gauges. Gauges shall be standard pressure type with a minimum 4-1/2 inch diameter dial and a pressure range not in excess of 150% of the maximum required test pressure. Gauges shall be liquid-filled.

D. Provide and maintain at the site a gauge stand with an approved laboratory calibrated test gauge. Periodically check test gauge used for testing against the test gauge, and whenever requested by Engineer.

E. Where it is necessary for testing, tap pipes and insert approved plugs after testing is completed.

F. Provide a hand or motor driven compressor to maintain the required test pressure constant throughout the duration of the test. If a water pump is used, pump water from a container with a known volume of water. If an air or inert gas pump is used, leakage shall be determined and calculated by the cycling of the pump.

G. Provide test gauges at each end of the line being tested.

H. Conduct leakage test in accordance with the requirements contained in the Schedule.

3.04 ALLOWABLE LEAKAGE

A. The maximum allowable leakage for the various piping systems is presented in the schedule.

B. It is the intent of this Contract to secure piping systems without leakage.
   1. Each section of pipe and within each structure shall not exceed the allowable leakage.
   2. It is also the intent to secure a piping system free from visible drips, streams and leaks. Therefore, even if a portion of the system meets the requirements for allowable leakage, visible leaks are not permitted and shall be repaired.

C. Leakage tests will be considered satisfactorily passed when the rate of leakage is equal to or less than the stipulated allowances, there is no evidence of visible leaks, and there is no evidence of other system defects.

3.05 RETESTING

A. Pipes and manholes not passing the tests shall have all defects corrected with methods approved by the Engineer to the inspection and satisfaction of Engineer, and shall be retested and re-corrected as often as is necessary until the test requirements have been met.

B. It is the intent of this Contract to obtain work meeting test requirements on their own and solely through the use of the normal integral sealing components.
   1. Joint leaks shall not be stopped using concrete, caulking, mortar, or other patching materials.
   2. Leaking pipe joints shall be re-jointed and leaking manhole joints shall have joints reset, or replaced if necessary.

C. Methods other than rejoining, resetting or replacing joint seals shall require the written approval of Engineer.

3.06 SCHEDULE

LEAKAGE TESTING REQUIREMENTS

SERVICE	FLUID	PRESSURE	DURATION (HRS.)	ALLOWABLE LEAKAGE (NOTE 1)		
				UNDERGROUND		EXPOSED
				INFIL.	EXFIL.	
NON-PRESSURE PIPING	WATER	4FT.	6	100	100	NONE
PRESSURE PIPING	WATER	(NOTE 2)	2	0	0	0

SCHEDULE NOTES:

1. Maximum allowable leakage in gallons/day/inch diameter/mile of pipe, or gallons/day/inch diameter/mile for manholes. Where a percentage is shown, the loss shall not exceed the percentage of the starting test pressure.
2. Maintain 150 psi or one and a half times operating pressure, whichever is greater, for 2 hours.

END OF SECTION 017550

PART 1 - GENERAL

1.01 SUBMITTALS

A. Submit the following documents to the Engineer before Substantial Completion:
   1. Project Record Documents as specified in Section 017839.
   2. Operations and Maintenance Manuals prepared in accordance with Section 017823 and be updated as a result of start-up activities.
   3. 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.
   4. 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.
   5. Spare parts checklist itemizing all spare parts furnished under the Contract summarized by Section.
   6. Electrical Underwriter's Certificate where the prime construction contract includes electrical construction or where this Contract is for a Prime Electrical Construction Contract.

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.
   3. Utility company signoffs and inspection approvals, if applicable.
   4. Federal, state, county, town and local signoffs and inspection approvals, where applicable.

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

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 paper 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 one (1) paper copies and two (2) electronic copies of the final updated Operations and Maintenance Manual. Refer to Section 017500 - Starting and Adjusting for requirements related to updating the manual(s).

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

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This Section includes:
   1. Maintenance of documents
   2. Recording of record information
   3. Submission of record documents

B. Work of this section also includes the furnishing of underground pipeline documentation.

1.02 PLANS AND SPECIFICATIONS FURNISHED TO THE CONTRACTOR

A. One (1) complete set of Contract Documents (plans, specifications and addenda) will be furnished to the Contractor in electronic portable document format (PDF).

1.03 MAINTENANCE OF DOCUMENTS

A. Each Contractor shall maintain at the site one (1) set of the following: drawings, specifications, addenda, change orders, approved shop drawings, test reports, operations and maintenance manuals, and shop drawing log.

B. Each Contractor shall make these documents available for use by the Owner, Engineer, regulatory agencies and other parties designated by the Owner.

C. Provide a drawing rack for storage of plans.

D. Maintain these documents in a clean, dry, legible condition throughout the entire contract period.

1.04 RECORDING OF RECORD INFORMATION

A. Affix a stamp to each Contract Drawing and Shop Drawing reading as follows: "RECORD DOCUMENT" - "NAME OF PROJECT" - "CONTRACTOR NAME" in 2-inch high printed letters. The stamp shall be specifically prepared for this project.

B. Keep the record documents current as the work progresses. Record information concurrent with construction progress.

C. Do not permanently conceal any work until required information has been recorded.

D. Legibly mark the Contract Plans to record actual construction, including, but not limited to the following:
   1. All as-built work.
   2. All approved field changes and conditions.
   3. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
   4. Location of underground conduits, boxes, devices. Wire sizes (AWG) and types installed. Number of active and spare wires in each conduit and conduit size (applicable where work involves electrical construction).
   5. Tied-down location of all underground process lines and buried valves.

E. Shop Drawings: Maintain as record documents. Legibly mark-up to show changes made due to field conditions encountered during construction.

1.05 PROJECT RECORD DOCUMENTS

A. Maintain a complete and accurate log of control and survey work as it progresses.

B. The Tank Contractor shall on completion of major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction, site work and underground facilities installed.

C. Each Contractor's surveyor site drawings shall also show the location of property line perimeter fence. The property line of the site shall be indicated on the plans.

D. If applicable, the primary electric service, gas service, and communication lines installed by the respective utility shall also be located on the record drawings prepared by each Contractor's surveyor.

1.06 SUBMITTAL OF RECORD DOCUMENTS

A. Each Contractor shall deliver to the Engineer one (1) full-size sets of drawings and one (1) PDF electronic copy detailing as-built chemical treatment installations, one (1) month prior to the date of startup of the plant site as outlined in the construction schedule. These shall be submitted to the Health Department by the Engineer for certification of installation and inspection. Drawings shall be submitted by each Contractor to the Engineer in accordance with the requirements of this Section.

B. At Substantial Completion, each Contractor shall deliver one (1) preliminary record set of as-built documents to the Engineer with all changes conspicuously ballooned or otherwise emphasized.

C. The work will not be considered substantially complete until such time as the preliminary record documents are delivered and acceptable to the Engineer. Mark this set "Preliminary Record Drawings".

D. Prior to Final Completion, each Contractor shall conform the preliminary record drawings to the comments made by the Engineer. The Contractor shall provide one (1) set of full-scale paper as-built drawings and one (1) electronic copy in portable document format (PDF).

E. As-built drawings shall be the same size as the Contract Drawings, with 1/2-inch margins space on three sides and a 2-inch margin on the left side for binding.

F. Each drawing shall bear in the title box the words "FINAL RECORD DRAWINGS" and the name of Each Contractor in heavy black lettering 1/2 inch high and be certified as complete and accurate.

G. As a convenience, Engineer will make available to each Contractor electronic media of the Contract Drawings for the sole purpose of each Contractor preparing as-built drawings.

H. Electronic media made available is without guarantee of compatibility with each Contractor's software or hardware.
   1. If each Contractor wishes to take advantage of this offer, each Contractor will be required to execute an indemnification and hold harmless agreement with the Engineer.
   2. Electronic media will be provided free of charge on disc in a zipped format.
   3. Electronic media shall be returned to the Engineer upon acceptance of the as-built drawings by the Owner.

1.07 RELATED DOCUMENTS

A. Provide certificate of release of liens if requested by the Engineer.

1.08 UNDERGROUND PIPELINE DOCUMENTATION

A. The installing Contractor shall document the location of all underground pipelines by taking digital photographs of the installed pipelines prior to backfilling. At least 3 digital photographs shall be taken of each pipe section before it has been backfilled.

B. Each Contractor shall provide each pipe installation crew with a digital camera capable of a 3 mega-pixel quality picture using Smart Media, Compact Flash Media, or Memory Stick cards as the media within the camera.

C. At the end of each day that pipe has been installed, the crew foreman shall hand deliver to the Engineer the removable media.
   1. The Engineer will then download the photographs and delete the photographs from the media.
   2. The media will be returned to the crew foreman within two working days from the date it was delivered.
   3. Each Contractor shall have at least three (3) 256 MB media cards available for this purpose to be used on a rotating basis.

D. Installed work will not be eligible for payment until documentation is provided.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 017839

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Footings.
   2. Foundation walls.
   3. Slabs-on-grade.
   4. Concrete toppings.
   5. Building frame members.
   6. Building walls.

1.03 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.04 ACTION SUBMITTALS

A. The contractor shall comply with the requirements of Division 01 Specification of the Project Manual, Section 013300.

B. Product Data: For each type of product indicated.

C. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mixing water to be withheld for later addition at Project site.
   2. Submit mix design mixtures for each type of concrete to be used on the Project at least 30 calendar days prior to the first scheduled concrete pour. The Contractor's testing laboratory shall develop concrete mix designs and test all materials and mixes for conformance with ACI 301 and these specifications. The costs associated with development of the design mix and testing of samples shall be included in the bid price.
   3. Submit the following:
      a. Name, address, and telephone number of Contractor's laboratory.
      b. Mix proportions.
      c. Source of cement, type, brand, and certified copies of mill reports, including physical and chemical analysis.
      d. Sources of fine aggregates and results of test made in accordance with ASTM C33 and ASTM C40.
      e. Source of coarse aggregates and results of tests made in accordance with ASTM C33.
      f. Catalog cuts of all admixtures.
      g. Furnish test results of slump, air entrainment and water-cement ratio for each mix design.
      h. For each mix proposed, make and cure four (4) standard 6 inch concrete test specimens to the laboratory in accordance with ASTM C192. Furnish compression

test results made in accordance with ASTM C39. Break two (2) cylinders at seven (7) days and two (2) at 28 days.

i. If the concrete is intended to be pumped, design mix accordingly and submit certification that it has been tested for pumping.

j. If adopted mix fails to produce concrete meeting the requirements for strength and placibility, the Architect may order additional cement or adjustments to mix proportions at no extra cost to the Owner.

D. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, spacing, locations, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement including steel bars and wire fabric.

E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer licensed in the state where the project is located; detailing fabrication, assembly, and support of formwork. Shop drawings shall bear the signature and seal of the same licensed Professional Engineer.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal
2. Shop drawings shall indicate formwork dimensioning, materials and arrangement of joints and ties.
3. Manufacturer's instructions: Indicate installation procedure and interface required with adjacent work

F. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect, if not shown on the drawings.

G. Samples: For waterstops and vapor retarder.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and testing agency.

B. Welding certificates.

C. Material Certificates: For each of the following, provided by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Curing compounds.
6. Bonding agents.
7. Adhesives and Vapor retarders.
8. Semi rigid joint filler.
9. Joint-filler strips.
10. Repair materials.

D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

E. Field quality-control reports.

F. Minutes of preinstallation conference.

G. Furnish transit-mix delivery slips to Owner's Representative.

1.06 QUALITY ASSURANCE

A. Comply with Referenced Standards specified in Division 01 Section "References" in addition to ACI 301.

B. Perform testing under the provisions of Division 01 Section "Quality Requirements" and the "FIELD QUALITY CONRTOL" Article of Part 3 listed in this specification.

C. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

D. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

E. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
   1. The contractor shall provide an adequately sized, insulated curing box to house concrete cylinders at the discretion of the Architect, for the 24-hour period between concrete pour and sample collection pick-up by the Testing Laboratory. As directed by the Architect, the contractor shall cure additional cylinders in the same fashion as the in-place concrete.
   2. Curing box shall be located away from the main construction area and shall be blocked up off the ground.
   3. A log sheet shall be provided in a waterproof sheet protector to log in the placement and removal of the concrete test samples by the testing laboratory.
   4. Minimum information to be logged for each pour date shall include: date of pour, date of pick-up, weather conditions at the time of pour, testing

F. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code - Reinforcing Steel."

G. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301, "Specifications for Structural Concrete", Sections 1 through 5.
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
   3. ACI 304 - "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".

H. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

I. Preinstallation Conference: Conduct conference at Project site.
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.

c. Ready-mix concrete manufacturer.
d. Concrete subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semi rigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

B. Store cement off the ground in a dry, weatherproof, adequately ventilated structure with provisions to prevent the absorption of water.

C. Transport dry concrete batches from the central plant to the site in approved truck mixers conforming to the requirements of the Truck Mixer Manufacturer's Agitating Standards. Each truck shall contain a plate stating the capacity, drum speeds and be provided with a revolution counter.

D. Packaged material shall be delivered and stored in the original packages until ready for use. Packages or materials showing evidence of water or other damage shall be rejected.

E. Protect all materials from freezing.

1.08 COORDINATION

A. Coordinate work under provisions of Division 01 Specification of this Project Manual.

B. The Contractor shall provide at least five (5) working days advance notice prior to formwork closure to the Architect.

C. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

D. Notify Architect a minimum of three (3) working days prior to commencement concrete pours.

1.09 REGULATORY REQUIREMENTS

A. Conform to ACI 304R and all applicable codes for placement of concrete and related work.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not place concrete when the ambient temperature is below 40 deg. F. or when the concrete temperature exceeds 85 deg. F. Under certain circumstances, the Engineer may approve the placement of concrete under the above conditions, provided that the procedures of ACI 305R and ACI 306R are strictly adhered to.

B. Do not place concrete when the conditions may adversely affect the placing, curing or finishing of concrete, or its strength.

C. Comply with the requirements contained in Section 016500 - PRODUCT DELIVERY, STORAGE AND HANDLING.

PART 2 - PRODUCTS

2.01 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other approved panel materials.
   2. Steel forms: Minimum 16 gage thick, stiffened to support weight of concrete with minimum deflection.
   3. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      a. Douglas Fir Species, solid one side grade and sound

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation. Inside surfaces shall be treated with a non-staining form release agent.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum unless indicated otherwise on the drawings.

G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal. Patterns and sizes as shown on the drawings.

H. Form-Release Agent: Commercially formulated, colorless, water based, non-toxic, V.O.C. compliant, environmentally safe material which will not stain concrete, absorb moisture or impair natural bonding or color characteristics of coating intended for use on concrete; manufactured by DAYTON SUPERIOR or equal. Agent shall not be detrimental to the environment.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
   2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

2.02 STEEL REINFORCEMENT

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.

B. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

C. Galvanized Reinforcing Bars: ASTM A 615, Grade 60; ASTM A 706, deformed bars; ASTM A767/A767M, Class II zinc coated after fabrication and bending.

D. Steel Bar Mats: ASTM A184/A184M, fabricated from ASTM A615/A615M, Grade 60 ; ASTM A706/A706M, deformed bars, assembled with clips.

E. Deformed-Steel Wire: ASTM A 496.

F. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.03 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
   1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
   2. Provide load bearing pad on bottom to prevent vapor barrier puncture.

2.04 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
   1. Portland Cement: ASTM C150/C150M, Type IA, gray. Supplement with the following:
      a. Fly Ash: ASTM C 618, Class F or C.
      b. Ground Granulated Blast-Furnace Slag: ASTM C989/C989M, Grade 100 or 120.
   2. Silica Fume: ASTM C1240, amorphous silica.
   3. Normal-Weight Aggregates: ASTM C33/C33M, No. 57 or 67 crushed stone coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
      a. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
      b. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
   4. Lightweight Aggregate: ASTM C330/C330M, 3/4 inch, nominal maximum aggregate size.
   5. Water: ASTM C94/C94M, clean and not detrimental to concrete.

2.05 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
   2. Retarding Admixture: ASTM C494/C494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.

6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.06 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class C or polyethylene sheet, ASTM D4397 not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
   1. Products: Subject to compliance with requirements, provide the following:
      a. Grace Construction Products, W. R. Grace & Co.; Florprufe 120
      b. Insulation Solutions, Inc.; Viper VaporCheck 10.
      c. Meadows, W. R., Inc.; Perminator 10 mil.
      d. Reef Industries, Inc.; Griffolyn 10 mil Green.
      e. Stego Industries, LLC; Stego Wrap 10 mil Class A.
      f. Or approved equal.

B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; AASTM D448, Size 10, with 100 percent passing a 3/8-inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C33/C33M for fine aggregates.

2.07 FLOOR AND SLAB TREATMENTS

A. Slip-Resistive Emery Aggregate Finish: Factory-graded, packaged, rustproof, non-glazing, abrasive, crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials with 100 percent passing No. 4 sieve.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Dayton Superior Corporation; Emery Tuff Non-Slip
      b. Lambert Corporation; EMAG-20
      c. L&M Construction Chemicals, Inc.; Grip It
      d. Metalcrete Industries; Metco Anti-Skid Aggregate

2.08 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 8 oz. /sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet weighing approximately 8 oz. / sq. yd. bonded to prevent separation during use.

C. Membrane curing compound: Moisture Retention complying with ASTM C309. Products: EUCOCURE VOX by Euclid Chemical Company or equal.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B, dissipating.
   1. Products: Eucocure VOX as manufactured by Euclid Chemical Company or approved equal.

2.09 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, 1/2" asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: three-component, solvent-free, moisture tolerant, epoxy modified cementitious product.
   1. Product: Armatec 110 EpoCem as manufactured by Sika Corporation or specifically approved equal.
   2. Types I and II, non-load bearing Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

D. Non-Shrink Grout: Premixed compound, free of chlorides, with non-metallic aggregate, cement water reducing and plasticizing agents; capable of minimum compressive strength of 2400 psi at 48 hours and 7000 psi at 28 days. Grout shall be suitable for contact with potable water. For equipment bases and pipe supports, use non-shrink grout by Master Builders, Embeco 636, Unisorb V-1 or equal.

E. Reglets: Fabricate reglets of galvanized-steel sheet not less than 26 gauge material; in the longest lengths possible with alignment splines for joints; secure to formwork; Type CO as manufactured by Fry Reglet or approved equal. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

F. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inches (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

G. Waterstops: Polyvinylchloride; 6 inches wide; heat sealed joints; Styles 705 and 723, as manufactured by GREENSTREAK, or equal.

H. Extrudable Strip Waterstop: One part polyurethane, extrudable swelling waterstop to create a compression seal; SikaSwell S-2 as manufactured by Sika Corp. or specifically approved equal.

I. Field Applied Waterstop Grout: Krystol Waterstop Grout, crystalline grout to be applied in accordance with the manufacturer's specifications at joints and penetrations. Manufacturer: Kryton International Inc. (800)267-8280 or approved equal.

2.10 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
   4. Compressive Strength: Not less than 4000 psi at 28 days when tested according to ASTM C 109.

2.11 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
   1. Fly Ash: 25 percent.
   2. Combined Fly Ash and Pozzolan: 25 percent.
   3. Ground Granulated Blast-Furnace Slag: 50 percent.
   4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent Portland cement minimum, with fly ash or Pozzolan not exceeding 25 percent.
   5. Silica Fume: 10 percent.
   6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
   7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
   8. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
   9. Admixtures: Use admixtures according to manufacturer's written instructions.
      a. Use plasticizing admixture in concrete, as required, for placement and workability.
      b. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
      c. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: Pier, Mat and Spread Footings; foundation walls, slab on grade and slab on metal deck: 4000 psi at 28 days.
   2. Maximum Water-Cementitious Materials Ratio: 0.50 for all concrete building elements.
   3. Slump Limits (Conventional Mix):
      a. Slabs: 3 inches plus or minus one inch.
      b. Piers, Foundation Walls and Footings: 4 inches plus or minus one inch.
   4. Slump Limits (Pump Mix):
      a. Final slump (Slabs): 6 1/2 inches plus or minus one inch.
      b. Final Slump (Foundation, walls and footings): 7 1/2 inches plus or minus one inch
   5. Air Content:
      a. Piers, Mats and Spread Footings: 5.5 percent, plus or minus 1.0 percent. at the point of delivery.
      b. Slabs: 3 percent, plus or minus 1.0 percent at point of delivery. Do not allow air content of trowel finished concrete floors to exceed 3 percent.
   6. Large Aggregates: 3/4" crushed stone; ASTM C33, No. 67.
   7. Use Admixtures only when approved by the Engineer.
   8. Mix Grout in accordance with the manufacturer's instructions and specifications.

2.13 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.14 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.
   1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
   2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
   3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and measurements before proceeding with formwork. Ensure that dimensions agree with the plans.

B. Inspect the formwork and reinforcing that it has been properly set and secured and that all items to be embedded, built-in or pass through concrete are at their proper locations and elevations.

C. The General Construction Contractor shall verify that all other prime contractors have installed concrete inserts, sleeves, and embedded elements of the project, such as conduit, and their work has been totally completed and inspected by the Architect.

D. Ensure that all points of contact with new grout are free from oil, grease and scale.

3.02 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
   1. Class A, 1/8 inch for smooth-formed finished surfaces.
   2. Class B, 1/4 inch for rough-formed finished surfaces.
      a. Hand trim sides and bottom of earth forms and remove loose soil to the satisfaction of the Architect.
      b. Remove water from forms and excavations and divert water flow to avoid washing over, under or though freshly placed concrete.

D. Construct forms tight enough to prevent loss of concrete mortar. Align form joints.

E. Do not apply form release agent where concrete surfaces are to receive special finishes or applied coatings that may be affected by the agent.

F. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

I. Chamfer: Provide 3/4" inch chamfer on all exterior horizontal and vertical corners and edges of permanently exposed concrete.

J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

K. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement. Do not apply form release agent where concrete surfaces are to receive special finishes or applied coatings that may be affected by the agent.

N. Where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack with non-metallic/ non-shrink grout.

O. Prepare previously placed concrete by cleaning with steel brush and apply a Bonding Agent in accordance with the manufacturer's specifications and instructions.

3.03 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
   2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
   3. Install dovetail anchor slots in concrete structures as indicated.
   4. Ensure that all inserts and embedded items are not disturbed during concrete placement.

3.04 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.05 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.06 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
1. Lap joints 6 inches and seal with manufacturers recommended tape.

B. Granular Course: Cover vapor retarder with fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch or minus 3/4 inch.

3.07 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars. Use reinforcing splices at minimum of locations and only at locations of minimum stress. Review locations of splices with Architect. Splice locations shall be approved during shop drawing review phase. Rebar splice overly shall be the minimum length as per ACI 318.
1. Weld reinforcing bars according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Take necessary measures to ensure that reinforcement is not disturbed during the placement of concrete.

3.08 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
   2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
   3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
   4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
   5. Space vertical joints in walls as indicated or at 20' o.c. maximum. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
   6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction / Control Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
   1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 3/16"-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
   2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
   3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

F. Ensure joint fillers and devices are not disturbed during placement of concrete.

G. Install all joint fillers and devices in accordance with the manufacturer's instructions and specifications for floor and wall finish.

H. Install joint device anchors. Maintain correct position to allow joint cover flush with floor and wall finish.

I. Install joint covers in one-piece length when adjacent construction activity is complete.

J. Apply sealants in joint devices in accordance with the manufacturer's specifications and instructions.

3.09 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
   2. Place concrete with the aid of mechanical vibrators which are capable of transmitting to the concrete not less than 3,000 impulses per minute. Maintain at least three (3) vibrators in good working condition, ready for use when concrete placement begins in any one area.
   3. Do not interrupt successive placement. Do not permit cold joints to occur. .

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
   1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
   2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
   3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   2. Maintain reinforcement in position on chairs during concrete placement.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and ACI 305R and as follows:
1. Maintain concrete temperature below 95 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
3. Maintain records of concrete placement. Record date, locations, quantity, air temperature and test samples taken.
4. In areas with floor drains, maintain floor elevations at walls; pitch surfaces uniformly to the drains maintaining a 1% slope.
5. Cure floor surfaces in accordance with ACI 308.
6. Apply curing compound in accordance with the manufacturer's specifications and instructions in two (2) coats with the second coat at right angles to the first.

3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces exposed to public view.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch 6 mm in one direction.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
   1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
   1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, and ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
   2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
      a. Specified overall values of flatness, F (F) 30; and of levelness, F (L) 20; with minimum local values of flatness, F (F) 24; and of levelness, F (L) 15; for suspended slabs.
   3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft. long straightedge resting on two high spots and placed anywhere on the surface does not exceed 3/16 inch.

E. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; use steel-reinforced plastic trowel blades instead of steel blades to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.

F. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
   1. This surface shall be used for interior and exterior walking surfaces unless noted otherwise. Finish edges of exterior walkway flags with steel tooled radius edge.
   2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

G. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, equipment pads, and elsewhere as indicated.
   1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

H. Slip-Resistive Finish: Before final floating, apply slip-resistive finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:
   1. Uniformly spread 25 lb. /100 sq. ft. of dampened slip-resistive over surface in one or two applications. Tamp aggregate flush with surface, but do not force below surface.
   2. After broadcasting and tamping, apply float finish.
   3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aluminum granules.

I. Finish exposed concrete as specified in Division 09 specifications of this project manual.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. All exposed horizontal and vertical wall and slab corners shall have a ¾" wide chamfered edge.

D. Equipment Bases and Foundations:
   1. Coordinate sizes and locations of concrete bases with actual equipment provided.
   2. Construct concrete bases 6 inches high unless otherwise indicated; and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
   3. Minimum Compressive Strength: 4000 psi at 28 days.
   4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 12 inch centers around the full perimeter of concrete base.
   5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete substrate.
   6. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   7. Cast anchor-bolt inserts into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

E. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

F. Grout: Install grout in accordance with the manufacturer's specifications and instructions. Moisten concrete and grout surfaces and allow drying until damp. Remove all standing water. Pump or inject grout into tight spaces to ensure intimate contact with the existing grout. Cure grout with an appropriate membrane in accordance with the manufacturer's specifications and instructions.

3.13 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 and ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
      a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
      b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
      c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
   3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
      a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

F. Liquid sealer/hardener to be applied on exposed concrete cured with moisture retentive or absorptive covers. The following materials provide varying levels of protection, sealant and hardness. Review products for project appropriateness.
   1. Euclid: Euco Diamond Hard (Liquid Sealer and Hardener)
   2. L&M Construction Chemicals: Seal Hard (Liquid Sealer and Hardener)
   3. Curecrete Chemical Company: Ashford Formula (Liquid Sealer and Hardener)
   4. Midwest Floor Care: Structure Formula (Liquid Sealer and Hardener)
   5. Or approved equal.

3.14 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least three month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semi rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.15 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Immediately remove all rust spots that have developed during the construction period as soon as directed by the Architect. Remove all rust spots that have formed by the use of temporary handrails.

3.16 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and/or qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Contractor is responsible to notify the Owners representative at least 72 hours prior to the scheduled work that requires inspection / testing. The presence of the Inspector engaged by the Owner does not relieve the contractor of Quality Control Requirements.

B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:
   1. Steel reinforcement placement.
   2. Headed bolts and studs.
   3. Steel reinforcement welding.
   4. Concrete placement, including conveying and depositing.
   5. Curing procedures and maintenance of curing temperature.
   6. Verification of concrete strength before removal of shores and forms from beams and slabs.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
   1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
      a. Frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
      b. One (1) additional test cylinder shall be taken during cold weather and be cured under the same conditions as the concrete it represents.
   2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
   3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
   5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   6. Compression Test Specimens: ASTM C 31.
      a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

b. Cast and field cure two Insert number sets of two standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi .
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7 and 28-day tests.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 24 hours of finishing.

END OF SECTION 033000

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Concrete Block.

B. Mortar and Mortar Coloring.

C. Anchors and Reinforcement.

D. Control Joints.

E. Joint Filler.

F. Installation of Steel Lintels, Metal Door Frames and items furnished by other sections in Masonry.

G. Cleaning of Masonry.

H. Related Masonry Accessories.

1.02 RELATED SECTIONS

A. Section 014500 - Quality Control.

B. Section 033000 - Cast-in-Place Concrete.

C. Section 055000 - Metal Fabrications.

D. Section 061000 - Rough Carpentry

E. Section 072100 - Thermal Insulation.

F. Section 079200 - Joint Sealants.

G. Section 081500 - Fiberglass Reinforced Plastic Doors and Frames.

H. Section 099100 - Painting.

1.03 APPLICABLE STANDARDS

A. ACI 530 - Building Code Requirements for Masonry Structures.

B. ACI 530.1 - Specifications for Masonry Structures.

C. ANSI/ASTM A82 - Cold-Drawn Steel Wire for Concrete Rein-forcement.

D. ANSI/ASTM C55 - Specification for Concrete Building Brick.

E. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.

F. ASTM C129 - Specification for Non-Load Bearing Concrete Masonry Units.

G. ANSI/ASTM C216 - Facing Brick (solid masonry units made from clay or shale).

H. ASTM A525 - Steel Sheet, Zinc-Coated (galvanized) by the Hot-Dip Process.

I. ASTM A615 - Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

J. ASTM C145 - Solid Load Bearing Concrete Masonry Units.

K. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

L. UL - Underwriters' Laboratories.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Submit samples in duplicate of masonry units, ties, and reinforcing for Architect/ Engineer’s approval.

C. Submit concrete block certifications and test reports from block manufacturer indicating that concrete masonry units meet or exceed project specifications.

D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

E. Shop drawing: Layout of control joint placement.

F. Submit hot/cold weather masonry construction procedures including a detailed description of methods, materials and equipment to be used to comply with requirements.

G. Submit samples of mortar mix and color to architect/engineer for preliminary approval prior to building sample wall.

1.05 QUALITY ASSURANCE

A. Special Inspections required, refer to Section 014500.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

E. Build a sample wall of concrete unit masonry, which will be exposed to view in the finished project for approval by the Architect/Engineer. Follow these guidelines:
   1. Each sample wall shall be a corner approximately 4’-0" long by 4’-0" wide by 3’-0" high, showing the pro-posed color range, texture, bond, special masonry coursing (if any), special masonry shapes (if any), flashing, reinforcing, mortar and workmanship. All units shipped for the sample shall be included in the panel. Sample panel shall include a jamb 24" high and sill 24" long with all associated flashing.

2. Erect panel in the presence of the Architect/Engineer before installation of materials.
3. When required, provide a separate panel for each type of concrete unit masonry or mortar.
4. Prior to start of masonry construction work obtain the Architect/Engineer and Owner approval of the sample wall.
5. Should sample be rejected, provide additional sample walls until acceptance is obtained from Architect/Engineer and Owner.
6. Use panel as standard of comparison for all masonry work built of same material.
7. Do not destroy or move panel until work is completed and accepted by Architect/Engineer.

1.06 DELIVERY AND STORAGE

A. Materials shall be delivered and stored under the provisions of 016500 so as to avoid breakage, moisture, staining or damage of any kind.

B. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver pre-blended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store pre-blended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.07 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

B. Extend cover a minimum of 24 inches() down both sides of walls and hold cover securely in place.

C. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

D. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
   2. Protect sills, ledges, and projections from mortar droppings.
   3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
   4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

E. No masonry work shall be installed in an atmosphere with temperature less than 40°F or more than 99°F unless work is protected in a manner previously approved by the Architect/Engineer.

F. For cold weather masonry construction, submit to Architect/Engineer for review and approval, a cold weather masonry construction plan, identifying all measures contractor shall take for cold weather masonry construction. Conform to IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

G. Hot Weather Construction - Protect masonry construction from direct exposure to wind and sun when erected in an ambient air temperature of 99°F or more (37°C) in shade with relative humidity less than 50%. Conform to IMIAC - Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Northeast Architectural Products, Ashley, PA.

B. Smithtown Concrete Products Corp., Smithtown, NY.

C. The Proudfoot Company, Inc., Monroe, CT.

D. Or approved equal.

2.02 CONCRETE MASONRY UNITS

A. Concrete Masonry Units: Architectural load-bearing masonry units shall meet ASTM C-90, Type I, Grade N.
   1. Unit Compressive Strength: Provide units cast from high strength concrete with a minimum average net-area compressive strength of 1900 psi. Provide units meeting fire resistance rating as required.
   2. Density Classification: Normal weight.
   3. Types:
      a. Type A = 8" standard masonry unit.
      b. Type B = 8" bond beam masonry unit.
   4. Units to be left exposed shall be colored with integrally mixed, light fast, weather-resistant pig-ment. Color shall be maintained uniformly throughout the job, within normal manufacturing tolerances.
   5. All exposed exterior units shall be manufactured with integral water repellant.

B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide 5/8-inch radius bull nose units for all outside corners unless otherwise indicated.
   3. Special shaped units shall meet same specifications as adjacent units. Split multiple faces of units where more than one face is exposed.

2.03 MORTAR

A. Mortar and grout materials and mix proportions shall meet applicable requirements of ASTM C270-866, Type N made with lime. Color shall be close to that of masonry units involved and shall be approved by the Architect. Mortar coloring shall be factory added and mixed into mortar. Hand mixing of color mortar at the jobsite is prohibited. Contractor to submit color samples to Architect/Engineer for selection. Once color selection is made, Contractor shall provide design mix to Architect/Engineer.

B. Mortar Materials:
   1. Portland cement: Cement shall conform to ASTM Speci-fication C150-61, Type 1.
   2. Lime: Hydrated lime shall be Type S or Type N, conforming to ASTM Specification C207-49. Quicklime shall conform to ASTM Specification C5-59. It shall be slaked in accordance with the manufacturer's directions.
   3. Lime Putty: Putty shall be a stiff mixture of lime and water. Keep putty moist until used. Putty made from quicklime shall be slaked and allowed to soak at least 24 hours before using. Putty made from Type S hydrated lime may be used immediately after mixing.
   4. Sand shall conform to ASTM Specification C144-(52T) except that sand for mortar in 1/4-inch-wide joints shall pass a No. 16 sieve.
   5. Mixing Water: Water shall be clean and potable.

C. Storage of Materials: Store materials under cover in a dry place and in a manner to prevent damage or intrusion of foreign matter. During freezing weather protect all masonry units with tarpaulins or other suitable material. Store cement, lime and air-setting mortars in watertight sheds with elevated floors. Protect reinforcement from the elements; immediately before placing, reinforcement shall be free from loose rust, ice, or other foreign coatings that will destroy or reduce the bond.

D. Mortar for Masonry Units: Mortar shall be mixed in the proportions of 1-part Portland, 1/2 to 1-1/4 parts hydrated lime or lime putty, and 4-1/2 to 6 parts of sand by volume to meet the requirements of ASTM C270-866.

E. Mixing Mortar: Mix all cementitious materials and sand in a mechanical batch mixer for a minimum of 5 minutes. Adjust the consistency of the mortar to the satisfaction of the mason but add only as much water as is compatible with convenience in using the mortar. All mortar shall be used within 2-1/2 hours of the initial mixing. It shall not be used after it has begun to set.

F. At exterior walls integrally mix mortar manufacturer’s approved water repellent admixture compatible with masonry sealant into the mortar.

2.04 REINFORCING

A. Single Wythe Walls: Lox-All #120 Truss Mesh 9-gauge parallel wires in each face and 9-gauge cross members a maximum of 16" o.c., butt welded to side rods as manufactured by Hohmann & Barnard, Inc., or approved equal. Provide prefabricated corners and tees. Reinforcement shall be completely embedded in mortar or grout.

B. Tie Bars at intersecting walls shall be rigid partition anchor Model #344, hot dipped galvanized, as manufactured by Hohmann & Barnard, Inc., or approved equal.

C. Steel reinforcement bars: ASTM A615, 60 ksi (414 Mpa) yield grade billet steel deformed bars; uncoated finish, size and dimensions as indicated on plans.

2.05 CONTROL JOINTS

A. The joint filler material shall be the thickness as required for the width of joint intended and recessed deep enough allowing for the rod and sealant at the exposed face of the masonry.

B. Vertical control joints shall be generally be located:
   1. At major changes in wall height.
   2. At changes in wall thickness.
   3. At control joints in foundations, in roof, and in floors.
   4. At chases and recesses for piping, columns, fixtures, etc.

5. At one or both sides of wall openings.
6. Near wall intersections.
7. Near return angles in L, T, and U-shaped structures.
8. Maximum spacing of control joints should in no case exceed 24'-0".

2.06 ACCESSORIES

A. Masonry Cleaner: All masonry work shall be thoroughly cleaned with Vana Trol Sure Klean as manufactured by the Process Solvent Co., Inc.

B. Joint filler shall be equal to Willseal 150 as manufactured by Willseal, LLC, 34 Executive Drive, Hudson, NH 03051, Telephone (800) 274-2813. Joint filler shall consist of micro-cell polyurethane foam, flame retardant, hydrophobic, UV-stabilized, acrylic emulsion, and a pressure sensitive adhesive with embedded scrim.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Examine conditions for compliance with installation tolerances and other conditions affecting performance of the Work. Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
   1. Verify that foundations are within tolerances specified.
   2. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

B. Report in writing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

C. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.02 GENERAL

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations

B. Mortar shall be thoroughly mixed and kept moist but shall not be re-tempered for use after initial set.

C. Lay only dry masonry units. Lay each unit in full joint of mortar on its bed and ends. Slush and fill each joint with mortar each course of masonry as work progresses.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Cut units to provide a uniform 1/8" clearance around electrical boxes and similar items.

F. Do not use chipped, cracked or broken units.

G. Set units straight, plumb, true to line, and level.

H. Adjust units to final position while mortar is soft and plastic. If unit is displaced after mortar has stiffened, remove unit, clean joints and unit of mortar and reset with fresh mortar.

I. When joining fresh work to set or partially set masonry clean exposed surface and remove loose mortar before laying fresh masonry.

J. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar before laying fresh masonry.

K. Unless indicated otherwise partitions shall extend from floor to bottom of floor or roof construction above.

L. Locate control joints as indicated on the contract drawings. Install expansion material and apply sealant.

M. Protect all freshly constructed masonry from injury of any kind. Replace injured work in a manner satisfactory to the Architect/Engineer. Com-pletely point and thoroughly wash all finished exposed masonry surfaces down with masonry cleaner in accor-dance with manufacturer's printed instructions.

N. Apply block filler and paint finish to masonry units.

3.03 BOND

A. Lay units in running bond with vertical joints centered on unit in course below unless indicated otherwise on drawings. Provide all reinforcement indicated. Do not use units with less than nominal 4-inch ()horizontal face dimensions at corners or jambs.

3.04 MORTAR BEDS

A. Lay hollow units with full mortar coverage on horizontal and vertical face shells. Provide full mortar coverage on horizontal and vertical face shells and webs where adjacent to cells or cavities to be filled with grout and on starting courses.

B. Lay block with full horizontal and vertical joints.

C. Tool joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated in surfaces to be exposed or painted.

D. Strike joints flush in surfaces to be covered.

3.05 REINFORCEMENT

A. Wire Reinforcement
   1. Place wire reinforcements as follows:
      a. All concrete block walls shall have continuous horizontal reinforcement at 16" o.c. vertically.
      b. Wire reinforcement shall be completely embedded in mortar or grout. Joints with wire reinforcement shall be at least twice the thickness of the wire.
      c. Wire reinforcement shall be lapped at least 8" at splices and shall contain at least one cross wire of each piece of reinforcement in the lapped distance.
      d. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

e. Provide continuity at wall intersections by using prefabricated T-shaped units and at corners by using prefabricated L-shaped units.

B. Steel Reinforcement Bar
1. Steel reinforcement bars, unless otherwise detailed on plans, shall be placed as follows:
a. Install #5 bars, vertically at all corners and at door and window jambs and 32" o.c., typically, unless otherwise noted on the contract drawings.
b. Fill all concrete masonry unit cells containing reinforcement bars solid with mortar.
c. Remove pre-molded insulation from masonry cores at location of vertical reinforcing bars.
d. Reinforcement bars shall be lapped at splices as follows:
1) Bar Size Min. Lap District
2) 24 inches
3) 30 inches
4) 36 inches
5) 42 inches

C. Weld all vertical reinforcement interrupted by steel lintels/beams to top of steel member, typical.

3.06 CONTROL AND EXPANSION JOINTS

A. Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:
1. Fit bond-breaker strips into hollow contour in ends of units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Nominal thickness shall be 3/8" (9 mm) and uniform. Shove or rod all vertical joints tight.

3.07 BUILT-UP WORK

A. Cooperate with other trades in building in items in masonry work.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items. Grout solid around built-in items and within door frames.

E. Install steel reinforcing straps, or as otherwise detailed, where interior walls meet perpendicular to exterior walls. Grout cores solid.

F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

3.08 LINTELS AND BOND BEAMS

A. Steel lintels shall extend into side walls at jambs, minimum 8" bearing on each side.

B. Install rebar and grout solid lintel blocks and bond beams as indicated. Provide temporary shoring for openings wider than 36".

C. Lintel blocks shall extend into side walls at jambs, minimum of 8" bearing on each side.

D. Fill cores in hollow CMU with grout 24 inches ()under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.09 REPAIRING, POINTING AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints. Dry brush masonry surfaces after mortar has set, at end of each day's work and after final points.

D. Leave work and surrounding surfaces clean and free of efflorescence, mortar spots and droppings.

E. Clean masonry with approved masonry cleaner. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.10 TOLERANCES

A. Maximum Variation from Unit to Adjacent Unit: 1/32 inch.

B. Maximum Variation from Plane of Wall: Not to exceed 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

C. Maximum Variation from Plumb: Not to exceed 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

D. Maximum Variation from Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.

E. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.11 PARGING

A. Parge exterior faces of exposed concrete block in 2 uniform coats to a total thickness of 3/4 inch (). Dampen wall before applying first coat and scarify first coat to ensure full bond to subsequent coat.

B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot (). Form a wash at top of parging and a cove at bottom.

C. Damp-cure parging for at least 24 hours and protect parging until cured.

END OF SECTION 042200

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Shop and field fabricated ferrous metal items.

B. Structural steel members.

C. Weld repairs to steel lap seams.

1.02 REFERENCES

A. AISC - Code of Standard Practice - Manual of Steel Construction - Allowable Stress Design (ASD).

B. ASTM A36/A36M - Structural Steel.

C. ASTM A53 - Hot-Dipped, Zinc-coated Welded, and Seamless Steel Pipe.

D. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.

E. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.

F. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

G. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.

H. ASTM A563 - Carbon and Alloy Steel Nuts.

I. ASTM A568/A568M - General Requirements for Steel, Carbon and High-Strength Low-Alloy Hot-Rolled Sheet and Cold-Rolled Sheet.

J. AWS A2.4 - Symbols for Welding, Brazing, and Nondestructive Examination.

K. AWS D1.1 - Structural Welding Code.

1.03 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Shop Drawings:
   1. Indicate profiles, sizes, connections, reinforcing, anchorage, size and type of fasteners, and accessories.
   2. Include erection drawings, elevations, and details where applicable.

C. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

D. Welders' Certificates: Certify welders employed on the Work have met AWS qualification within the previous twelve (12) months.

E. Manufacturer's Mill Certificate: Certify that Products meet or exceed specified requirements.

1.04 QUALIFICATIONS

A. Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the project is located. Shop drawings must be signed and sealed by a Professional Structural Engineer.

B. Fabricate structural steel members in accordance with AISC Code of Standard Practice.

1.05 FIELD MEASUREMENTS

A. Verify field measurements.

B. Replacement fabrications shall be of same dimensions, strength, and gage as original members, unless noted differently on drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel Sections: ASTM A36; sizes to match existing where not indicated on drawings.

B. Plates: ASTM A283; gage to match existing where not indicated on drawings.

C. Bolts, Nuts, and Washers ASTM A325 and Teflon coated: ASTM A325

D. Welding Materials: AWS D1.1; type required for materials being welded.

2.02 FABRICATION

A. Fit and shop assemble in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise. Components shall be comparable in size and capacity to existing components in similar anchorage situations.

F. Fabricate support framing for openings and edges where existing supports are inadequate.

2.03 FINISHES

A. Prepare surfaces to be primed. Refer to Section 099870 - Steel Tank Coating System.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Shop prime structural steel members.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work, including the removal of existing metal fabrications that require replacement.

B. Beginning of installation means erector accepts existing conditions.

C. Verify that opening sizes and dimensional tolerances are acceptable.

D. Verify that supports are correctly positioned.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on shop drawings.

D. Connections shall be capable of transferring loads identical to capacity of existing connections.

E. Perform field welding in accordance with AWS D1.1. Provide a fire watch during all hot work operations.

F. Secure to prevent movement and anchor by welding.

G. Obtain Engineer approval prior to site cutting or making adjustments not scheduled.

END OF SECTION 055000

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Treated Wood Members.

B. Miscellaneous Framing, Blocking, Furring and Sheathing.

C. Fasteners.

D. Framing accessories.

1.02 RELATED SECTIONS

A. Section 042200 - Concrete Unit Masonry.

B. Section 061753 - Shop Fabricated Wood Trusses.

C. Section 062000 - Finish Carpentry.

D. Section 073113 - Asphalt Shingles.

E. Section 074633 - Vinyl & Polymer Siding.

1.03 QUALITY ASSURANCE

A. Lumber Grading Rules and Wood Species to be in conformance with the Voluntary Product Standards PS 20-70. Grading rule of the following associations apply to materials furnished under this section:
   1. Southern Pine Inspection Bureau (SPB).
   2. Western Wood Products Associations (WWPA).
   3. American Wood Preserves Bureau (AWPB).
   4. American Plywood Association (APA).
   5. National Fire Protection Agency (NFPA).
   6. Lumber Grading Agency by ALSC.
   7. Building Officials and Code Administration (BOCA).

B. Requirements of regulatory agencies. Comply with the following:
   1. Fire retardant treated wood: Testing agency, UL label rating, acceptable to governing Building Officials.
   2. All lumber and plywood shall be grade-marked.
   3. In lieu of grade stamping exposed to view lumber and plywood, submit manufacturer's certificate under provisions of Section 014500 that products meet or exceed specified requirements.

1.04 REFERENCES

A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.

B. APA - American Plywood Association.

C. APA/EWS - American Plywood Association - Engineered Wood Systems.

D. AWPA - (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.

E. WWPA - Western Wood Products Association.

F. Lumber Grading:
   1. Standard Grading and Dressing Rules No. 16, current edition, for Douglas Fir, Western Hemlock, West Red Cedar, White Fir, and Sitka Spruce, published by West Coast Lumber Inspection Bureau, or
   2. "Current Grading Rules", issued by the Western Wood Products Association.

G. ASTM D2559 - Adhesives for structural laminated wood products for use under exterior (wet use) exposure conditions.

H. AITC - American Institute of Timber Construction.

I. Extended ASTM E84 Fire Test Method, Factory Mutual Research Report J.I. 1R9Q9. AC.

J. BOCA: 2310.2: Fire Retardant Treated Wood (1993).

K. ASTM C1177.

L. ASTM E136.

M. ASTM E119.

1.05 SUBMITTALS

A. Certification:
   1. Pressure Treated Wood: Submit certification by treating plant stating chemicals and process used, net amount of salts retained and in conformance with applicable standards.
   2. Preservation Treated Wood: Submit certification for waterborne preservative that moisture content was reduced to 19% maximum, after treatment.
   3. Fire-Retardant Treatment: Submit certification by treating plant stating that fire-retardant treatment materials comply with governing ordinances and that treatment will not bleed through finished surfaces.

1.06 PRODUCT DELIVERY, STORAGE AND PROTECTION

A. All materials shall be inspected upon receipt at job site. No faulty or damaged materials shall be accepted. It shall be contractor’s responsibility to produce finished items of work in first-class condition, free from all defects.

B. Do not handle products in a manner which will damage, warp or distort products.

C. Do not store products directly on the ground; protect from elements.

1.07 WARRANTY

A. Provide 30-year manufacturer’s written warranty for pressure treated and fire resistant treated wood items.

B. Provide five-year manufacturer’s warranty for exterior grade sheathing.

PART 2 - PRODUCTS

2.01 MATERIALS - LUMBER AND FRAMING

A. Materials shall meet the Federal specifications, commercial standards, product standards and these specifications, unless more restrictive requirements are indicated on drawings.

B. All lumber for blocking, plates and nailers located within a maximum distance of 18 inches from grade or in contact with masonry or concrete shall be treated in accordance with AWPB Standards LP-2-80. All lumber shall be dried after treatment and have moisture content in each piece of 19% or less, or shall conform to the applicable grading standards for the species involved. All cuts, planed surfaces, bored holes, etc., shall be treated at the jobsite by dipping or liberally brushing with same materials as specified in AWPB Standard LPA2A80. All lumber shall be grade marked. Lumber treated by any method other than AWPB Standards LP-2-80 will not be accepted.

C. Non-Structural Light Framing: Douglas Fir Larch species, No. 2 grade, 19 percent maximum moisture content or equivalent stress grade.

D. Miscellaneous Framing: No. 2 species, 19 percent maximum moisture content or equivalent stress grade.

E. All interior lumber to be used for framing, blocking, furring shall be SPIB or WCLB treated with fire retardant to obtain flame spread rating of 25 or less when treated according to ASTM E-84. Treat cuts, etc. as recommended by manufacturer of flame retardant materials.

F. Rough hardware, nails, screws, bolts, etc., for securing lumber in place shall be commercial quality, any suitable type and finish for interior dry location, galvanized or nonferrous hardware for all exterior work and for interior work in toilets.

2.02 MATERIALS - SHEATHING

A. Backing panels: APA C-D plugged, exterior type, 3/4 inch and 5/8-inch-thick, as indicated on drawings.

B. Finish panels: APA A-B, exterior type, 3/4-inch-thick, free of knots and/or plugs on exposed side, as indicated on drawings.

C. All plywood shall comply with APA Standards and be of thickness indicated on drawings.

D. Moisture content of the plywood at the time of installation and at the time roofing is installed shall be less than 19 percent.

2.03 FASTENERS

A. Nails and Fasteners: Hot-dipped galvanized steel in accordance with ASTM A153 for exterior, high humidity and treated wood locations, unfinished steel elsewhere.

B. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

C. Lumber to lumber: Cement coated or annular threaded nails of sufficient length to penetrate 1.25 inches into adjoining members, except as otherwise indicated.

2.04 ACCESSORIES

A. Construction Adhesive: Waterproof; air cured, rubber based, cartridge dispensed, Liquid Nail 601, manufactured by Macco Adhesives, The Glidden Company, or approved equal.

PART 3 - EXECUTION

3.01 VERIFICATION

A. Verify existing conditions under provisions of Section 013100.

B. Verify that walls and other substrates are at the proper elevations and ready to receive work of this section.

3.02 PREPARATION OF SURFACES

A. Surfaces to receive new wood members shall be free of all dirt, debris, and loose materials. Exposed surfaces shall be mechanically scraped if necessary, to remove projections.

B. Surfaces shall have no free water present in any form (rain, dew, frost, snow or ice).

C. Contractor is responsible to inspect all exposed surfaces to see that conditions are satisfactory for installation of new work.

3.03 WORKMANSHIP

A. Work shall be performed in conformance with good trade practice, recommendations of manufacturers, building codes and these specifications unless specifically indicated otherwise on the drawings and shall be well fitted and securely fastened in its proper location with nails, screws, bolts or other approved fastening devices.

3.04 FIRE RETARDANT

A. Required for wood blocking and nailers.

B. Treat to flame spread rating of 25 or less and fuel contribution of 30 or less when tested in accordance with ASTM E84. Re-dry to maximum 19 percent moisture content.

C. Each piece of treated wood shall bear UL label of compliance.

3.05 CLEAN-UP

A. Clean or replace any adjacent surfaces of materials damaged by treated lumber.

3.06 INSTALLATION - FRAMING

A. Set structural members level and plumb, in correct position.

B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of permanent bracing.

C. Place horizontal members flat, crown side up.

D. Construct load bearing framing and curb members full length without splices.

E. Double members at all openings. Space short members over and under opening to member spacing.

F. Bridge framing in excess of 8 feet span at mid-span.

G. Coordinate installation of adjacent construction.

H. Warped wood members shall not be used unless they can be fastened adequately to permanently hold them in their required alignment.

3.07 INSTALLATION - SHEATHING

A. Nailing pattern and spacing shall be in accordance with APA recommenda-tions or as listed in the Building Code of New York State.

B. Install telephone and electrical panel back boards with plywood sheathing material where required. Size the back board by 12 inches (25 cm) beyond size of electrical panel.

C. Fasteners:
   1. Fastener heads shall be flush with wood surface and shall penetrate adjoining piece minimum 1.25 inches.
   2. The installed withdrawal resistance shall be a minimum of 100 pounds per nail.

3.08 SITE TREATMENT OF WOOD MATERIALS

A. Apply preservative treatment in accordance with manufacturer's published instructions.

B. Brush apply two coats of preservative treatment on wood in contact with cementitious materials and roofing and related metal flashings. Treat site-sawn cuts.

C. Allow preservative to dry prior to erecting members.

3.09 SCHEDULE

A. Provide nailers, blocking, furring, and reinforcement as called for in all other specified Sections, or as required in the field during construction, in accordance with the requirements of this Section.

END OF SECTION 061000

GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Wood roof trusses.
   2. Wood truss bracing.
   3. Wood truss bridging.

1.03 DEFINITIONS

A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.04 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details for trusses.
   1. Show location, loads, pitch, span, camber, configuration, framed openings, bracing and spacing for each type of truss required.
   2. Indicate sizes, stress grades, and species of lumber.
   3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
   4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
   5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
   6. Show splice details and bearing details.

B. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Shop Drawings shall bear the seal and signature of a licensed Professional Engineer in the State of New York.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For metal connector-plate manufacturer, professional engineer, and fabricator.

B. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.

C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss fabricating firm.

D. Evaluation Reports: For the following, from ICC-ES:
   1. Metal-plate connectors.
   2. Metal truss accessories.

1.06 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
   1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
   2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction. Fabricator shall have a minimum of 5 years documented experience.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations in TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
   1. Store trusses in a vertical position resting on bearing ends flat, off of ground, and adequately supported to prevent lateral bending.
   2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
   3. Provide for air circulation around stacks and under coverings.

B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

1.08 REGULATORY REQUIREMENTS

A. Conform to applicable code(s) for loads, seismic zoning and other governing criteria.

1.09 COORDINATION

A. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying the progress of other trades whose work must follow erection of the trusses.

1.10 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on the approved shop drawings.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014500 "Quality Controls," to design metal-plate-connected wood trusses.

B. Design Trusses under the direct supervision of a professional engineer experienced in the design of this work and licensed in the state in which the project is located.

C. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
   1. Design Loads: As indicated.
   2. Maximum Deflection Under Design Loads:
      a. Roof Trusses: Vertical deflection of 1/240 of span.

D. Comply with applicable requirements and recommendations of the following publications:
   1. TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
   2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
   3. TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

E. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.02 DIMENSION LUMBER

A. Certified Wood: For metal-plate-connected wood trusses and permanent bracing, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

B. Lumber Grading Rules SPIB: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
   3. Provide dressed lumber, S4S.
   4. Provide dry lumber with 19 percent maximum moisture content at time of dressing.
   5. Wood Members: Single Top and bottom Chords, Southern Yellow Pine Species, No. 2 grade, 19 percent maximum and 7 percent minimum moisture content or equivalent. Stress Grade. Finger scarfing not permitted.

C. Retain "Minimum Chord Size for Roof Trusses" Paragraph below if requirement for minimum chord sizes is needed to provide stiffer members for nailing. Minimum Chord Size for Roof Trusses: 2 by 6 inches nominal (38 by 140 mm actual) for top chords, 2 by 6 inches nominal (38 by 140 mm actual) for bottom chords.

D. Minimum Specific Gravity for Top Chords: 0.50

E. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

2.03 METAL CONNECTOR PLATES

A. Manufacturers Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Alpine Engineered Products, Inc.; an ITW company
   2. MiTek Industries, Inc.; a subsidiary of Berkshire Hathaway Inc
   3. Truswal Systems Corporation; an ITW company

B. Source Limitations: Obtain metal connector plates from single manufacturer.

C. General: Fabricate connector plates to comply with TPI 1.

D. Double Hot-Dip Galvanized-Steel Sheet: ASTM A 446653/A 653M; Structural Steel (SS), Grade A high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick galvanized in accordance with ASTM A 525. G 60 coating; Die stamped with integral teeth, minimum 0.036 inch (0.91 mm) thick.
   1. Use for interior locations unless otherwise indicated.

E. Truss Bridging: Type, Size and spacing recommended by the Truss Manufacturer.

2.04 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
   1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
   2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M type to suit application and as recommended by the manufacturer of the truss plates.

B. Nails, Brads, and Staples: ASTM F 1667.

2.05 METAL FRAMING ANCHORS AND ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Basis-of-Design Product Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. Simpson Strong-Tie Co., Inc
   2. USP Structural Connectors

C. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of basis-of-design products Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

D. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
   1. Use for interior locations unless otherwise indicated.

E. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall studs below, 1-1/2 inches (38 mm) wide by 0.050 inch (1.3 mm) thick. Tie fastens to one side of truss, top plates, and side of stud or top plate below.

F. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches (32 mm) wide by 0.050 inch (1.3 mm) thick. Clip is fastened to truss through slotted holes to allow for truss deflection.

G. Roof Truss Bracing/Spacers: U-shaped channels, 1-1/2 inches (38 mm) wide by 1 inch (25 mm) deep by 0.040 inch (1.0 mm) thick, made to fit between two adjacent trusses and accurately space them apart, and with tabs having metal teeth for fastening to trusses.

2.06 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 94 percent zinc dust by weight.

B. Protective Coatings: SSPC-Paint 22, epoxy-polyamide primer or SSPC-Paint 16, coal-tar epoxy-polyamide paint.

2.07 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.

C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
   1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

2.08 SOURCE QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.
   1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
   2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.

B. Correct deficiencies in Work that special inspections indicate does not comply with the Contract Documents.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Space trusses 24 inches (610 mm) o.c. or as indicated; adjust and align trusses in location before permanently fastening.

G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.

H. Securely connect each truss ply required for forming built-up girder trusses.
   1. Anchor trusses to girder trusses as indicated.

I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
   1. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.

J. Install wood trusses within installation tolerances in TPI 1.

K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members without written approval from the Engineer..

L. Replace wood trusses that are damaged or do not meet requirements.
   1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

M. Place headers and supports to frame openings required.

N. Frame openings between trusses with lumber.

O. Coordinate placement of decking with the work of this section.

3.02 REPAIRS AND PROTECTION

A. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

C. Protective Coating: Clean and prepare exposed surfaces of metal connector plates. Brush apply primer, when part of coating system, and one coat of protective coating.
   1. Apply materials to provide minimum dry film thickness recommended by coating system manufacturer.

D. Protect Trusses from damage throughout the construction period until the project is accepted by the Owner.

END OF SECTION 061753

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Includes furnishing and installation of non-custom manufactured items, including aluminum clad trim and fascia boards, all necessary mounting clips, etc., required for a complete installation.

B. Includes installation of all finish hardware furnished in Section 087100.

1.02 RELATED SECTIONS

A. Section 061000 - Rough Carpentry.

B. Section 076200 - Flashing and Trim.

C. Section 079200 - Joint Sealants.

D. Section 087100 - Door Hardware.

E. Section 099100 - Painting.

1.03 REFERENCES

A. ALSC - American Lumber Standards Committee.

B. APA - American Plywood Association.

C. AWI - Architectural Wood Work Institute.

D. ASTM D1761 - Mechanical Fasteners in Wood.

E. ASTM E84 - Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details and accessories.

C. Samples: Submit two 12-inch-long samples of aluminum on trim boards.

D. Product Data: Submit available aluminum trim colors to Architect/Engineer for selection.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products under the provisions of 016500 and per manufacturer's instructions.

B. Trim materials should be stored on a flat and level surface on a full shipping pallet. Handle materials to prevent damage to product edges and corners. Store materials under a protective covering to prevent jobsite dirt, moisture and residue from collecting on the boards.

C. Protect work from moisture damage.

1.06 QUALITY ASSURANCE

A. Verify that field measurements are as indicated on shop drawings.

B. Allowable Tolerances for trim boards:
   1. Variation in component length: -0.00 / +1.00"
   2. Variation in component width: ± 1/16"
   3. Variation in component thickness: ± 1/16"
   4. Variation in component edge cut: ± 2°
   5. Variation in Density -0% + 10%

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials used in finished work shall be clear, free from cracks, checks, knots and other imperfections that may interfere with the proper completion of the work and, any warped or otherwise imperfect work shall be removed and replaced by parties responsible for same.

B. Lumber Materials:
   1. Softwood Lumber: Pine Species, B or better, maximum moisture content of 19%, ¾ inch thickness.

2.02 ACCESSORIES

A. Adhesive: Type recommended by AWI to suit application.

B. Bolts, nuts, washers, lags, pins and screws: of size and type to suit application.

C. Concealed Joint Fasteners: Threaded Steel.

PART 3 - EXECUTION

3.01 WORKMANSHIP

A. First grade workmanship. Finish woodwork free of chatter marks, torn grain short finish, splits, etc. Avoid butt joints and exposed ends or edges of materials.

B. Work shall be scribed and fit to other finished surfaces in a careful manner. Should other work be damaged or disturbed, it shall be made good at the expense of the Contractor.

C. Verify all measurements, reinforcement and blocking at the building and examine all adjoining work on which work is dependent before beginning installation. Beginning of installation implies acceptance of existing conditions and responsibility for the same.

D. Exposed surfaces shall be machine-sanded to an even, smooth surface, nails set, ready for finishing. All woodwork shall be dry, clean and smooth before any finishing materials are applied. All nail holes, cuts, cracks and other defects shall be treated so as to render them unnoticeable.

3.02 INSTALLATION

A. Carefully scribe finish carpentry items. Set and secure finish carpentry items in place rigid, plumb, and square.

B. Use purpose designed fixture attachments for mounted components.

C. Install hardware, fixtures, and accessories supplied under other Sections for installation.

D. Install items in accordance with manufacturer's instructions; install wood to maximum possible length, cutting and splicing shall be unacceptable.

E. Ensure that mechanical and electrical items affecting this Section of work are properly placed, complete, and have been inspected by the Architect/Engineer prior to commencement of installation.

3.03 PREPARATION FOR SITE FINISHING

A. Site Finishing: Aluminum capping. Before capping installation, prime all surfaces and ends of wood trim - refer to Section 076200.

B. Prime and paint - refer to Section 099100.

3.04 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/16-inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32-inch.

END OF SECTION 062000

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The work described in this Section of the specifications includes but is not limited to cold applied water based emulsified asphalt dampproofing and protective cover board for exterior below grade foundations.

1.02 RELATED WORK

A. Section 033000 - Cast-In-Place Concrete

B. Division 40 - Process Integration

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM D 41 - Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
   2. ASTM D 1227 - Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Submit copies of manufacturer’s current certification to ISO 9002, primers, and associated auxiliary materials shall be included.

C. Submit references clearly indicating that the materials proposed have been installed for not less than five years on projects of similar scope and nature. Submit references for a minimum of ten projects.

D. Submit manufacturers complete set of standard instructions and details for dampproofing.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and protect products under the provisions of 016500.

B. Deliver materials to jobsite in undamaged and manufacturer's original unbroken containers, dry, undamaged, seals and labels intact.

C. Cold applied elastomeric membrane should be stored in closed containers outdoors.

D. Store membrane at temperature of 5°C (40°F) and above to facilitate handling.

E. Membrane contains petroleum solvents and is flammable. Keep away from open flame or excessive heat. Do not allow smoking or welding in the working area. Use in well ventilated area.

1.06 QUALITY ASSURANCE

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until cured.

B. Protect from rain until coating has set, do not expose to UV. Application shall be protected or covered within 7 days of application.

C. Dampproofing shall be carried out by applicators skilled in this work in strict accordance with manufacturer's printed instruction. Submit proof of minimum five years' applicators experience.

D. Perform Work in accordance with the printed requirements of the manufacturer and this specification. Maintain one copy of manufacturer instructions on site.

E. Components used in this section shall all be sourced from one manufacturer.

F. No installation work shall be performed during rainy or inclement weather and on frost or wet covered surfaces.

G. Ensure continuity of the dampproofing membrane throughout the scope of this section.

H. Work shall be so scheduled as to provide a watertight seal at the end of each working day on the areas worked upon during the day.

1.07 PROTECTION

A. Protect all surfaces not to be treated. Provide adequate protection of materials and work of this section from damage by weather, backfilling operations and other causes.

B. Protect work of other trades from damage resulting from work of this section. Make good such damage at own expense to satisfaction of the Architect/Engineer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. MasterSeal 614 or 615 by BASF Building Systems, 889 Valley Park Drive, Shakopee, MN 55379. Tel: (800) 433-9517; Web: www.BASFbuildingsystems.com.

B. Or approved equal.

2.02 MATERIALS

A. On concrete walls receiving dampproofing, apply one of the following:
   1. Trowel apply one coat of MasterSeal 614 long fiber reinforced complying with ASTM D1227, Type 2, Class I and ASTM D1187, Type 1; or
   2. Brush, roller and spray apply two coats of MasterSeal 615 short fiber reinforced complying with ASTM D1227, Type 2, Class I, and ASTM D1187, Type 1; or

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
   1. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing.
   2. Verify items which penetrate surfaces to receive dampproofing are securely installed.
   3. Surfaces to receive dampproofing shall be fully cured, dry and free of oil, form release agents, curing compounds, grease, laitance and loose material.

4. Allow the manufacturer's required minimum cure time for new concrete. Ensure concrete is smooth and free from voids and honeycombing prior to application.

B. Report in writing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

C. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.02 PREPARATION

A. Protect adjacent surfaces not designated to receive dampproofing.

B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's published instructions. Surface should be free of oil, grease, dirt, laitance, and loose material. Dry surfaces shall be dampened with water and kept damp until application.

C. Apply mastic to seal penetrations, small cracks or minor honeycomb in substrate. Remove unnecessary projections and fill voids to provide relatively smooth surfaces.

3.03 INSTALLATION

A. Prime surfaces and apply product in accordance with manufacturer's published instructions.

B. Trowel Grade: Trowel apply at minimum rate of 7 gallons per 100 square feet to produce a minimum dry film thickness of 60 mills.

C. Brush, Roller and Spray Grade: Brush, roll or spray apply at rate of 1.5 to 2.5 gallons per 100 square feet, depending on substrate texture, to produce a minimum dry-film thickness of 15 mils. Apply material in 2 coats by brush, roller or spray. Allow first coat to dry tacky before applying second coat.

D. Fill in crevices and grooves, providing continuous coating and free from breaks and pinholes. Carry coating over exposed top and outside edge of footing. Spread around joints, grooves, and slots, and into chases, corners, reveals, and soffits. Bring coating to finished grade.

E. Install below grade protection board in conjunction with material application.

F. Place backfill at least 24 to 48 hours after application, but within 7 days. Do not rupture or damage film or displace coating or membranes.

3.04 CLEANING AND PROTECTION

A. Clean tools and equipment immediately with hot, soapy water. Cured material can be removed with solvent.

B. Clean up and properly dispose of debris remaining on Project site related to application.

C. Remove temporary coverings and protection from adjacent Work areas.

D. Protect application from damage during construction.

3.05 FIELD QUALITY CONTROL

A. Section 014500 - Quality Control: Field testing and inspection.

B. Inspect dampproofing application and test for minimum dry film thickness specified.

END OF SECTION 071113

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Rigid thermal board insulation.

B. Thermal kraft faced batt insulation.

C. Thermal accessories.

1.02 RELATED SECTIONS

A. Section 033000 - Cast-in-Place Concrete.

B. Section 042200 - Concrete Unit Masonry.

C. Section 061000 - Rough Carpentry.

D. Section 061753 - Shop Fabricated Wood Trusses.

1.03 REFERENCES

A. NFPA 255 - Test of Surface Burning Characteristics of Building Materials.

B. ASTM E84 - Test of Surface Burning Characteristics of Building Materials.

C. ASTM C665 Specification for Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

D. ASTM E136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C.

E. ASTM C518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter.

F. ASTM C423 Test Method for Sound Absorption Coefficient by the Reverberation Room Method.

G. UL 723 - Test of Surface Burning Characteristics of Building Materials.

1.04 SYSTEM DESCRIPTION

A. Provide continuity of thermal, vapor and air barrier at building enclosure elements.

1.05 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Submit manufacturer product data and technical information for each product and installation.

C. Manufacturer’s certificate: Certify that products meet or exceed specified requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS AND MATERIALS

A. Rigid thermal cavity insulation shall be Styrofoam CavityMate insulation as manufactured by the Dow Chemical Company, Formular CW25 as manufactured by the Owens-Corning Company, or approved equal, having the following requirements:
   1. The insulation shall be extruded polystyrene board, impervious to moisture and closed-cell structure with no voids between cells.
   2. Insulation shall meet the following specifications as a minimum:
      a. Thermal Resistance per ASTM C518 & C177 = R-5.0/inch
      b. Flammability per ASTM E84 = less than 25
      c. Moisture Resistance (absorption % by volume) per ASTM C272 = .02
      d. Moisture Resistance (absorption % by volume) per ASTM C355 = 0.6
      e. Density (lb/ct) per ASTM C303 = 2.1
      f. Compressive Strength (psi) perpendicular to board face per ASTM C1621 (0.1" Deflection or Yield) = 25
      g. Thermal Expansion (in/in/F) per ASTM D696 = .00005
      h. Maximum Operating Temperature (F) for continuous use = 165

B. Rigid thermal below grade insulation shall be equal to Styrofoam Highload 40 Insulation as manufactured by the Dow Chemical Company, Formular 400 high compressive strength insulation as manufactured by the Owens-Corning Company or approved equal, having the following requirements:
   1. The insulation shall be extruded polystyrene board, impervious to moisture and closed-cell structure with no voids between cells.
   2. Insulation shall meet the following specifications as a minimum:
      a. Thermal Resistance per ASTM C518 & C177 = R-5.6/inch
      b. Flammability per ASTM E84 = less than 25
      c. Moisture Resistance (absorption % by volume) per ASTM C272 = .02
      d. Moisture Resistance (absorption % by volume) per ASTM C355 = 0.6
      e. Density (lb/ct) per ASTM C303 = 2.1
      f. Compressive Strength (psi) perpendicular to board face per ASTM C1621 (0.1" Deflection or Yield) = 40
      g. Thermal Expansion (in/in/F) per ASTM D696 = .00005
      h. Maximum Operating Temperature (F) for continuous use = 165

C. Thermal batt insulation shall be kraft faced thermal batt fiberglass insulation as manufactured by Owens-Corning or approved equal.
   1. Batt insulation shall be a minimum of R-38 above ceiling and R-19 in frame walls unless noted otherwise.
   2. Install insulation with kraft facing warm-in-winter side. Fiberglass type batts shall be in conformance with ASTM C665, Type II.

D. Insulation baffles shall be Raft-R-Mate by Owens-Corning, Durovent by ADO Products, or approved equal.

E. Weather Barrier shall be Tyvek Commercial Wrap by DuPont or approved equal.

F. Accessories:
   1. Tape and Sealants: Type recommended by insulation manufacturer to meet requirements of C402.4.2 of the International Energy Construction Code.
   2. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions under provisions of Section 013100.

B. Verify that substrate, adjacent materials, and insulation are dry and clean and are ready to receive insulation.

3.02 INSTALLATION - BATTS

A. Install insulation and vapor barrier in accordance with manufacturer's instructions.

B. Install in exterior walls, roof, and ceiling spaces without gaps or voids. Do not compress insulation.

C. Install baffles to prevent roof insulation from blocking attic venting air flow.

D. Install batts to fill entire cavity. If stud cavity is less than 96" in height, cut lengths to friction fit against floor and ceiling tracks.

E. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

F. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.

G. Install insulation that is specified with factory applied vapor retarder with the vapor retarder membrane facing warm side of building spaces. Lap or tape ends, butt joints, tears, cuts, and side flanges of membranes.

H. Batts may be friction fit in place until the interior finish is applied.

I. Where walls are not finished on both sides or insulation does not fill the cavity depth, supplementary support must be provided to hold product in place.

J. Repair damaged or defective wall areas that may interfere with installation of insulation.

3.03 INSTALLATION - FOUNDATION & WALL PERIMETER

A. Adhere a 6 inch (150 mm) wide strip of polyethylene sheet over joints with double beads of adhesive each side of joint. Tape seal joints. Extend sheet full height of joint.

B. Apply adhesive in three continuous beads per board length. Tape seal all joints.

C. Install boards horizontally. Place boards in a method to maximize contact bedding. Stagger joints. Butt edges and ends tight to adjacent board and to protrusions.

D. Extend boards over control and expansion joints, unbonded to foundation or masonry 3 inches (75 mm) to one side of joint.

E. Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

3.04 PROTECTION

A. Do not permit work to be damaged prior to covering insulation.

B. Protect work until placement of backfill or concrete.

3.05 CLEAN-UP

A. Remove all rubbish accumulated in connection with this Section.

B. Replace any materials damaged by installation of materials associated with this section.

END OF SECTION 072100

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Granular surfaced fiberglass asphalt shingle roofing.

B. Leak barrier and roof deck protection and all other items essential to the completeness of the roofing installation, though not specifically specified, shall be provided for a watertight installation meeting the manufacturer's warranty requirements.

C. Metal flashings, ridge vent, starter shingles and all accessories essential to the completeness of the roofing installation.

1.02 RELATED SECTIONS

A. Section 061000 - Rough Carpentry.

B. Section 076200 - Flashing and Trim.

C. Section 077123 - Gutters and Downspouts.

1.03 REFERENCES

A. ASTM A653/A653M - Steel Sheet, Zinc Coated or Zinc-Iron Alloy Coated by the Hot-Dip Process.

B. ANSI/ASTM B209 - Aluminum Alloy Sheet and Plate.

C. ANSI/ASTM D226 - Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

D. ANSI/ASTM D3018 - Class A - Asphalt Shingles Surfaced with Mineral Granules.

E. ASTM D3462 - Standard Specification for Asphalt Shingles made from Glass Felt and Surfaced with Mineral Granules.

F. ASTM D3161 Type 1 - Wind Resistance of Asphalt Shingles.

G. ASTM A361 - Sheet Steel, Zinc Coated (Galvanized) by the Hot Dip Process for Roofing and Siding.

H. ASTM D4586 - Asphalt Roof Cement, Asbestos-Free.

I. ASTM B370 - Copper Sheet and Strip for Building Construction.

J. ASTM D2218 - impact Resistance of Prepared Roof Covering materials.

K. ASTM D7158 - Standard Test Method for Wind Resistance of Sealed Asphalt Shingles (Uplift Force/ Uplift Resistance Method).

L. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance and Transmission of Materials Using Integrating Spheres.

M. National Roofing Contractors Association - NRCA Steep Roofing Manual.

N. Asphalt Roofing Manufacturers Association - ARMA.

O. UL 580 - Tests for Wind Uplift Resistance of Roof Assemblies.

P. UL 997 - Wind Resistance of Prepared Roof Covering Materials.

Q. UL 790 - Tests for Fire Resistance of Roof Covering Materials.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide data indicating material characteristics, performance criteria, colors, and limitations including Energy Star acceptance.

C. Shop Drawings: Indicate specially configured metal flashings, jointing methods and locations, fastening methods and locations, and installation details.

D. Samples: Submit two sample boards indicating the manufacturer's full line of available colors. Submit two full size sample shingles indicating size, texture, color and overall appearance.

E. Manufacturer's Instructions: Indicate preparation required and installation proce-dures.

F. Certificate of Compliance: Provide a Certificate of Compliance from an independent laboratory indicating that the asphalt fiberglass shingles made in normal production meet or exceed the following requirements:
   1. ASTM E 108/UL 790 Class A Fire Resistance
   2. ASTM D 3161/UL 997 Wind Resistance
   3. ASTM D 3462

G. Manufacturer's written certification indicating roofing applicator qualifications comply with those necessary to obtain specified warranty.

H. Sample warranty for review.

1.05 QUALITY ASSURANCE

A. Roof system shall be an integrated system providing single source responsibility from the manufacturer.

B. Manufacturer Qualifications: Company specializing in manufacturing the roofing system products specified in this section, with a minimum of 25 years' experience.

C. Installer Qualifications: Certified and trained by the shingle manufacturer for steep slope installation, certified to install enhanced warranty projects, such as GAF Master Elite Roofing Contractor, CertainTeed Master Shingle Applicator Wizard or approved equal.

D. Perform work in accordance with NRCA Steep Roofing Manual.

E. A final inspection is to be conducted by a manufacturer's roofing inspector.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code(s) for UL 790 Class A fire resistance and ASCE 7, UL 997 and UL 580 wind uplift for shingle types specified.

1.07 DELIVERY, STORAGE AND HANDLING

A. Store products under the provisions of Section 016500, and in accordance with manufacturer's instructions.

B. Store all products in manufacturers unopened, labeled packaging until they are ready for installation. Store products in a covered, ventilated area, at a temperature not more than 110 degrees Fahrenheit, do not store near stream pipes, radiators, or direct sunlight.

C. Store bundles on a flat surface. Maximum stacking height shall not exceed manufacturer's recommendations. Store rolls on ends.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not install eave edge protection and shingles when ambient temperatures are below 50°F (10°C).

1.09 PROTECTION

A. It shall be the Contractor's responsibility to respond immediately to correction of roof leakage during construction. A four (4) hour time limit shall be given from the time of notification of emergency conditions. In the event of water penetration during rain or a storm, the Contractor shall provide for repair or protection of the building contents and interior. If the Contractor does not respond or cannot be contacted, the Owner will effect repairs or emergency action and the Contractor shall be back charged for all expenses and damages, if any.

B. Protect the building and the contents of the building from all risks resulting from the work. Contractor shall be sufficiently prepared to expediently install a temporary membrane to protect areas of incomplete roofing in the event of rain.

C. Contractor must take every precaution to prevent interior leakage, materials from falling into the interior, or other such occur-rences.

D. Do not load or permit any part of structure to be loaded with a weight that will endanger its safety or cause damage. Confine equipment, storage of materials and debris and the operations and movements of workmen within any limits as indicated or as directed by the Owner.

1.10 WARRANTY

A. Provide to the Owner a complete system warranty from the manufacturer such as GAF WeatherStopper Golden Pledge Warranty, CertainTeed SureStart Plus 5-Star Warranty or approved equal. Contractor must be a GAF Certified Master Elite Contractor, CertainTeed Master Shingle Applicator Wizard or approved equal.
   1. Material defects: Warranty shall provide 100% non-prorated coverage for materials and labor for 40 years.
   2. Workmanship errors: Warranty shall provide 100% coverage for workmanship errors for the first 20 years.
   3. In addition to the requirements listed above, the installer must register and pay for this warranty. The Warranty will be issued and accepted only if the project passes the manufacturer's final inspection.

1.11 EXTRA MATERIALS

A. Furnish under provisions of Section 016500.

B. Provide extra shingles of each color specified in unopened packages, capable of covering 2 percent of cov-ered area.

PART 2 - PRODUCTS

2.01 MANUFACTURERS - ASPHALT SHINGLES

A. GAF Materials Corporation, 1361 Alps Road, Wayne, NJ 07470.

B. CertainTeed Corporation, P.O. Box 860, Valley Forge, PA 19482.

C. Or approved equal.

2.02 MATERIALS

A. GAF Timberline Ultra HD Lifetime High Definition Shingles, super heavyweight, granule surfaced, self-sealing asphalt shingle, reinforced with fiberglass Micro Weave core and Stain Guard protection which prevents pronounced discoloration from blue-green algae through formulation/blends of granules. Architectural laminate styling provides a wood shake appearance with a 5” or 5-5/8” exposure and features GAF’s patented High Definition color blends and enhanced shadow effect. Color and pattern as selected by Owner from manufacturer’s full range of colors available.

B. CertainTeed Landmark Premium Shingles, 300 pounds per square, composed of a fiberglass mat base with ceramic coated colored/UV resistant mineral service granules across entire face of the shingle tightly embedded in carefully refined, water resistant asphalt. The two pieces of the shingle are firmly laminated together in a tough asphaltic cement, and are self-sealing, algae-resistant construction. Architectural laminate styling provides a wood shake appearance with a 5” or 5-5/8” exposure and features CertainTeed’s Max Def color blends and enhanced shadow effect. Color and pattern as selected by Owner from manufacturer’s full range of colors available.

C. Or approved equal.

2.03 ACCESSORIES

A. Hip and Ridge Shingles: High profile self-sealing ridge cap shingle matching the color of selected roof shingle.

B. Starter Strip: Pre-cut self-sealing starter shingle with factory applied adhesive, designed for premium roof shingles matching the color of selected roof shingle.

C. Leak Barrier: Self-adhering, self-sealing, bituminous leak barrier surfaced with fine, skid-resistant granules, Install leak barrier at valleys and around dormers, sidewalls, firewalls, chimneys, plumbing vents, and skylights.

D. Shingle Underlayment: Premium, water repellant, breather type roofing underlayment meeting ASTM D226 and D4869.

E. Roofing Cement: Asphalt Plastic Roofing Cement meeting the requirements of ASTM D4586, Type I or Type II, asphalt type with mineral fiber components, free of toxic solvents, capable of setting within 24 hours at temperatures of 75 F (24 C) and 50% RH.

F. Ridge Vent: Flexible rigid plastic ridge ventilator designed to allow the passage of hot air from attics, while resisting snow infiltration and for use in conjunction with eave/soffit ventilation products.

G. Soffit Vents: As specified in Section 074633 - Vinyl & Polymer Siding.

H. Nails: Standard round wire, zinc-coated steel or aluminum; 10 to 12 gauge, smooth, barbed or deformed shank, with heads 3/8 inch (9mm) to 7/16 inch (11mm) in diameter. Length must be sufficient to penetrate into solid wood at least 3/4 inch (19mm) or through plywood or oriented strand board by at least 1/8 inch (3.18mm).

I. Metal Flashing: As specified in Section 076200 - Flashing and Trim. 20-inch (510 mm) width minimum; shop precoated with silicone coating of clear color, a non-corroding metal drip edge must be used at eaves and at rake edges.

2.04 FLASHING

A. Form flashings to protect roofing materials from physical damage and shed water.

B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

C. Hem exposed edges of flashings minimum 1/4 inch (6 mm) on underside.

D. Apply bituminous paint on concealed surfaces of flashings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing site conditions under provisions of Section 013100.

B. Verify that roof penetrations are in place and flashed to deck surface.

C. Verify roof openings are correctly framed prior to installing work of this Section.

D. Verify deck surfaces are clean, dry and smooth, free of moisture, ridges, warps or voids, and suitable for installation of roof system.

E. Beginning of installation means installer accepts existing conditions and substrate.

3.02 PREPARATION

A. Examine existing roof deck surface to receive new roof system for moisture damage, unevenness, irregularities and deflection that would affect quality and execution of work. If deck surface is not suitable for receiving new roofing, or if structural integrity of deck is suspect, immediately notify Architect/Engineer.

B. Areas of existing roof deck that are damaged or deteriorated shall be inspected by Architect/Engineer and roofing manufacturer’s representative. Repair areas as directed in accordance with manufacturer’s instructions.

C. Fill knot holes and surface cracks with latex filler at areas of bonded eave protec-tion.

D. Broom clean deck surfaces thoroughly.

3.03 INSTALLATION - RIDGE VENT

A. Install ridge vent along entire length of ridges.

B. Cut continuous vent slots through the sheathing, stopping 6 inches from each end of the ridge. On roofs without ridge board, make slot 1 inch wide on either side of the peak (2 inches overall) and on roofs with ridge board, make two slots 1-3/4 inches wide one on each side of the peak (3-1/2 inches overall).

C. Install ridge vent material along the full length of the ridge, including uncut areas. Butt ends of ridge vent material and join using roofing cement.

3.04 INSTALLATION - UNDERLAYMENT

A. Install flat and without wrinkles in accordance with manufacturer's instructions.

B. Eaves:
   1. Install eave metal flashing tight with fascia boards; lap joints 2 inches (51mm) and seal with plastic cement or high-quality urethane sealant; nail at the top of the flange.
   2. On all roofs install leak barrier up the slope from eaves edge a full 36 inches (914mm) or to at least 24 inches (610 mm) beyond the interior "warm wall". Lap ends 6 inches (152mm) and bond.

C. Hips and Ridges:
   1. Install leak barrier along entire lengths. If ridge vents are to be installed, position the leak barrier so that the ridge slots will not be covered.

D. Roof Deck:
   1. Install underlayment over a clean dry deck; install sheets horizontally so water sheds.
   2. Install leak barrier at eaves, valleys, rakes, skylights, dormers and other vulnerable leak areas.
   3. Lay underlayment over deck and overlap 12" at side laps and 12" at end laps. Fasten side and end laps 12" o.c. and middle of the roll 24" o.c. Completely cover all side laps, end laps and fasteners with tape.
   4. Lap underlayment over leak barrier in valley at least 6 inches.
   5. Apply tape over all fasteners at the center of the roll to prevent rain or snow from entering at the fasteners.

E. Penetrations:
   1. Vent pipes: Install a 24-inch square piece of leak barrier membrane lapping over roof deck underlayment; seal tightly to pipe.
   2. Rake edges: Install metal edge flashing over leak barrier membrane and roof deck underlayment; set tight to rake boards; lap joints at least 6 inches and seal with plastic cement; secure with nails. On all roofs install leak barrier up the slope from eaves edge along rake a full 36 inches (914mm) or to at least 24 inches (610 mm) beyond the interior "warm wall".

3.05 INSTALLATION - METAL FLASHING

A. Weather lap joints minimum 2 inches (50 mm) and seal weather tight with plastic cement.

B. Secure in place with nails at 12 inches (300 mm) on center. Conceal fastenings.

C. Flash and seal work projecting through or mounted on roofing with plastic cement, weather tight.

D. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counter flashings.

E. Install ridge vent per manufacturer’s instructions.

3.06 INSTALLATION - ASPHALT SHINGLES

A. Install shingles in accordance with manufacturer's instructions.

B. Minimize breakage of shingles by avoiding dropping bundles on edge, by separating shingles carefully and by cutting and not breaking over ridge or bundles. Handle carefully in hot weather to avoid scuffing the surfacing or damaging the shingle edges.

C. Placement and Nailing:
   1. Along rakes and eaves install starter strip containing sealant or cement to underlayment and each other in a 4” width of asphaltic roof cement. Secure with 6 nails.
   2. Nails must be driven flush with the shingle surface. Do not overdrive or under drive the nails.
   3. Each shingle shall be securely nailed with six (6) min. 1² long, large head galvanized roofing nails. Nailing points shall be one nail (1²) one inch, (8²) eight inch and (14²) fourteen inch from each end and 5-5/8² from bottom of shingle.
   4. Consult the application instructions for proper shingle offset. Laterally offset shingles from the existing keyways to avoid waves or depressions caused by excessive dips in the roofing materials. Using the bottom of the tab, align subsequent courses.
   5. Project first course of shingles 3/4 inch (19 mm) beyond fascia boards.
   6. Extend shingles 1/2 inch (13 mm) beyond face of gable edge fascia boards.
   7. At ridges, install ridge cap shingles over vent material, maintaining 5-inch (127 mm) weather exposure. Do not drive nails home, leaving 3/4² (19 mm) slot open between ridge and roof shingles. Place ridge cap shingles to avoid exposed nails and in accordance with manufacturer's instructions.

D. Penetrations: All penetrations are to be flashed according to manufacturer, ARMA and NCRA application instructions and construction details.

E. Complete installation to provide weather tight service.

3.07 FIELD QUALITY CONTROL

A. Avoid breaking shingles by separating carefully and avoiding dropping. Take extra precautions and handle carefully in hot or cold weather.

B. Field inspection will be performed under provisions of Section 014500. Schedule required manufacturer inspections required for warranty.

3.08 PROTECTION

A. Protect finished work under provisions of Section 015000. Provide temporary protective sheeting over uncovered deck surfaces at the end of the day.

B. Do not permit traffic over finished roof surface.

C. Replace any shingles damaged during the course of the work at no additional cost to the Owner.

END OF SECTION 073113

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preformed vinyl polymer shakes and shingle siding.

B. Preformed vinyl polymer soffit panels.

C. Underlayment.

D. Accessories and trim.

1.02 RELATED SECTIONS

A. Section 042200 - Concrete Unit Masonry.

B. Section 061000 - Rough Carpentry.

C. Section 076200 - Flashing and Trim.

D. Section 079200 - Joint Sealants.

1.03 REFERENCES

A. ASTM D 3679 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding.

B. ASTM D 4477 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Soffit.

C. ASTM D 5206 - Standard Windload Resistance Test.

D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

E. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

F. ASTM D7254 - Standard Specification for Polypropylene (PP) Siding.

G. VSI - Vinyl Siding Institute.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide manufacturer’s data on each product to be used indicating materials, component profiles, sizes and surface texture, color selection chart and installation methods.

C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations and installation details.

D. Manufacturer's Instructions: Indicate procedures and methods required for proper installation.

E. Samples: For each finish product specified, provide two complete sets of color chips representing manufacturer's full range of available colors and patterns along with two samples minimum size 36 inches long, representing actual product, color, and patterns.

F. Approved installer certification letter(s) from manufacturer documenting current ap-proval and not less than five years of experience with products specified.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have current 5-star Contractor or Master Craftsman credentials by Georgia-Pacific, CertainTeed or Equal. Provide installer with not less than five years of experience with products specified. In lieu of credentials, the Owner may consider accepting installer who pays to have the manufacturer's technical representative on site for the entire first day of installation and weekly site visits during the course of construction to ensure manufacturer's full warranty for the project.

B. Manufacturer Qualifications: Manufacturer shall not have less than twenty years of experience manufacturing vinyl products and shall be a member of Vinyl Siding Institute (VSI).

C. Mock-Up: Provide a mock-up for evaluation of installation techniques and workmanship.
   1. Finish areas as designated by Architect/Engineer.
   2. Do not proceed with remaining work until workmanship is approved by Architect/Engineer.
   3. Reinstall mock-up area as required to produce acceptable work.

D. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

E. Do not install siding which is wet or covered with ice or frost. Do not install siding on wet or frozen substrate. Do not install siding when precipitation is falling.

F. Fire Resistance: Provide vinyl siding products that meet or exceed the following ratings:
   1. Flame Spread Index < 25, smoke development rating <450, per ASTM E 84.
   2. Fire endurance classification of 1 hour, per ASTM E 119 as wall assembly.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 016500.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Do not store products directly on ground. All materials shall be blocked off the ground.

D. Properly support and handle siding such that the siding is not subject to any unnec-essary bending stress.

E. Reject all damaged material.

1.07 WARRANTY

A. Provide manufacturer's standard lifetime limited warranty on siding products and twenty-five-year color fade warranty, transferable to new owners.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Georgia Pacific Corporation, Vinyl Siding Products distributed by Blue Linx Corporation, 4300 Wildwood Parkway, Atlanta, Georgia 30339. Tel: (800) 839-2588 or (516) 425-1616; Fax: (516) 764-4818; Email: jmkelly@bluelinxco.com <mailto:jmkelly@bluelinxco.com>; Web: www.bluelinxco.com.

B. CertainTeed Corporation, Siding Products Group, P.O. Box 860, Valley Forge, Pennsylvania 19482. ASD. Tel: (800) 233-8990. Fax: (610) 341-7940; Email: ctsiding@certainteed.com <mailto:ctsiding@certainteed.com>; Web: www.certainteed.com <http://www.certainteed.com>.

C. Or Approved Equal prior to bid, see Section 012500 - Product Substitution Procedures.

2.02 MATERIALS

A. Vinyl Siding, Soffit and Components: Provide products made of extruded polyvinyl chloride as specified in this section and manufactured to comply with requirements of ASTM D 3679.
   1. Provide elongated nailing slots on nailing flanges to allow for movement.
   2. Factory-notch ends of horizontal panels to form overlapping joints.
   3. Provide products that meet weathering requirements of ASTM D 3679.

B. Vinyl polymer shake and shingle siding:
   1. Georgia Pacific: Cedar Spectrum, Owner shall select from manufacturers full range of styles (hand split siding or shingle siding).
   2. CertainTeed: Cedar Impressions, Owner shall select from manufacturers full range of styles (straight edge or staggered perfection shingles, straight edge rough-split shakes or staggered rough-split shakes).
   3. Shakes and shingles shall have a prominent wood grain finish, color through full thickness of material, minimum .100-inch thickness, minimum 3/4-inch projection and resistant to wind loads up to 156 mph.

C. Vinyl polymer soffit panels:
   1. Georgia Pacific: D5 double 5-inch perforated soffit.
   2. CertainTeed: Ironmax double 5-inch perforated soffit.
   3. Soffit panels shall have a minimum .044-inch thickness.

D. Owner shall select from manufacturers full range of available colors (standard, deluxe, premium and shaded) for all vinyl products.

2.03 VINYL CARPENTRY ACCESSORIES

A. Provide coordinating accessories by same manufacturer for a complete and proper installation, whether or not specifically indicated on the drawings, including but not limited to the following:
   1. Inside and outside corner posts.
   2. J-Channel.
   3. Under sill trim.
   4. Starter Strip per application.
   5. Lineal, band and finish boards.
   6. Mitered outside and inside corner posts.
   7. Window and door casings.
   8. Moldings, decorative and detail trim.
   9. Wall outlet, faucet, light trim plates, etc.

B. Provide galvanized or other corrosion-resistant nails as recommended by manufacturer of siding products.

C. Soffit clips, eave transition & closure strips, channels, one-piece corners, trim, edging, tracks, fasteners and any other accessories required to install the soffit panels.

2.04 WATER-RESISTIVE BARRIER

A. Spunbonded Polypropylene Weather Membrane with a microporous coating, Non-woven, Nonperforated, Tyvek Commercial Wrap or WRB provided by siding manufacturer.

B. Performance Characteristics:
   1. Gurley Hill sec/100cc >2500.
   2. Water Vapor Transmission 9-15 perms as tested by ASTM E-96-90, Method A.
   3. Water penetration resistance of 865 cm on hydrostatic head in accordance with AATCC-127.
   4. Trapezoidal Test of 30/33 in accordance with ASTM D-5733-9.
   5. Air-Ins < .02L/S•M2 @ 75 PA.
   6. Dry Indicator Method ASTM D-779 = to 24-hour rating.
   7. Manufacturer Warranty: Lifetime product replacement and/or system warranty.

C. Approved Tape & Sealants:
   1. Provided by Tyvek or WRB manufacturer.
   2. Elastomeric polymer based, butyl rubber, rubber based, meeting ASTM C920 evaluation.

D. Recommended Fasteners for Wood, Insulated Sheathing Board, Exterior Gypsum
   1. Plastic cap nails.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and wall openings are as required by the manufacturer, as indicated on approved shop drawings and ready to receive work. Do not begin installation until substrates have been properly prepared. Notify Architect/Engineer of unsatisfactory preparation before proceeding.

B. Beginning of installation means installer accepts existing conditions and substrate.

3.02 PREPARATION

A. Examine, clean, and repair as necessary any substrate conditions which would be detrimental to proper installation.

B. Do not begin installation until unacceptable conditions have been corrected.

3.03 INSTALLATION - SIDING

A. Install pressure treated 2”x3” furring strips on masonry at 16” on center and around perimeter of openings. Install 2” rigid insulation board between furring strips, stagger joints. Install 5/8” exterior grade plywood sheathing over furring strips and rigid insulation or other wood frame construction, stagger joints in accordance with manufacturer’s recommendations.

B. Install one layer of underlayment (Tyvek Commercial Wrap or equal) horizontally on wood frame surfaces. Weather lap edges and ends minimum 6 inches. Stagger vertical joints and securely fasten in place. Seal seams, joints and penetrations through WRB with specified tape and fasteners prior to installation of finish material. WRB shall be air tight and free from holes, tears, and punctures. All window and door penetrations are to be flashed and sealed with manufacturer approved flashing material per ASTM 2112, AMMA guidelines and manufacturer instructions. Cover with exterior cladding within 24 hours of installation.

C. Install products in accordance with the latest printed manufacturer's instructions. Securely fasten products with all components in place, properly aligned, leveled, true and plumb.

D. Nail horizontal panels by placing nail in center of slot. Drive nails straight, leaving 1/16-inch (1.6 mm) space between nail head and flange of panel. (Note: Refer to Installation Manual for latest installation recommendations).

E. Allow space between both ends of siding panels and trim for thermal movement. Overlap horizontal panel ends one-half the width of factory pre-cut notches.

F. Stagger lap joints in horizontal siding in uniform pattern as successive courses of siding are installed.

G. Install J-channel and flashing to accommodate successive courses of siding. Install wood shims at building corners to bring cut edges of vertical siding out to correct plane.

H. Install starter strips, corner posts, trim boards, window and door casings, etc. as required for a complete and watertight job.

I. Fabrication of component profile on site not permitted.

J. Ensure site cuttings or burred edges do not remain on finish surfaces.

K. Conceal all fasteners.

L. Place sealant or gaskets to arrest weather penetration. Maintain neat appearance.

3.04 INSTALLATION - SOFFIT

A. Install soffit panels, accessories and any required supports per manufacturer's instructions. System shall allow for quick and easy installation and have a special lock which prevents slipping of the panel.

B. Erection of the soffit panels must be started correctly and the sections held true to line. Horizontal lines are to be straight and level and vertical lines plumb.

C. Soffit panel ribs shall be installed perpendicular to the fascia. Corners shall be mitered.

D. Install flashing and trim as required to achieve positive drainage. Hem all exposed edges of flashing, trim or closer strips.

3.05 TOLERANCES

A. Maximum Variation from Plumb or Level: 1/8 inch in 10 feet, non-cumulative.

B. Maximum Variation for Plan of Wall: 1/16 inch at any point.

3.06 CLEANING AND PROTECTION

A. Protect finished work under provisions of Section 015000.

B. Clean adjacent areas and siding of excess sealant.

C. Clean siding soiled during installation with a method approved by the manufacturer.

D. Protect installed products until completion of project and acceptance by Owner.

E. Touch-up, repair or replace damaged products before Substantial Completion at no additional cost to the Owner.

END OF SECTION 074633

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Sheet metal flashing, flashing accessories, flashing sleeves and collars at mechanical and plumbing items, which extend through the roof or wall surfaces.

B. Fastening hardware such as nails, screws, wedge blocks, etc.

C. Sheet metal capping over wood trim.

1.02 RELATED WORK

A. Section 042200 - Concrete Unit Masonry

B. Section 061000 - Rough Carpentry

C. Section 062000 - Finish Carpentry

D. Section 073113 - Asphalt Shingles

E. Section 074633 - Vinyl & Polymer Siding

F. Section 079200 - Joint Sealants

1.03 REFERENCES

A. ASTM A-446 Specification for Steel Sheet

B. ASTM B-209 Specification for Aluminum Sheet

C. ASTM B-221 Specification for Aluminum Extruded Shapes

D. FS QQ-L-201 Specification for Lead Sheet

E. ASTM A792 Steel Sheet, Aluminum-Zinc Alloy-Coated, by the Hot-Dip Process

F. ASTM B32 Solder Metal

G. ASTM B209 Aluminum and Alloy Sheet and Plate

H. ASTM B486 Paste Solder

I. ASTM D226 Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

J. ASTM D486 Asphalt Roof Cement, Asbestos-free

K. FS O-F-506 Flux, Soldering, Paste and Liquid

L. WH Warnock Hersey International, Inc., Middleton, WI.

M. FM Loss Prevention Data Sheet

N. NRCA National Roofing Contractors Association - Roofing Manual

O. SMACNA Architectural Sheet Metal Manual

1.04 SUBMITTALS

A. Section 013300 Submittal Procedures.

B. Product Data: Submit manufacturer's literature of all materials specified herein to Architect/Engineer for approval in accordance with requirements described in General Requirements. Obtain approval from Architect/Engineer in writing prior to delivery and installation.

C. Shop Drawings: Submit shop drawings for all metal flashing and trim. Submitted shop drawings shall include, but shall not be limited to the following:
   1. Dimensioned drawings of all metal flashing at roof and wall penetrations and at changes and terminations of roofing and wall materials. Indicate proposed material, gauge and accessories.
   2. Indicate material profile, jointing pattern, jointing details, method of lapping joints, providing for expansion and turning corners, fastening methods, flashing terminations, and other installation details.

D. Samples: Submit two samples 12 inches long illustrating typical gauge, external corner, internal corner, junction to vertical dissimilar surface, flashing and capping material and finish.

1.05 QUALITY CONTROL

A. Fabricator and Installer: Company specializing in sheet metal flashing work with 6 years' experience. Provide documentation of experience with a minimum of twelve references for custom fabrication work upon request.

B. Reference standards
   1. Comply with details and recommendations of SMACNA Manual for workmanship, methods of joining, anchorage, provisions for expansion, etc.

C. Manufacturer's Warranty
   1. Pre-finished metal material shall require a written 20-year non-prorated warranty covering fade, chalking and film integrity. The material shall not show a color change greater than 5 NBS color units per ASTM D-2244 or chalking excess of 8 units per ASTM D-659. If either occurs material shall be replaced per warranty, at no cost to the Owner.

D. Contractor's Warranty
   1. The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of five years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.

1.06 DELIVERY, STORAGE AND PROTECTION

A. Deliver and store materials in manufacturer's original, unopened containers or packages with labels intact and legible under the provisions of Section 016500.

B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials, which may cause discoloration or staining. Materials shall be stored in a safe, dry place.

1.07 GENERAL REQUIREMENTS

A. Proper Surfaces: Surfaces to which roofing and flashings are to be applied shall be even, smooth, sound, thoroughly clean and dry, and free from all defects that might affect the application. Report any unsatisfactory surfaces to Archi-tect/Engineer in writing, prior to commencing work.

B. Accessories: All accessories or other items essential to the completeness of the metal flashing installation, though not specified, shall be provided. All such items, unless otherwise indicated on drawings or specified, shall be of same material as the item to which applied. Nails, screws and bolts shall be of the types best suited for the purpose intended and shall be of a composition that is compatible with the metal that it will contact.

C. Dissimilar Materials: Where materials come in contact with dissimilar metals, an insulating paint or tape shall be applied between the dissimilar metals to prevent electrolysis between the two materials.

D. Workmanship: Except as otherwise indicated on drawings or specified, the work-manship of metal flashing work, method of forming joints, anchoring, cleating, pro-visions for expansion, etc. shall conform to the standard details and recommenda-tions of the following:
   1. The Aluminum Association.
   2. Federal Specifications.
   3. ASTM.
   4. Architectural Sheet Metal Manual, latest edition as published by the Sheet Metal and Air Conditioning Contractors National Association, Inc.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Flashing, counter flashing, flashing associated with mechanical and plumbing items and material for trim capping.
   1. Material: Continuous sheet, ASTM B209, .040-inch thickness. Coil stock will not be permitted. Provide proper size material to cap scheduled items, 20-inch (510 mm) width minimum for roof flashing.
   2. Mill finish for all roof penetration flashing.
   3. Finish - shop precoated with Kynar 500 or Hylar 5000 baked enamel finish.
   4. Flashing Nails: Standard round wire roofing type, hot dipped zinc coated steel; minimum 19/64-inch (7.54 mm) head diameter and 0.104-inch (0.356 mm) shank diameter; of sufficient length to penetrate through roof sheathing into wood sub-strate. Screws, bolts and nuts for fastening aluminum sheet metal work shall be made of aluminum alloys 6061-T6. Washers of similar material shall be used to pre-vent tearing of sheet metal.

B. Aluminum Sill: .040 aluminum continuous sheet sill, where indicated on drawings.

C. Aluminum Capping: .032 Aluminum sheet material, color as selected by Owner.

D. Nails for fastening aluminum sheet metal work shall be made of aluminum alloys 6062 or 5056 meeting Federal Specification FF-N-105, Type 2, Style 20. Screws, bolts and nuts for fastening aluminum sheet metal work shall be made of aluminum alloys 6061-T6. Washers of similar material shall be used to prevent tearing of sheet metal.

2.02 ACCESSORIES

A. Sealant: Specified in Section 079200 - Joint Sealants.

B. Slip Sheet: Resin paper.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square and free from distortion or defects.

B. Fabricate cleats, interlockable with sheet.

C. Form pieces in longest possible lengths, in single-length sheets. Short lengths or splices will be unacceptable.

D. Hem exposed edges on underside ¼ inch, miter and seam corners.

E. Fabricate vertical faces with bottom edge formed outward ¼ inch and hemmed to form drip.

F. Form corners from one piece with 18-inch minimum legs. Solder joints.

G. Prime and paint all wood trim scheduled to receive capping.

H. Form flashings to protect roofing materials from physical damage and to shed water. Seal metal joints.

I. Apply bituminous paint on concealed surfaces of flashings.

PART 3 - EXECUTION

3.01 FABRICATION

A. All metal flashing and trim work shall be fabricated in strict accordance with the detailed drawings and with best trade practices. Ends of fabricated sheets shall be fastened to make joints watertight and still provide for expansion and contraction. Lines and angles shall be sharp and true. Plane surfaces shall be free from waves and buckles. No oil canning shall be accepted in finished work. Seams shall be watertight.

3.02 EXAMINATION

A. Section 013100 - Project Management and Coordination: Verification of existing conditions before starting work. Inspect all surfaces to which metal or metal accessories are to be installed. Do not install metal work unless such surfaces are sound, dry, clean and free of defects that might be detrimental to the metal work. Report any unacceptable conditions to the Architect/Engineer in writing before commencing work.

B. Protect contact areas of dissimilar metals with heavy asphalt or other approved coating, specifically made to stop electrolytic action.

C. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set and nailing strips located.

D. Verify membrane termination and base flashings are in place, sealed, and secure.

E. Beginning of installation means acceptance of existing conditions.

F. Field measure site conditions prior to fabricating work.

3.03 INSTALLATION

A. Flashing shall be installed in strict accordance with trade practices. Completed installation shall be true to line with shapes undistorted, not damaged, and with properly shaped angles. Provide expansion joints and other means for relieving stresses from expansion and contraction of the material.

B. Install work watertight, without waves, warps, buckles, fastening stress, or distortion, allowing for expansion and contraction.

C. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.

D. Flashing set into masonry shall be sealed with mortar. Tool joints tight and smooth.

E. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

F. Seal joints watertight.

G. Prime paint all wood trim scheduled to receive capping.

3.04 MANUFACTURED SHEET METAL SYSTEMS

A. Installing Contractor shall be responsible for determining if the sheet metal systems are in general conformance with roof manufacturer's recommendations and warranty requirements.

B. Furnish and install manufactured sheet metal systems in strict accordance with manufacturer's printed instructions.

3.05 SHOP FABRICATED SHEET METAL

A. Installing Contractor shall be responsible for determining if the sheet metal systems are in general conformance with roof manufacturer's recommendations and warranty requirements.

B. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.

C. Hem exposed edges. Angle bottom edges of exposed vertical surfaces to form drip.

D. All corners for sheet metal shall be lapped with adjoining pieces fastened and set in sealant.

E. Install sheet metal to comply with Architectural Sheet Metal manual, Sheet Metal and Air Conditioning Contractor's National Associations, Inc.

3.06 ERECTION TOLERANCES

A. Maximum Variation from Alignment: 1/8 inch.

3.07 GUARANTEE

A. The Contractor shall guarantee that all materials and workmanship provided by this section shall be guaranteed free of defects for a period of five (5) years from date of acceptance. Any defects arising within this period shall be promptly corrected without additional cost. This is in addition to the manufacturer's warranty.

END OF SECTION 076200

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Aluminum gutters, downspouts and accessories.

1.02 RELATED SECTIONS

A. Section 062000 - Finish Carpentry.

B. Section 073113 - Asphalt Shingles

C. Section 076200 - Flashing and Trim.

1.03 REFERENCES

A. ASTM B32 - Solder Metal.

B. ASTM B209 - Aluminum and Aluminum Alloy Sheet and Plate.

C. SMACNA - Architectural Sheet Metal Manual.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide data on prefabricated components.

C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations and installation details.

D. Samples: Submit two samples, 6 inches (150 mm) long, illustrating component design, finish, color and configuration.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code(s) for size and method of rain water discharge.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 016500.

B. Stack preformed and prefinished material to prevent twisting, bending or abrasion, and to provide ventilation. Slope to drain.

C. Prevent contact with materials during storage which may cause discoloration, stain-ing or damage.

1.07 COORDINATION

A. Coordinate work under provisions of Section 013100.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aluminum: ASTM B209, 3003 alloy, H14 temper; 0.040-inch-thick; mill finish interior, shop precoated Kynar 500 or Hylar 5000 finish, color white.

2.02 COMPONENTS

A. Gutters: SMACNA style profile seamless, 5” ogee profile.

B. Downspouts: SMACNA rectangular profile seamless 3”x4”.

2.03 ACCESSORIES

A. Anchorage Devices: Type recommended by fabricator.

B. Gutter Supports: Hidden flanges screwed to fascia

C. Downspout Supports: Straps.

D. End Caps, Elbows: Fabricate to gutter profile.

E. Fasteners: Aluminum finish exposed fasteners same as flashing metal.

F. Leaf Screen: 10 gauge welded screen, galvanized after fabrica-tion, sized to fit and cover entire length of gutter with gaps.

G. Boot Cap: Provide 4”x3”x12” cast iron boot cap, Zurn model Z192 or equal, to transition into drain pipe at each downspout location.

H. Primer: Zinc chromate type.

I. Protective Backing Paint: Bituminous.

2.04 FABRICATION

A. Form gutters and downspouts of profiles and sizes indicated in accordance with approved shop drawings.

B. Fabricate with required connection pieces.

C. Form sections square, true and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

D. Hem exposed edges of metal.

E. Solder shop formed metal joints. After soldering, remove flux. Wipe and wash sol-der joints clean. Weather seal joints.

F. Fabricate gutter and downspout accessories; seal watertight.

2.05 FINISHES

A. Apply bituminous protective backing on surfaces in contact with dissimilar materi-als.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

3.02 INSTALLATION

A. Install gutters, downspouts and accessories in accordance with manufacturer's instructions and approved shop drawings.

B. Slope gutters 1/8 inch per foot minimum to leader locations.

C. Seal metal joints watertight.

D. All gutters to be fastened maximum 32 inches o.c.

END OF SECTION 077123

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

B. Perimeter of wall openings, joints and ends.

C. Joints of all material requiring caulking or sealants and to prevent water, moisture, and air infiltration.

D. Perimeter of piping/wall and/or floor.

E. Intersections of different materials requiring caulking and sealants.

1.02 REFERENCES

A. ASTM C790 - Use of Latex Sealing Compounds.

B. ASTM C804 - Use of Solvent-Release Type Sealants.

C. ASTM C834 - Latex Sealing Compounds.

D. ASTM D1056 - Flexible Cellular Material - Sponge or Expanded Rubber.

E. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specifications.

1.03 SUBMITTALS

A. Submit under provision of Section 013300.

B. Manufacturer's complete descriptive data and color availability.

C. Manufacturer’s installation instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

D. Submit schedule of all conditions and joints requiring caulking and sealant proposed for each condition.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with sealant manufacturer’s requirements for preparation of surfaces and material installation instructions.

B. All work shall be performed by a qualified caulking and sealant contractor, who has specialized in this type of work for a minimum of five (5) years. Provide a minimum of five (5) references to the engineer for review and approval.

1.05 PERFORMANCE REQUIREMENTS

A. Install sealants to prevent air and moisture from infiltrating or migrating from the building exterior to the interior.

1.06 PROTECTION

A. Mask surrounding surfaces.

B. Protect sealants until cured.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.09 WARRANTY

A. The products covered under this Section shall be covered by the manufacturer's standard 5-year warranty and include coverage for installed sealants and accessories which fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.01 SEALANT MANUFACTURERS

A. Sealants shall be manufactured by Bostik, TPI, 3M, Dow Corning or equal.

2.02 SEALANTS

A. Acrylic latex sealant (Interior): ASTM C920, paintable grade; single component, solvent curing, non-staining, non-bleeding, non-sagging.

B. Polyurethane sealant (Exterior): ASTM C92C, multi-component, chemical curing, non-staining, non-bleeding, non-sagging.

C. Caulking compounds shall be non-staining. Selection based upon manufacturer's recommendations for type of surface material and submitted to the Architect/Engineer for approval.

D. Butyl: One-part butyl non-sagging, FSTT-5-1657.

E. One Part Silicone: ASTM C920, Type 5, Grade HS, Class 75, vertical surfaces.

F. Backing material shall be inserted into joint to the proper depth to allow for the proper balance of joint and sealant dimensions. Avoid excessive longitudinal stretching of rods during installation.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint cleaner: Non-corrosive and non-staining type, as recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint backing: Round, closed cell polyethylene foam rod, oversized 50% larger than joint width; as recommended by sealant manufacturer; and compatible with sealant.

D. Bond breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate surface and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer’s instructions.

C. Perform preparation in accordance with manufacturer’s instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfiguration.

E. Apply masking tape. Do not allow tape to touch surface to which caulking or sealant is to be applied.

3.03 INSTALLATION

A. Perform installation in accordance with sealant manufacturer’s requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Install sealant to achieve performance requirements, in accordance with manufacturer’s instructions.

D. Measure joint dimensions and size material to achieve required 2:1 width/depth ratios.

E. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.

F. Remove masking tape immediately after tooling of sealant is accomplished and before surface skin has started to form.

G. Install bond breaker where joint backing is not used.

H. Install sealant free of air pockets, foreign embedded matter, ridges and sags.

I. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

J. Apply sealant in continuous uniform bed.

K. Tool joints concave, flush with surface of adjoining material.

L. Match color of sealant to adjoining material.

3.04 CLEANING

A. Comply with the requirements of Section 017423.

B. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

A. Protect sealants until cured and until project completion.

END OF SECTION 079200

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fiberglass Reinforced Plastic (FRP) flush doors and frames.

B. Reinforcement, anchorage, accessories and attachment items, trim, shims and closures.

C. Factory preparation for hardware.

1.02 RELATED SECTIONS

A. Section 042200 - Concrete Unit Masonry.

B. Section 074633 - Vinyl and Polymer Siding.

C. Section 079200 - Joint Sealants.

D. Section 087100 - Finish Hardware.

1.03 REFERENCES

A. NYS Uniform Fire Prevention and Building Code.

B. Accessible and Usable Buildings and Facilities CABO/ANSI A117.1-1992.

C. ASTM D 523 - Standard Test Method for Specular Gloss.

D. ASTM D 635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

E. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

F. ASTM E 152 - Standard Methods of Fire Tests of Door Assemblies.

G. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.

H. SDI 100 - Recommended Specifications for Steel Doors and Frames.

I. UL 305 - Standard for Panic Hardware.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Shop Drawings: Drawings shall fully describe and locate all items being furnished and shall include large scale details of principal construction features and internal reinforcement. Indicate frame elevations, hardware, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finishes.

C. Product Data: Indicate frame and door configuration and finishes.

D. Submit color and texture chips of FRP door and frame colors and textures for selection by Owner. The selected color shall pigment both the gel-coat and exterior laminate.

E. Submit samples of finished materials, door section and exposed fastening devices for approval upon the Owner or Architect's request.

F. Calculations: Submit calculations for fiberglass composite door, verifying theoretical limits of thermal warpage based upon the exposure temperature differential.

G. Closeout: Submit warranty documents specified herein.

1.05 PROJECT CONDITIONS

A. Examine contract documents with respect to work indicated or required under this Section to ensure its completeness. Notify Architect of deficiencies in construction where attachment of the work of this Section is concerned. Contractor is responsible to coordinate hardware function and operation with all required system components.

B. Coordinate the work with frame opening construction, door and hardware installation.

1.06 QUALIFICATIONS

A. The manufacturer of the items herein shall have been regularly engaged in the manufacture and installation of the complete assembly specified herein for a period of no less than five (5) years. Upon request of the Owner or Architect, working samples and list of similar installations shall be submitted before approval.

B. Except when so described, the manufacture and fabrication must originate in that manufacturer's plant or plants.

C. The use of different finished components from more than one source of manufacture will not be acceptable.

D. Contractor with five (5) years documented experience installing FRP doors and frames. Contractor shall submit five (5) references for projects completed within the last two (2) years.

1.07 SITE STORAGE AND PROTECTION OF MATERIALS

A. Comply with the requirements contained in Section 016500 - Product Delivery, Storage, and Handling.

B. Any scratches or disfigurement caused in shipping or handling are to be promptly cleaned and touched up per manufacturers recommendations, and materials are to be properly stored on planks or dunnage, out of water, and covered to be protected from damage due to any cause.

C. Doors shall have their wrappings or coverings removed upon arrival at the building site and shall be stored in a vertical position, spaced by blocking to permit air circulation between them.

D. Provide packaging, separators, banding, spreaders and paper wrappings as required to completely protect all frames during transport and storage.

E. Remove defective or damaged material from project site within 24 hours.

F. Acclimate doors and frames to site conditions for a minimum of 24 hours before installation.

1.08 PERFORMANCE REQUIREMENTS

A. ASTM E84/NFPA 255: Door faces shall have a Class A rating with a flame spread of 25, or less, and a smoke developed rating of 450, or less.

B. Wind Loading: Design and reinforce doors and frames to withstand wind loading pressures indicated on the structural drawings.

1.09 WARRANTY

A. Furnish a written warranty covering repair of defects in materials, installation, and workmanship developing during the specified period at no extra cost to the Owner for the following:
   1. Doors and frames shall have a lifetime guarantee against failure due to corrosion from the specific environment named at the time of purchase.
   2. Doors and frames shall be guaranteed for ten years against failure due to materials and workmanship, including warp, separation or de-lamination, and expansion of the core.
   3. Hardware shall be warranted to be free of defects in both workmanship and materials for a period of one year.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. FIB-R-Dor, Div. of Advance Fiberglass, Inc.; 7516 Counts Massie Rd., N. Little Rock, AR 72113. ASD. Tel. Toll Free: (800) FIB-RDOR, Tel: (501)758-9494. Fax: (501) 758-9496. Website: www.fibrdor.com. <http://www.fibrdor.com.>

B. Simon Door Company, LLC, P.O. Box 4557, Brownsville, TX 78523; Tel: (866) 894-7511. Fax: (956) 831-7530. Website: www.simondoor.com <http://www.simondoor.com>.

C. Chem-Pruf Door Co., Ltd., P.O. Box 4560, Brownsville, Texas 78523, (800) 444-6924, Fax: 956-544-7943, Website: www.chem-pruf.com <http://www.chem-pruf.com>.

D. Approved equal.

2.02 MATERIALS

A. Fiberglass Reinforced Plastic (FRP) DOORS:
   1. Thickness: 1-3/4 inches.
   2. Thermal Insulating Value: 'R' factor 11.
   3. Construction:
      a. Core: End-grain balsa wood, resin-impregnated.
      b. Door Plates: Molded in one continuous piece, resin reinforced with hand-laid glass fiber mat, nominal 1/8-inch-thick, minimum 15-mil gel-coated surface.
      c. Door Edges: Minimum 3 layers resin-reinforced glass fiber mat, nominal 3/8-inch-thick, machine tooled.
   4. Sizes: Indicated on drawings.
   5. Door Plates: 1/8-inch-thick, molded in one continuous piece, starting with a 25-mil gelcoat of the color specified, integrally molded with at least two layers of 1.5 ounce per square foot fiberglass mat and one layer of 18 ounces per square yard woven roving. This will yield a plate weight of 0.97 lbs. per square foot at a ratio of 30/70 glass to resin.
   6. Finish: Flush, smooth gloss surface, minimum value of 88 in accordance with ASTM D 523.
      a. Color and texture: To be selected by Owner.

B. Fiberglass Frames:
   1. Construction: One-piece pultruded fiberglass reinforced plastic, minimum 1/4-inch wall thickness, jamb-to-head joints mitered and reinforced with FRP clips and stainless-steel fasteners; conforming to SDI requirements for performance equivalent to 16 gage steel frames.
   2. Frame profile: as Indicated on drawings.
   3. Sizes: as Indicated on drawings.
   4. Finish: Satin Co-Extruded finish, with true and consistent color throughout frame thickness.
   5. Color: To be selected by Owner.

C. Frame Anchors: Manufacturer's standard stainless-steel expansion anchors for existing openings, and stainless-steel masonry tee anchors for new construction. Provide jamb anchors within 18 inches of top and bottom each frame and at 24 inches on center in between.

D. Door Hardware: Specified in Section 087100.

E. Accessories:
   1. Rubber silencers at interior doors.
   2. Vision Lite - Type 9 or 10 beveled pultruded fiberglass reinforced plastic frame with stainless steel fasteners on interior or less public side of door. See Section 088100 for glazing information.
   3. Sizes: Indicated on drawings.

2.03 FABRICATION

A. Fiberglass Reinforced Plastic (FRP) Doors:
   1. Minimum glass fiber to resin ratio: 30 percent.
   2. Mortise for lockset, and recess for strike plate in lock stile.
   3. Embed steel reinforcement for hinges in fiberglass matrix; provide for hinge leaf recesses in hinge stile.
   4. Astragals shall be full height, fully fastened to face of active leaf.

B. Fiberglass Frames:
   1. Mortise for lock strike, and recess for strike plate in lock jamb.
   2. Reinforce for hinges and other required hardware.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Field verify that opening sizes and tolerances are acceptable. Beginning of installation means installer accepts existing conditions and substrate.

3.02 INSTALLATION

A. Install doors and frames in accordance with ANSI/SDI 100 and manufacturer’s instructions plum, level, and square.

B. Coordinate installation of doors with installation of frames and hardware specified in Section 087100. Interface and coordinate with other work.

C. Install frames plumb, level, square, and rigidly secured in the opening.

D. Adjust doors to fit snugly and close without sticking or binding.

E. Coordinate with masonry construction for anchor placement.

F. Protect materials to prevent scratching, twisting, and denting or otherwise damaging.

G. Caulk interior and exterior perimeter of frames.

H. Shim frames every 12 to 16 inches.

I. Secure frame with appropriate anchors and hardware.

J. Set all entrance saddles in mastic.

K. Install and adjust all hardware and adjust to achieve quiet and smooth operation.

L. Install all weatherstripping.

3.03 ERECTION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

B. Maximum Clearances: 1/8 inch at jambs and heads, 1/4 inch at meeting stiles of pairs of doors, 1/4 inch between door bottom and finished floor or threshold.

3.04 ADJUSTING

A. Adjust work under provisions of Section 017500.

B. Adjust door and hardware for quiet, smooth and balanced door movement.

3.05 PROTECTION AND CLEANING

A. Upon completion of the work, all protection (including coatings) shall be removed and the exposed surfaces of the work cleaned and left in perfect condition free of smears, scratches and abrasions. Repair or replace damaged materials as directed by Architect / Engineer.

END OF SECTION 081500

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Hardware for all new doors.

B. Accessories and miscellaneous trim.

1.02 RELATED SECTIONS

A. Section 062000 - Finish Carpentry.

B. Section 081500 - Fiberglass Reinforced Plastic Doors and Frames.

1.03 REFERENCES

A. American National Standards Institute (ANSI);
   1. ANSI A156.3 - National Standard for Exit devices.
   2. ANSI A156.4 - National Standard for Door Controls - Closers.
   3. ANSI A156.6 - National Standard for Architectural Door Trim.
   4. ANSI A156.13 - National Standard for Mortise Locks & Latches.

B. National Fire Protection Association (NFPA):
   1. NFPA 80 - Fire Doors and Windows.
   2. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.
   3. NFPA 252 - Fire Tests of Door Assemblies.

C. Underwriters Laboratories (UL):
   1. UL 10B - Fire Tests of Door Assemblies.
   2. UL 305 - Panic Hardware.

1.04 GENERAL REQUIREMENTS

A. Keying:
   1. General - Locks must incorporate a security system to ensure that keys are used during construction will not open doors after District occupancy. Coordinate permanent locks with District’s standard keying.
   2. Construction Keys and Inserts - Permanent cylinders with construction inserts are to be assembled into and shipped with all exterior-door locksets. Construction keys are to be shipped with the door locks. Construction insert-extractor keys are to be shipped to the Owner via Registered Mail. Prior to substantial completion, the Contractor shall collect all construction keys and, in the presence of the Owner or Engineer, remove the construction inserts from the lock cylinders and give all construction keys and inserts to the Owner or Engineer.

1.05 SUBMITTALS

A. Comply with the requirements contained in Section 013300.

B. Product Data: Submit manufacturers' technical product data for each item of hardware. Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finishes. Hardware sets will not be considered for approval without technical product data.

C. Hardware Schedule: Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware.
   1. Final Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
      a. Type, style, function, size and finish of each hardware item.
      b. Name and manufacturer of each item.
      c. Fastenings and other pertinent information.
      d. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
      e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
      f. Mounting locations for hardware.
      g. Door and frame sizes and materials.
      h. Keying information.
      i. Coordination with access control system.
   2. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.

D. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Deliver, store and handle materials in accordance with the requirements of Section 016500.

B. Packing and marking: Package each item of hardware and each lock set separately in individual containers, complete with necessary screws, keys, instructions, and installation template for spotting mortising tools. Mark each container, identifying installation location of each item. Keep knobs suitably covered during construction period.

1.07 QUALITY ASSURANCE

A. Coordinate the work with other directly affected Sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.

B. Coordinate Owner’s keying requirements during the course of the Work. Furnish the Owner with ten (10) keys. Key all door cylinders to match Owner's master cylinder.

C. Perform work in accordance with the following requirements:
   1. ANSI A117.1
   2. NFPA 101.
   3. NFPA 80.
   4. NFPA 252.
   5. UL 10B.
   6. UL 305.

D. Regulatory Requirements:
   1. Conform to applicable code for requirements applicable to doors and frames.

2. Conform to ANSI A117.1-2003 "Accessible and Useable Buildings and Facilities" for mounting heights and locations of accessories.

E. Manufacturer: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

F. Supplier: A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware to similar projects for a period of not less than 10 years, and who employs an experienced Architectural Hardware Consultant (AHC) to prepare the hardware schedule submittal and who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements.

1.08 WARRANTY

A. Provide manufacturer’s standard minimum one-year warranty for all hardware.

1.09 MAINTENANCE PRODUCTS

A. Provide special wrenches and tools applicable to each different or special hardware component.

B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS (GENERAL)

A. Bolts, screws and other fastenings required for the application of the finish hardware shall be of size and type to fit requirements and shall be of same material and finish as the exposed parts of the hardware that they fasten.

B. Door hardware: Hand of lock shall be as required. If door hand is changed by proper bulletin or change order before hardware is delivered, furnish such hardware items at no additional expense to Owner.

C. Strikes: Furnish curved lip strikes with dust box of sufficient length to protect trim on all locks or latches.

D. Silencers: Use three at single doors, four at pairs of doors on interior frames.

E. All locks, locksets, latch sets, and bolts shall conform to Federal Specification FF-H-106a/ANSI. All locks shall accept interchangeable, removable cores.

F. Finishes: Refer to the individual hardware headings for finish designations.

2.02 DOOR HARDWARE

A. Lockset: Corbin Russwin ML2000 Series mortise lock or approved equal with Lustra lever handle, LWA trim and Best removable core cylinders keyed to District’s system. US26D finish, function as noted.

B. Hinges - Exterior: Stainless steel 4-1/2" x 4-1/2" heavy weight ball bearing, non-rising stainless-steel pin, Model T4A3386 4.5 X 4.5 NRP, manufactured by McKinney or approved equal, stainless steel machine screws furnished by hinge manufacturer.

C. Hinges - Interior: Stainless steel 4-1/2" x 4-1/2" standard weight ball bearing, non-rising stainless-steel pin, Model TA2714 4.5 X 4.5, manufactured by McKinney or approved equal, stainless steel machine screws furnished by hinge manufacturer.

D. Closer - Exterior: Parallel arm application, extra duty hold open, UNI-7500H, 689 finish with SRI pretreatment coating, manufactured by Norton or approved equal.

E. Closer - Interior Doors: Parallel arm application, extra duty hold open, UNI-7500H, 689 finish with SRI pretreatment coating, manufactured by Norton or approved equal, mount closer on less public side of door.

F. Overhead Stop: Model 6-series-652 as manufactured by Rixson or approved equal.

G. Flush Bolts: Inactive leaf of double doors, Model FB01M-26D UL Listed for Metal Doors, metal door extension, flush bolts as manufactured by McKinney or approved equal. Shim and wear plate shall be furnished by hardware manufacturer, top and bottom of door.

H. Dustproof Strike: Model DPS3-26D as manufactured by McKinney or approved equal.

I. Astragal: Steel doors use 12-gauge stainless steel, FRP doors use FRP, 2 inches wide, edges rounded, factory finish, supplied by door manufacturer.

J. Exterior Saddle: Aluminum Model S483AV x opening width as manufactured by Reese or approved equal.

K. Interior Saddle: Aluminum Model S405A x opening width as manufactured by Reese or approved equal.

L. Weatherstripping: Model 373SS as manufactured by Reese or approved equal mounted with stainless steel self-tapping screws, min. 8” on center.

M. Door Sweep: Model MCK18061CNB as manufactured by McKinney or approved equal, mounted with stainless steel self-tapping screws, min. 8” on center

N. Provide matching strikes, screws and brackets for all hardware.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work and dimensions are as indicated.

3.02 INSTALLATION

A. Where not specified under other sections to be performed by manufacturer or suppliers, machine, fit and drill metal doors.

B. Prepare doors of various types to receive hardware, using templates and instructions provided with the hardware items for jobsite work.

C. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by the Architect/Engineer.

1. Conform to requirements of ANSI A117.1-2003 "Accessible and Useable Buildings and Facilities"

D. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do not install surface mounted items until finishes have been completed on the substrate.

E. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

G. Set thresholds for exterior doors in full bed of butyl rubber or polyisobutylene mastic sealant.

3.03 ADJUSTING

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Clean adjacent surfaces soiled by hardware installation.

C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

D. Instruct Owner’s Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

3.04 PROTECTION OF FINISHED WORK

A. Do not permit adjacent work to damage hardware or finish.

3.05 HARDWARE SETS

A. Coordinate the Hardware Schedule with the Door Schedule on the Contract Drawings, each set to have:
   1. SET 1
   2. Exterior Hinges
   3. Lockset (Storeroom) ANSI No. F07
   4. Exterior Closer
   5. Overhead Stop
   6. Flush Bolts
   7. Dustproof Strike
   8. Astragal
   9. Exterior Saddle
   10. Weatherstripping
   11. Door Sweep

12. SET 2
13. Exterior Hinges
14. Lockset (Storeroom) ANSI No. F07
15. Exterior Closer
16. Exterior Saddle
17. Weatherstripping
18. Door Sweep
19. SET 3
20. Interior Hinges
21. Lockset (Storeroom) ANSI No. F07
22. Interior Closer
23. Interior Saddle

END OF SECTION 087100

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Provide Louvers and all associated louver accessories and components in accordance with the Contract Documents and as required to provide a complete and first class installation. The work of this section shall include, but not be limited to fixed metal louvers, dampers and frames.

1.02 RELATED SECTIONS

A. Mechanical: Division 23

1.03 REFERENCES

A. AMCA 500 (Air Movement Control Association) - Test Method for Louvers.

B. ASTM B221 - Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.

C. SMACNA - Architectural Sheet Metal Manual.

1.04 PERFORMANCE REQUIREMENTS

A. Design and fabricate units to withstand wind lateral loads and snow loads.

1.05 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens and frames.

C. Product Data: Provide data describing design characteristics, maximum recom-mended air velocity, design free area, materials and finishes.

D. Samples: Submit two (2) samples, 2" x 2" in size illustrating finish and color of exte-rior and interior surfaces.

E. Submit two samples of manufacturer's full line of powder coating color chips. Color to be selected by Owner.

F. Products and materials shall comply with sustainability requirements for products having recycled content, document percentages by weight of postconsumer and preconsumer recycled content not less than 25 percent.

G. Manufacturer's Certificate: Certify that Products meet or exceed specified require-ments. Equals will only be accepted if they meet or exceed the performance of specified louvers.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with AMCA Certification for louvers and dampers.

B. Verify that field measurements are as indicated on shop drawings and instructed by the manufacturer.

1.07 COORDINATION

A. Coordinate the Work with installation of flashings.

B. Coordinate the Work with installation of mechanical ductwork.

1.08 WARRANTY

A. Provide manufacturer's standard warranty.

B. Provide 20 year manufacturer's warranty against failure of Kynar 500 finish.

PART 2 - PRODUCTS

2.01 INTAKE LOUVERS

A. Louvers shall be fabricated to provide a minimum of (44%), of free area and bear the AMCA certified ratings program seal for air performance and water penetration. The rating shall show a beginning point of water penetration at .01 ounces per square foot of free area at a free area velocity of 974 feet per minute, (6886) cubic feet per minute, with .14 inches of water gauge pressure drop for air intake. Louvers shall have a full width sill with head and blades contained within jambs. Louver shall be approximately 4" deep.

B. Louvers shall be provided with insect screen.

C. Material: Extruded Aluminum 6063 - T6.

D. Louver finish shall be Kynar 5000® PDVF or Hylar 5000®, color as selected by Owner.

E. Louvers shall be Type EA-450-D as manufactured by Arrow United Industries.

2.02 EXHAUST LOUVERS

A. Louvers shall be 45° standard blade-combination exhaust louvers with integral gravity backdraft dampers.

B. Louvers shall be provided with bird screen.

C. Material: Extruded Aluminum 6063-T52.

D. Face of Louver: Full width head and sill with blades contained within jambs.

E. Louver finish shall be Kynar 5000® PDVF or Hylar 5000®, color as selected by Owner.

F. Louvers shall be Type 377 as manufactured by Arrow United Industries.

2.03 MOTORIZED ACTUATORS

A. Fast-acting, two-position actuators shall be of the power open, spring return or power closed, spring open direct coupled type for on/off louver control as per the equipment schedules.

B. Actuator shall fail normally closed.

C. Die-cast aluminum housing shall allow for flush mounting to louver.

D. Timing at rated torque and voltage:
   1. Drive Open: 15 seconds
   2. Spring Close: 15 seconds

2.04 ACCESSORIES

A. Fasteners and Anchors: Stainless steel type.

B. Head and Sill Flashings: Roll formed to required shape, single length in one piece per location. Flashings: Of same material as louver frame.

C. Screens: Install screen mesh in shaped frame, reinforce corner construction, shop install to louver with fasteners. Screen shall be easily removed from the building interior. Insect Screen: 18/16 mesh, 0.011" aluminum wire, set in aluminum frame.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings and instructed by the manufacturer.

3.02 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.

B. Install louvers level and plumb.

C. Install flashings and align assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

D. Secure louvers in opening framing with concealed fasteners.

E. Install screens and frame to interior of louver where indicated.

F. Install perimeter sealant and backing rod in accordance with sealant specifications.

G. Provide and locate louvers per contract drawings.

H. Provide automatic control dampers with motors at louver locations as called for on contract drawings.

I. Blank off and seal any sections of louvers not covered by the ductwork.

3.03 ADJUSTING AND CLEANING

A. Adjust work under provisions of Division 01.

B. Test operable louvers and adjust as needed to produce fully functioning units that comply with requirements.

C. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

D. Before final inspection, clean exposed surfaces in accordance with manufacturer's directions.

E. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Engineer, remove damaged units and replace with new units.

F. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089100

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. 2-foot x 2-foot acoustical ceilings complete with suspension systems and related accessories. Acoustical units, suspension system, grid system and wall moldings shall be furnished by a single manufacturer, for a complete ceiling system.

B. It shall be the contractor's responsibility to coordinate with all other trades and other contractors hired by the Owner including the electrical contractor. Contractor shall remove and replace ceiling panels as required. It shall be the ceiling contractor’s responsibility to furnish a finished ceiling with no broken, scarred, marked, or soiled ceiling panels following the total completion of the project. Contractor shall assume removal replacement of up to 20% of ceilings installed.

1.02 RELATED SECTIONS

A. Section 042200 - Concrete Unit Masonry.

B. Section 061000 - Rough Carpentry.

C. Section 099100 - Painting.

D. Division 23 - HVAC.

E. Division 26 - Electrical.

1.03 REFERENCES

A. Job conditions, preparatory work, and installation techniques shall be in accordance with Acoustical Materials Association Installation Recommendations.

B. Acoustical units shall be as described in the current edition of the Acoustical Materials Association Performance Data Bulletin.

C. American Society for Testing and Materials (ASTM):
   1. ASTM C 635 - Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
   2. ASTM C 636 - Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
   3. ASTM E 84 Test Method for Surface Burning Characteristics of Building Materials.
   4. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material.
   5. ASTM E 580 - Specification for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Restraint.
   6. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   7. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
   8. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
   9. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
   10. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
   11. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
   12. ASTM E 1264 Classification for Acoustical Ceiling Products.

13. ASTM E 1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
14. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

D. ASCE 7 Standard - American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

E. CISCA 0-2 - Ceilings and Interior Systems Construction Association Recommendations for Direct-Hung Acoustical Tile and Lay-In Panel Ceilings, Seismic Zones 0-2.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide data on metal grid system, components, acoustic tile units and accessories.

C. Samples: Submit two 6" x 6" samples of each ceiling type, illustrating material and finish of acoustic units.

D. Submit to the Architect/Engineer for approval scaled shop drawings showing layout of suspension system and tile, incorporating light fixtures, grilles and other items mounted through or on acoustical ceiling.

E. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

1.05 QUALITY ASSURANCE

A. Single Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

B. Installer Qualifications: Company specializing in performing work of this Section with minimum 5 years documented experience.

C. Install components to withstand seismic loads in accordance with the Building Code of New York State, Section 1621 for Category C.

D. Regulatory Requirements: Surface Burning Characteristics in Accordance with ASTM E 1264 for Class A finish:
1. Flame Spread: Less than 25.
2. Smoke Developed: Less than 50.

1.06 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered and stored under the provisions of 016500.

B. Deliver acoustical ceiling units to project site in original, unopened packages, labeled so as to allow easy identification.

C. Follow manufacturer’s instructions on storage of materials; store materials in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

D. Prior to installation, store acoustical units for 24 hours minimum at same temperature and relative humidity as space where Work will be installed.

E. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.07 ENVIRONMENTAL CONDITIONS

A. Section 016500 - Product Delivery, Storage and Handling: Environmental conditions affecting products on site.

B. Maintain uniform temperature of minimum 60 degrees F and maximum 80 degrees F and maximum humidity of 75 percent prior to, during, and after acoustic unit installation.

C. Do not subject ceiling system to chemical fumes, vibrations, moisture or condensation, excessive humidity, or excessive dirt or dust buildup.

D. The ceilings must be maintained to avoid excessive dirt or dust buildup that would provide a medium for microbial growth on ceiling panels. Microbial protection does not extend beyond the treated surface as received from the factory, and does not protect other materials that contact the treated surface such as supported insulation materials.

1.08 PROJECT CONDITIONS

A. Section 013100 - Project Management and Coordination.

B. Sequence work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

C. Install acoustic units after all interior wet work is complete and dry.

D. Rigidly secure acoustical ceiling system including integral mechanical and electrical components with maximum deflection of 1/36”.

1.09 WARRANTY

A. Provide manufacturer’s 30-year system warranty to withstand relative humidity without sagging, warping, mold/mildew, bacteria or rust.

1.10 EXTRA MATERIALS

A. Section 017800 - Closeout Submittals.

B. Provide minimum 10 percent of total acoustic unit area of each type of tile to Owner in unopened packages.

PART 2 - PRODUCTS

2.01 STANDARD OF QUALITY

A. The following acoustic tile specification is based upon products as manufactured by Armstrong World Industries, Incorporated, Lancaster, PA (800) 448-1405. Substitutions shall be considered during bidding as stipulated in section 013300.

B. Provide acoustical ceiling system including tile, grid suspension system and all accessories manufactured by a single manufacturer.

2.02 ACOUSTIC PANELS

A. Type “ACT” 24" x 24" x 5/8" Armstrong Ceramaguard Fine Fissured perforated square lay-in #607, white, mineral fiber composition, Humiguard Plus and Antimicrobial BioBlock Plus.

B. Ceiling Attenuation Class (CAC) of 38, Light Reflectance (LR) of 0.82 and Noise Reduction Class (NRC) of 0.55.

C. Recycled Content: Manufactured from minimum 65 percent recovered slag.

2.03 SUSPENSION SYSTEM

A. Type Armstrong 15/16” Prelude Plus XL fireguard exposed Tee grid, Color: White

B. Suspension system shall not be less in size and strength than required to support itself and shall be increased in size and strength as necessary to support the light fixtures, acoustical units and related items without deflecting more than 1/36" of the span when tested as a simple beam, ends free.
   1. Grid: ASTM C 635, intermediate duty, steel exposed T; nominal 1-inch width; stab-in connections. ASTM E580, galvanized steel with baked polyester paint finish. Main beams and cross tees in accordance with the Building Code of New York State, Section 1621 for Category C as described in ESR-1308.
   2. Accessories: Stabilizer bars, beam end retaining clips, hold down clips, and splices.
   3. Support System: Main runners, cross tees, spacer bars, variable placement tees, grid adapters, and components shall be of cold rolled steel with a protective coating.
   4. Edge Moldings: Moldings and channel moldings nominal 15/16-inch x 15/16 inch hemmed (#7809), shall be of cold rolled steel with a protective coating of standard (white) factory applied and in accordance with the Building Code of New York State, Section 1621 for Category C as described in ESR-1308.
   5. Recycled Content: Manufactured from minimum 20 percent recycled steel.
   6. Attachment devices, wire hanger and ties in accordance with the Building Code of New York State, Section 1621 for Category C.

2.04 HANGERS

A. Suspension wire attached to power actuated fasteners shall be 12 gauge galvanized pre-straightened wire to support a maximum of 16 sq. ft. of ceiling and 8 gauge galvanized pre-straightened wire to support a ceiling area exceeding 16 sq. ft. No hanger shall support more than 24 sq. ft. of ceiling.

B. Types of power actuated fasteners shall be subject to the approval of the manufacturer for the type of ceiling installed.

2.05 ACCESSORIES

A. Provide all accessories, as required or recommended by manufacturer for use/condition including, spacers, hold downs, and wall moldings.

B. Touch up Paint: Type and color to match acoustic and grid units.

C. Sealant for Perimeter Moldings: Specified in Section 079200.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013100 - Project Management and Coordination: Verification of existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

C. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.02 INSTALLATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

B. Install ceiling system per manufacturer's instructions and in accordance with the Building Code of New York State, Section 1621 to support ceiling and applied fixture loads. Provide hanger wire at all four corners of each light fixture. If acceptable to authority having jurisdiction, fixed attachment may be accomplished by pop-riveting the runner to the wall molding.

C. Install ceiling tile in accordance with tile layouts shown on Reflected Ceiling Plans and approved shop drawings.

D. Contractor to coordinate work closely with electrical and mechanical trades in order to establish and maintain clearances with a minimum of conflict.

E. Refer to Acoustical Materials Bulletin LXXII (1962) for installation and materials standards.

F. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.

G. Hanger spacing to fall not more than 4'-0" o.c., not more than 2' 0" from ends, and not more than 4'-0” o.c. between ends of main runners and as required to support other work resting in or on ceiling. All four corners of all light fixtures must be supported with hanger wire.

H. The presence of a hanger wire within 3 inches of an expansion relief joint as called for in ASTM C 636 shall be required in addition to the requirements of the Building Code of New York State, Section 1621.2.5.

I. Where conditions prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

J. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

K. Do not eccentrically load system, or produce rotation of runners.

L. Perimeter Molding:
   1. Install edge molding at intersection of ceiling and vertical surfaces into bed of acoustic sealant at walls.
   2. Use longest practical lengths.
   3. Overlap and rivet corners.

4. Provide at junction with other interruptions.
5. To be same material and style as grid system.
6. To be manufactured by the same manufacturer as grid system.

M. Wall moldings shall be provided at the perimeter of all rooms and shall be securely fastened to walls or as indicated. Finish channel corner plates shall be used at all exterior corners. Channel flanges shall be cut, the web bent, and flanges overlapped to form interior corners.

3.03 INSTALLATION - ACOUSTIC UNITS

A. Install acoustic units in accordance with manufacturer's instructions.

B. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

C. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.

D. Lay directional patterned units one way. Fit border trim neatly against abutting surfaces.

E. Install units after above ceiling work is complete.

F. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.

G. Cutting Acoustic Units:
1. Cut and field paint exposed edges to fit irregular grid and perimeter edge trim.
2. Cut and field paint exposed edges of field cut units.
3. Double cut and field paint exposed edges of tegular or recessed units.

3.04 CLEANING

A. Tile and trim shall be clean and without blemish at time of acceptance.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members.

C. Replace damaged and broken panels.

D. At the completion of the finished acoustical ceiling work, remove all rubbish from the building, leaving floors broom clean. Excess material, scaffolding, tools and other equipment shall be removed from the building and job site.

3.05 CONSTRUCTION TOLERANCES

A. Section 014500 - Quality Control: Tolerances.

B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

C. Local kinks or bends shall not be made in hanger wires as a means of leveling main runners. Wire hanger loops shall be tightly wrapped and sharply bent to prevent any vertical movement or rotation of the member within the loops.

D. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION 095123

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Painting, sealing and filling.

C. The work described in this section includes, but is not limited to the following:
   1. Concrete block walls.
   2. Miscellaneous walls and surfaces, as indicated on painting schedule, plans and details.
   3. Steel lintels and miscellaneous steel fabrications.
   4. Exposed pipes and conduits.
   5. Miscellaneous surfaces not prefinished or excluded specifically.
   6. All items provided by other specification sections and/or indicated on contract drawings that are not pre-finished or that are furnished in prime coats.

D. All sections or work referencing this section.

E. Items not included:
   1. Anodized aluminum or stainless-steel surfaces.
   2. Prefinished surfaces.
   3. Exposed pipes and booster pumps, see Section 099744.

1.02 RELATED SECTIONS

A. Section 042200 - Concrete Unit Masonry

B. Section 055000 - Metal Fabrications

C. Section 079200 - Joint Sealants

D. Section 081500 - Fiberglass Reinforce Plastic Doors and Frames

E. Division 26 Electrical Items

1.03 REFERENCES

A. NYSDEC: VOC compliance.

B. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer and Related Products.

C. ASTM D3359 - Standard Test Methods for Measuring Adhesion by Tape Test.

D. ASTM D7091 - Standard Practice for Nondestructive Measurement of Dry Film Thickness.

E. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.

F. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.

G. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.

H. SSPC (Society for Protective Coatings) - Steel Structures Painting Manual.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Product Data: Provide data on all finishing products to be used.

C. Provide schedule indicating all surfaces to be painted, type of primer and finish paint, surface preparation and color to Architect prior to application. Provide manufacturers product number and description.

D. Samples:
   1. Submit two sets of paper chip samples, illustrating range of colors available for each surface finishing product scheduled.

E. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

F. Submit material safety data sheets (MSDS).

1.05 QUALITY ASSURANCE

A. The Contractor shall either verify in writing that he intends to apply the products listed, or shall submit for approval a list of comparable materi-als of another listed approved manufacturer. This submittal shall include full identifying product names, descriptive literature, catalog numbers, and color samples.

B. Consideration will only be given to Suppliers who can demonstrate that their paint system complies with these specifications having had successful and documented experience of the size, quality, performance and reliability to that specified, and who can successfully demonstrate this criteria to the Architect/Engineer.

C. Manufacturer: Company specializing in manufacturing the products specified in this section with a minimum 5 years documented experience.

D. Applicator: Company specializing in performing the work of this section with minimum 5 years documented experience and approved by the manufacturer.

E. No claim by the Contractor as to the unsuitability or unavail-ability of any material specified, or his unwillingness to use same, or his inability to produce first class work with same, will be entertained.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Conform to the applicable code(s) for flame and smoke ratings requirements for finishes.

B. Conform to New York State Code for Volatile Organic Compound (VOC) Content.

C. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

D. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer. Do not apply exterior coatings when unfavorable weather conditions are forecast within 24 hours of application.

E. Apply exterior paint only when temperature exceeds 50 degrees F or as otherwise required by manufacturer and drying conditions are good and predicted to remain so for at least 24 hours.

F. Apply interior paint only when inside space and surface temperatures exceed 60 degrees F or as required by manufacturer and will be maintained above that point until paint has dried. Provide and maintain application temperatures for all finishes.

G. Provide minimum lighting levels of 80-foot candles (860 1x) measured mid-height at substrata surface.

1.07 DELIVERY, STORAGE AND PROTECTION

A. Deliver, store and handle products under the provisions of Section 016500.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

C. Container label to include manufacturer’s name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Store paint at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer’s instructions.

E. Do not allow product to freeze.

1.08 PROJECT CONDITIONS

A. Section 013100 - Project Management and Coordination.

B. Sequence application to the following:
   1. Do not apply finish coats until paintable sealant is applied.
   2. Do not apply sealant or primer until surfaces are properly prepared.

1.09 EXTRA MATERIALS

A. Furnish under provisions of Section 017800. Supply minimum 1 gallon of each color, type, and surface texture used; store where directed.

B. Label each container with color, type, texture, room locations, in addition to the manufacturer’s label.

1.10 PROTECTION OF OTHER WORK

A. The Contractor shall furnish and lay drop cloths in all areas where painting is being done to protect floors and other work from damage. He shall be responsible for any damage to other work and shall replace any materials which have been damaged to such an extent that they cannot be restored to their original condition.

B. Protect all finished surfaces by covering or by removing and replacing, in case of small items such as hardware.

1.11 JOB CONDITIONS

A. Before painting is started in any area, the area shall be cleaned and excessive dust shall be removed from all areas to be painted. After painting operations begin in a given area, clean only with commercial vacuum cleaning equip-ment.

B. Adequate illumination and ventilation shall be provided in all areas where painting operations are in progress.

1.12 INSPECTION OF SURFACES

A. Before starting any work, surfaces to receive paint finish shall be examined carefully for defects which cannot be cor-rected by the procedures specified herein and which might prevent satisfactory painting results. Work shall not proceed until such damages are corrected.

B. The commencing of work shall be con-strued as acceptance of the surfaces, and thereafter this Con-tractor shall be fully responsible for satisfactory work as required herein.

1.13 COOPERATION WITH OTHER TRADES

A. This work shall be scheduled and coordinated with other trades and shall not proceed until other work and/or job conditions are as required to achieve satisfactory results.

B. The Contractor shall examine the specifications for the various other trades and shall thoroughly familiarize himself with all their provisions regarding painting. All surfaces that are left unfinished by the requirements of other sections except "Items not Included" in this Section, shall be painted or finished as part of the work covered by this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURERS - PAINT

A. The following requirements listed in this specification are based upon products as manufactured by Tnemec and Sherwin-Williams and are provided as the standard of quality for the basis of the bid. Substitutions shall be considered during bidding as stipulated in Section 013300.

2.02 PAINT MATERIAL

A. Refer to the attached schedule for a listing of the appropriate surfaces for each paint material. The following are the types of materials that shall be used:
   1. Modified Aromatic Polyurethane Primer:
      a. Tnemec Series 1 Omnithane or Sherwin-Williams B65A14 Corothane I Mio-Zinc
   2. Polyamidoamine Epoxy:
      a. Tnemec Series V69 Hi-Build Epoxoline II or Sherwin-Williams B58-600 Macropoxy 646 Fast Cure Epoxy
   3. Aliphatic Acrylic Polyurethane:
      a. Tnemec Series 73 Endura-Shield or Sherwin-Williams B65-350 Hi-Solids Polyurethane
   4. 100% High Solids, Hi-Build Amine Epoxy:
      a. Tnemec 280 Tneme-Glaze or Sherwin-Williams B62-210 Dura-Plate UHS
   5. Waterborne Cementitious Acrylic Filler:
      a. Tnemec Series 130 Envirofill or Sherwin-Williams B42W200 Cement-Plex 875
   6. Modified Polyamine Epoxy:

a. Tnemec Series 201 Epoxoprime or Sherwin-Williams B58WQ5100 Corobond 100 Epoxy

7. Modified Polyamine Epoxy:
   a. Tnemec Series 215 Surfacing Epoxy or Sherwin-Williams B58W910 Steel Seam FT-910
8. Modified Polyamine Epoxy:
   a. Tnemec Series 22 Epoxoline or Sherwin-Williams B62-210 Dura-Plate UHS
9. Self-Crosslinking Hydrophobic Acrylic:
   a. Tnemec Series 115 Uni-Bond DF or Sherwin-Williams B66W1 DTM Primer/Finisher
10. HDP Acrylic Polymer:
    a. Tnemec Series 1028 Enduratone or Sherwin-Williams B66-350 Sher-Cryl HPA

B. Colors shall be as selected by the Owner and Architect/Engineer.

C. Gloss levels for paints required are as follows (ref. National Paint & Coatings Association - NPCA):

	Sheen Level	Test Method	Gloss Range
2.	85-degree meter	Below 15	
3.	Eggshell	60-degree meter	5 to 20
4.	60-degree meter	15 to 35	
5.	Semi-Gloss	60-degree meter	30 to 65
6.	60-degree meter	Over 65	

D. Coatings shall be ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogenous coating, good flow and brushing properties, capable of drying or curing free of streaks or sags.

2.03 MIXING

A. Mixing or tinting shall be done at factory.

B. Site mixing will be prohibited.

2.04 APPLICATION EQUIPMENT

A. Application equipment items are not required to be new, but they shall be adequate and commensurate for the work and work-manship required herein.

2.05 ACCESSORIES MATERIALS

A. Provide all required ladders, scaffolding, drop cloths, mask-ings, scrapers, tools, sandpaper, dusters, cleaning solvents, and remove waste as required to perform the work and achieve the results specified herein. Materials not specifically indicated but required to achieve the finishes specified shall be of commercial quality and as recommended by the manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013100 - Project Management and Coordination: Verification of existing conditions before starting work.

B. Verify the surfaces and substrate conditions are ready to receive Work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop applied primer for compatibility with subsequent cover materials.

E. Do not begin work until surfaces to receive paint are dry, firm, sound, clean and free of defects or blemishes which would adversely affect the quality or appearance of the finished work.

F. Verify items are ready to receive finishes. Beginning of work means Contractor accepts existing substrata and surface conditions.

G. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maxi-mums:
   1. Masonry: 12 percent.

3.02 PREPARATION - GENERAL

A. Protect finished surfaces and equipment.

B. Correct defects and clean surfaces which affect work of this section. Remove any coatings that exhibit loose surface defects.

C. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

D. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

E. Uncoated Ferrous Surfaces: Remove scale by wire brushing; wash clean with solvent. Apply treatment of phosphoric acid solution. Prime paint after repairs.

F. Shop Primed and Existing Previously Painted Steel Surfaces: Sand and scrape to remove loose paint and rust, power tool clean, feather edges; clean surfaces with solvent. Prime bare steel surfaces.

G. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, fittings, and all other surfaces to be protected from paint prior to preparing surfaces or finishing.

H. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

I. Follow manufacturer’s recommendations for preparing surfaces to be primed and painted.

J. Mask, cover or remove surfaces to be protected from paint. Protect electrical, plumbing and mechanical equipment and systems not to be painted.

K. Provide adequate lighting.

L. Clean and sand surfaces to be painted.

M. Clean and remove scale, oil or grease from ferrous metal surfaces.

N. Protect finished surfaces and equipment.

3.03 EXAMINATION - ADDITIONAL REQUIREMENTS

A. Before painting is started in any area, the area shall be cleaned and excessive dust shall be removed from all areas to be painted. After painting operations begin in a given area, clean only with commercial heavy-duty vacuum cleaning equip-ment.

B. All concrete block shall be finished as specified prior to paint application.

C. Adequate illumination and ventilation shall be provided in all areas where painting operations are in progress.

D. Before starting any work, surfaces to receive paint finish shall be examined carefully for defects which cannot be cor-rected by the procedures specified herein and which might prevent satisfactory painting results. Work shall not proceed until such damages are corrected.

E. The commencing of work in a specific area only shall be con-strued as acceptance of the surfaces, and thereafter the Con-tractor'' applicator shall be fully responsible for satisfactory work as required herein.

3.04 PREPARATION - ADDITIONAL REQUIREMENTS

A. All surfaces shall be prepared as specified in the attached schedule. Surface preparation of steel shall be in accordance with SSPC - Chapter 2 - Surface Preparation Specifications.

B. Galvanized surfaces: Remove surface contamination and oils, lightly sand and wash with solvent. Apply coat of etching primer.

C. Uncoated ferrous surfaces: Remove scale by wire brushing and wash clean with solvent. Apply treatment of phosphoric acid solution. Prime paint after repairs.

D. Shop primed and existing previously painted steel surfaces: Sand and scrape to remove loose paint and rust, power tool clean, feather edges; clean surfaces with solvent. Prime bare steel surfaces.

E. Masonry: All joints shall be tooled slightly concave. After erection, all mortar splatter shall be removed and all voids and holes shall be patched and leveled flush with the surrounding surfaces, and be bagged to simulate surrounding texture. All masonry shall be installed with the intent that it will be painted.

F. Surface appurtenances: If allowed by the Architect/Engineer, remove or mask electrical plates, hardware, light fixture trim, escutcheons, fittings, and all other surfaces to be protected from paint prior to preparing surfaces or finishing. Refer to paragraph 1.01 (B).

G. Surfaces: Correct defects and clean surfaces, which affect work of this Section. Remove or repair existing coatings that exhibit surface defects.

H. Do not paint over UL Labels, manufacturer installed equipment nameplates, factory installed nameplates and equipment identification plates.

3.05 APPLICATION

A. Application of paint shall be in accordance with SSPC - Chapter 5 - Paint Application Specifications.

B. It is the intent that the above brand names and types of mate-rial will give complete coverage with uniform appearance. If any additional coat is necessary for complete coverage and appearance, it shall be done at no additional cost.

C. All paints to be new stock, delivered to job unopened. Prepare sur-faces properly for receiving paint; protect adjacent surfaces not to be painted.

D. Use of sprays may be permissible, upon prior approval by the Owner.

E. All work shall be carefully done by skilled mechanics. Finished surfaces to be uniform in thickness, coverage, gloss, finish and color, and free from brush marks. All coats shall be thoroughly dry before applying succeeding coats.

F. Apply products in accordance with manufacturer's instructions. Do not apply finishes to surfaces that are not dry.

G. Do not apply finish coats until paintable sealant is applied.

H. Do not apply sealant or primer until surfaces are properly prepared.

I. Spray, roller and/or brush may be used as appropriate for the various conditions, but the specified dry film thicknesses must be provided.

J. Thicknesses listed in the Schedule for High Build Coatings can be obtained in one coat by spray, but not necessarily by brush or roller.

K. The specified DFT shall hold precedence over whatever recommendations are made for other supplier's products.

L. Minimum air and surface temperature for application of epoxy coatings shall be maintained at 60 degrees F unless otherwise noted on the manufacturer's product data sheet.

M. Minimum air and surface temperature for 100% solids by volume epoxy coatings shall be 70 degrees F. Optimum temperature of unopened 100% solids epoxy shall be 75 degrees F. Minimum temperature of unopened 100 solids epoxy shall be 60 degrees F.

N. Heat shall be supplied by equipment that delivers clean, warm air into the space to be coated. Heat shall not be supplied by devices that give off exhaust fumes such as carbon dioxide or carbon monoxide into the area to be coated. The purpose of this requirement is to prevent the coatings from yellowing during application and cure.

O. Sand surfaces lightly between coats to achieve required finish.

P. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

Q. Prime concealed surfaces and cut ends of interior and exterior woodwork with primer paint.

R. Apply materials to obtain:
   1. Owners and Architect/Engineer's satisfaction and approval.
   2. Smooth uniform appearance.
   3. Complete coverage.
   4. Match with approved color sample.
   5. Work free of runs, sags and skips.
   6. Sharp, clean edges where finishes or colors change.

7. Surfaces free of defects and damage at time of acceptance.

S. Sand painted materials between coats.

T. Paint PVC pipe in accordance with recommendations of the paint manufacturer and apply primer.

3.06 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Paint shop primed equipment.

B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

C. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.

D. Paint exposed conduit and electrical equipment occurring in finished areas.

E. Paint both sides and edges of plywood backboards of electrical and telephone equipment before installing equipment.

F. Color code equipment, piping, conduit, and exposed duct work in accordance with other Sections.

3.07 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under the provisions of Section 014500.

B. Dry Film Thickness Testing: Owner will engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
   1. Contractor shall touch up and restore coated surfaces damaged by testing.
   2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.08 PROTECTION

A. Protect adjacent areas from splattering of paint.

B. Protect painted coating from damage or discoloration until project is accepted by Owner.

3.09 CLEAN UP

A. Clean work under the provisions of 017423.

B. Collect waste materials, which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

C. Install finished items removed by this Section. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

D. Remove masking and protective covering.

E. Leave factory finish surfaces clean and free of paint.

F. Clean adjacent area of any paint not scheduled to receive painted coating.

G. Remove tools, rubbish, equipment and unused material.

3.10 SCHEDULE

A. Ferrous Metals, Interior (including, but not limited to, structural AND miscellaneous steel)
   1. Shop Surface Preparation - SSPC-SP6/NACE No.3, Commercial Blast Cleaning.
   2. Field Surface Preparation - SSPC-SP1 “Solvent Cleaning” and “Low Pressure Water Clean” (as necessary) in accordance with SSPC-SP WJ-4 / NACE WJ-4 to remove all forms of surface contamination and any formations of zinc oxide. Power tool clean all damages to shop applied primer in accordance with SSPC-SP3 “Power Tool Cleaning” and apply spot coat of designated field primer.
   3. Shop Primer - Series 1 Omnithane at 2-3 mils or Corothane I Mio-Zinc at 3-4 mils.
   4. Field Primer - Series V69 Epoxoline II at 3-5 mils or Macropoxy 646 at 3-5 mils in finish color.
   5. Finish (2 coats) - Series V69 Epoxoline II at 3-4 mils each or Macropoxy 646 at 3-4 mils each.

B. Ferrous Metals, exterior (including, but not limited to, structural AND miscellaneous steel)
   1. Shop Surface Preparation - SSPC-SP6/NACE No.3, Commercial Blast Cleaning.
   2. Field Surface Preparation - SSPC-SP1 “Solvent Cleaning” and “Low Pressure Water Clean” (as necessary) in accordance with SSPC-SP WJ-4 / NACE WJ-4 to remove all forms of surface contamination and any formations of zinc oxide. Power tool clean all damages to shop applied primer in accordance with SSPC-SP15 “Commercial Grade Power Tool Cleaning” and apply spot coat of designated field primer.
   3. Shop Primer - Series 1 Omnithane at 2-3 mils or Corothane I Mio-Zinc at 3-4 mils.
   4. Field Primer - Series 1 Omnithane at 2-3 mils or Corothane I Mio-Zinc at 3-4 mils.
   5. Field Intermediate - Series V69 Epoxoline II at 3-5 mils or Macropoxy 646 at 3-5 mils in finish color.
   6. Finish (2 coats) - Series 73 Endura-Shield III at 2-3 mils or Hi-Solids Polyurethane at 3-4 mils each.

C. Block walls, interior
   1. Surface Preparation - Remove all loose mortar, mortar splatter and mortar protrusions. Ensure all surfaces are dry and free of dust and other construction residues. Allow curing for 28 days.
   2. Block Filler - Series 130 Envirofill, 60-80 sf/gal or Cement-Plex 875, 60-80 sf/gal.
   3. Finish (2 coats) - Series 280 Tneme-Glaze at 7-10 mils or Dura-Plate UHS at 7-10 mils each. Finish surface shall be uniformly smooth to the touch, free of voids and cleanable.

D. Exposed pipes and conduits, metal doors and frames, mechanical grilles, convectors, etc.
   1. Surface Preparation - SSPC-SP1 “Solvent Cleaning” followed by abrasive sanding.
   2. Field Primer - Series 115 Uni-Bond DF at 2-4 mils or Pro-Cryl Universal Primer at 2-4 mils.
   3. Finish (2 coats) - Series 1028 Enduratone at 2-3 mils or Sher-Cryl HPA at 2-3 mils each.

END OF SECTION 099100

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Exterior coating.

C. Piping, Valves and Fittings.

1.02 RELATED SECTIONS

A. Section 013300 - Submittals

B. Section 016100 - Basic Product Requirements

C. Section 016500 - Product Delivery, Storage and Handling

D. Section 221113 - Facility Piping

E. Section 402323 - Potable Water Process Piping

F. Section 402324 - Valves and Valve Accessories

1.03 REFERENCES

A. ANSI/NSF 61 - Drinking Water System Components - Health Effects

B. AWWA - C115 - Standard for Flanged Pipe

C. NACE No. 2/SSPC SP10 - Near-white Blast Cleaning.

D. NACE No. 3/SSPC SP6 - Commercial Blast Cleaning.

E. SSPC PA - 1 - Shop, Field, and Maintenance Painting of Steel

F. SSPC PA 2 - Method for Measuring of Dry Paint Thickness with Magnetic Gages

G. SSPC VOL 1 - Good Painting Practices - 2002 4th Edition latest edition

H. SSPC VOL 2 - Systems and Specifications - 2005 Edition latest edition

I. SSPC SP 3 - Power Tool Cleaning

J. SSPC SP 2 - Hand Tool Cleaning

K. SSPC VIS 1-89 - Visual Standard for Abrasive Blast Cleaned Steel.

L. ASTM D4417–03 – Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

M. ASTM E1216-99(2005) - Standard Practice for Sampling for Particulate Contamination by Tape Lift

N. NACE SP0188-99 Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide material data sheets (MDS) and material safety data sheets (MSDS), issued by the manufactures, for all materials and accessories that are to be used.

C. Samples: Provide a color chart for paint color selection by the Owner and Engineer for approval prior to all aspects of painting.

D. Manufacturer's instructions: Indicate surface preparation and paint application.

E. Submit a detailed plan on the method(s) to be employed to protect adjacent equipment and surfaces including, but not limited to, the following:
   1. Method of surface preparation.
   2. Method of paint application.
   3. Quality Control Plan for all phases of construction operations.

F. Submit detailed daily reports weekly, to include the following:
   1. The daily work location, date, start time and finish time, ambient conditions including wet bulb temperature, dry bulb temperature, and steel surface temperature, including hold point inspection observations.
   2. All surface preparation operations including location, date, start time and finish time.
   3. The date, start time and finish time for all painting operations, including location, wet bulb temperature, dry bulb temperature, and steel surface temperature, of the each coat applied.
   4. The name, type, batch numbers, manufacturer's name and amount of coatings used for each application.

G. The Contractor shall submit to the Engineer letters from manufacturers certifying that the paint being supplied for this project conforms completely to specifications.

1.05 REGULATORY REQUIREMENTS

A. All coatings shall comply with VOC regulations as promulgated by the Ozone Transport Commission, effective January 2005.

1.06 CERTIFICATES

A. The Contractor shall submit to the Engineer, immediately upon completion of the job, certification from the manufacturer indicating that the quantity of each coating purchased was sufficient to properly coat all surfaces.

B. Certification shall make reference to the square footage figures provided to the manufacturer by the Contractor.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to the site under provisions of Sections 016100 and 016500.

B. All materials furnished by the Contractor shall be brought to the job site in the original sealed and labeled containers of the paint manufacturer and shall be subject to inspection by the Engineer.

C. Every container of coatings materials shall have the batch number imprinted on the can, as well as the Federal Specification Number. Colors, where not specified, shall be as selected by the Engineer or Owner.

D. Store all materials as recommended by the manufacturer. Any materials stored improperly shall be removed from the site immediately. Maintain storage location and temperature log at storage site available for inspection.

E. The Contractor shall supply the Owner with two (2) one gallon paint kits of each of the exterior, intermediate and finished coats in each color.

1.08 WARRANTY

A. Provide a 1-year labor and manufacturer's materials warranty for the coating systems.

B. Warranties are to be submitted in writing to the Engineer prior to product delivery.

C. Any defects, failures, breakdowns, or discrepancies of the paint or coatings, that reveal themselves within the 1-year warranty period after acceptance of work shall be promptly repaired at no additional cost to the Owner.

D. Touch up procedures shall be issued by the engineer for areas of coating defects, breakdowns, or discrepancies to be repaired, only if the accumulative areas are less than five square feet, or if the engineer permits.

E. Remove the entire coating in the area where failure occurs. Touch-up work will not be permitted. The surface is to be prepared as originally scheduled.

PART 2 - PRODUCTS

2.01 COATING REQUIREMENTS

A. All coating systems submitted for use shall be new for the project described. Two component coating materials shall be mixed in accordance with the manufacturer's data sheet. No partial kits shall be permitted to be used.

B. All coating systems submitted for use shall conform and meet the minimum requirements specified by the Engineer for:
   1. Adhesion - ASTM-D-3359 and 4541
      a. Minimum 900 psi as measured with a Type 2 tester
   2. Hardness - ASTM-D-3363, 2583, and 2240
      a. Exterior Finish Coating - No gouging or scratching with an 8H or less pencil
   3. Flexibility - ASTM-D-522 and FED-STD-6221
      a. Exterior Finish Coating - No less than 34% elongation, average of three tests
      b. Impact Resistance - ASTM-D-2754
      c. Exterior Coating - No visible cracking or delamination of film after 34 inch pounds or less direct impact.
   4. Abrasion Resistance - ASTM-D 968 and 4060
      a. No More than 100 mg loss after 1000 cycles

2.02 MANUFACTURERS

A. TNEMEC COMPANY, INC

B. PPG INDUSTRIES

C. SHERWIN WILLIAMS

D. Coating substitutions shall be permitted only after receiving written approval from the Engineer prior to bid.

2.03 MATERIALS - DUCTILE IRON PIPING

A. TNEMEC Paint System - Two full coats, one stripe coat.
   1. Tnemec Series 27FC Typoxy, 4.0 - 6.0 mils DFT
   2. Tnemec Series 27FC Typoxy Stripe Coat (Contrasting Color)
   3. Tnemec Series 72 Low VOC Acrylic Urethane, 3.0 - 5.0 mils DFT

B. PPG Paint System - Two full coats, one stripe coat
   1. PPG Amerlock 2/400 Epoxy, 4.0 - 6.0 mils DFT
   2. PPG Amerlock 2/400 Epoxy Stripe Coat (Contrasting Color)
   3. PPG Amercoat 450H, 3.0 - 5.0 mils DFT

C. SHERWIN-WILLIAMS Paint System - Two full coats, one stripe coat
   1. Sherwin-Williams Macropoxy 646, 4.0 - 6.0 mils DFT
   2. Sherwin-Williams Macropoxy 646 Stripe Coat (Contrasting Color)
   3. Sherwin-Williams Acrolon 218HS, 3.0 - 5.0 mils DFT

2.04 MATERIALS - PVC & COPPER PIPING (CHEMICAL PROCESS)

A. TNEMEC Paint System - Two full coats
   1. Tnemec Series 115 Uni-bond, 2.0 - 4.0 mils DFT
   2. Tnemec Series 1028 or 1029 Enduratone, 2.0 - 3.0 DFT

B. PPG Paint System - Two full coats
   1. PPG Amerlock Sealer, 1.5 mils DFT
   2. PPG Amercoat 220, 2.0 - 5.0 mils DFT

C. SHERWIN-WILLIAMS Paint System - Two full coats
   1. Sherwin-Williams DTM Primer/Finish, 2.5 - 5.0 mils DFT
   2. Sherwin-Williams DTM Acrylic Semi-Gloss, 1.5 - 2.5 mils DFT

2.05 ACCESSORIES

A. Seam Sealer/Caulk: Shall be as recommended by the coating manufacturer.

2.06 TESTING

A. The Engineer shall have the right to take random samples of paint from the painter's bucket as it is being applied to the steel structure, tank or mechanical piping. These samples will be sent to the paint manufacturer for analysis to determine constituents and type of coating.

B. No material of any kind shall be used until it has been inspected and accepted by the Engineer. All materials rejected shall be immediately removed from the work and not again offered for inspection.

2.07 ACCESSORY MATERIALS

A. Provide all required ladders, scaffolding, drop cloths, maskings, scrapers, tools, sandpaper, cleaning solvents, and remove waste as required to perform the work to achieve the results

specified herein. Materials not specifically indicated but required to achieve the finishes specified shall be of commercial quality and as recommended by the manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall verify existing ambient condition and substrate conditions prior to proceeding with any work and submit to Engineer/representative prior to requesting Engineer's/representative's verification.

B. Contractor shall verify substrate is properly prepared, properly cleaned, and or properly coated in accordance with project specifications prior to proceeding with any additional work and prior to requesting Engineer's/representative's verification.

C. Should the contractor request verification from Engineer/representative and work is not in conformance with requirements contractor shall pay $500 per occurrence to cover the costs to the owner.

3.02 PREPARATION - GENERAL

A. Surface Preparation Schedule:
   1. Ductile Iron: All damaged primer and or connections shall be cleaned to SSPC SP-3 (Power Tool Cleaning)
   2. Copper & PVC: Shall be cleaned in accordance with SSPC SP-1 (Solvent Cleaning) and SSPC SP-2 (Hand Tool Cleaning) to achieve a uniformly scarified surface.

B. Cleaned surfaces, when viewed without magnification, shall be free of all visible paint oil, grease, dirt, mill scale, rust, oxides, corrosion products and other foreign matter as noted in Chapter 2, SSPC Painting Manual Volume 2.

C. Pit filler shall be applied to all voids that are greater than ¼ of the original steel surface thickness.

D. The pit filler shall be applied prior to the application of the first coat and in accordance with manufacturer's instructions. If the manufacturer's instructions differ from the project specifications, the more stringent will apply.

E. All areas shall be cleaned prior to any coating application. All surfaces to be painted shall be dry.

F. Weld projections or irregular portions of welds, or any steel defects that would interfere with the proper coating shall be ground smooth, as directed.

3.03 APPLICATION

A. Apply coating in strict conformance with the manufacturer's instructions and requirements. If the manufacturer's instructions differ from the project specifications, the more stringent will apply.

B. Before coating is applied to surfaces, steps shall be taken, either by circulation of dry air or by the application of heat, to dry the metal surfaces completely.

C. No coatings shall be applied when the surface temperature is less than 5 degrees Fahrenheit (3 degrees Celsius) above the dew point.

D. No coatings shall be applied when the relative humidity is above 85% or as recommended by manufacturer.

E. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer. Do not apply exterior coatings when unfavorable weather conditions are forecast within 24 hours of application.

F. No surfaces shall be coated that are not in compliance with SSPC surface preparation standards or any other part of the project specifications.

G. All coatings shall be applied at the rate specified. Deficiencies in film thickness shall be corrected with the proper surface preparation and application of an additional coating or as directed by the Engineer. Coatings in excess of the specified range shall be corrected at the direction of the Engineer.

H. All coating applications shall be inspected and approved by the Engineer prior to the application of any succeeding coats. All coats shall be applied to the dry film thickness specified.

I. The minimum and maximum total dry film thickness shall be as indicated in this section. The Mil Gauge shall be calibrated in accordance with the National Institute of Standard and Technology. The Contractor shall have available on the job site a satisfactory magnetic type Mil Gauge for measuring film thickness.

J. A brush applied stripe coat, of different color, shall be applied to all weld seams, edges, seams, or any non conforming surfaces deemed necessary by the Engineer. The stripe coat shall be applied after the first coat but prior to the second coat.

K. The coating shall be applied as a continuous film of uniform thickness. Any holidays or areas missed in the application shall be recoated within the maximum re-coat time or be corrected with the proper surface preparation and cleaning prior to the application of the subsequent coating.

L. All coatings that are specified shall only be acceptable in the number of coats specified in the contract documents.

M. Color Coding of Process Piping shall be in accordance with Ten States Standards as follows:

Service	**Color**
Raw Water	Olive Green
Potable Water	Dark Blue
Caustic	Yellow w/ green band
Blowoff/Waste	Light Brown
Chlorine	Yellow
Gas Supply Piping	Red
Drainage and Waste	Dark Gray
Tower Effluent Piping	Dark Blue w/Olive Green Bands

3.04 CLEANING

A. All surfaces shall be free of all dirt, oil, debris, or any other foreign matter prior to the application of any coating.

B. The Contractor shall maintain his work area in a neat, orderly fashion. Accumulation of debris, muck, rust, scale, etc., shall be frequently (not to exceed 1 week) cleaned up and removed from the site. Thinners used to clean equipment shall be held in sealed containers and removed from the site to an approved disposal area by the Contractor. Provide certificates from the disposal site indicating that the material has been properly disposed of.

C. Upon completion of the work, all excess material, rigging, empty containers, cables, tarps, etc., shall be removed from the site. Buildings and grounds shall be left in as good condition as when work was started.

3.05 FIELD QUALITY CONTROL

A. The Engineer will inspect the painting as it is being performed.

B. The Engineer reserves the right to accept each phase of the work before further work may be conducted, to halt all Work deemed to be improper or not in compliance with project specifications, and to require the contractor to promptly correct all improper practices or deficient work. Contractor shall notify the Engineer's/representative's 24 hours minimum prior to the following:
   1. Prior to the start of work
   2. Immediately following surface preparation
   3. Immediately prior to each coating or lining application
   4. Following the application of each coat
   5. Following the curing of the coating or lining

C. The Engineer reserves the right to conduct any testing, both destructive and nondestructive, at any time for inspection or evaluation purposes.

D. Any expenses incurred for corrective measures required as the result of improper practices and/or defective or deficient work shall be borne by the contractor and the extent of these corrective measures shall be at the discretion of the engineer.

E. The contractor shall provide safe access to all areas, including but not limited to, equipment, containers and spaces for inspection at any time as deemed necessary by the engineer or his representative

F. Sufficient lighting shall be provided to ensure proper safety conditions and permit inspection.

G. All manholes and other tank openings shall remain open as necessary during cleaning, painting and curing operations.

END OF SECTION 099744

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Roof truss identification signage.

1.02 RELATED SECTIONS

A. Section 074633 - Vinyl & Polymer Siding

B. Section 081500 - Fiberglass Reinforced Plastic Doors and Frames

1.03 QUALITY ASSURANCE

A. Acceptable Manufacturers: Regularly engaged in production of signs, which meet project requirements for a minimum of five (5) years.

B. Provide manufacturer five (5) year warranty for building signage.

1.04 SUBMITTALS

A. Manufacturer's Instructions: Manufacturer's recommended installation instructions and procedures for care of finished surfaces for each product specified.

B. Shop Drawings/Manufacturer's Data:
   1. Shop drawings showing sign locations on plans and corresponding sign schedule.
   2. Details of fabrication and erection showing each product's materials and fin-ishes.
   3. Indicating color, type, spacing, text and style of letters; background and frame.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in manufacturer's original unopened protective packaging in accordance with Section 016500.

B. Identify contents, manufacturer, brand name and applicable stan-dards.

C. Store in original packaging, off the ground and under protective covers.

D. Handle to prevent damage.

PART 2 - PRODUCTS

2.01 MATERIALS - ROOF TRUSS IDENTIFICATION SIGNAGE

A. Roof Truss Identification signage
   1. Reflective image
   2. UV, chemical, abrasion and moisture resistant
   3. Compliant with New York 19NYCRR Part 1264 requirements
   4. Substrate: 0.040” aluminum with 1/8” mounting holes or flexible vinyl label stock with permanent adhesive.
   5. Signs shall be located at each exterior building entrance. Sign placement shall be compliant with New York 19NYCRR Part 1264 requirements.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine areas scheduled to receive signs for conditions that would affect quality and execution of work.

B. Do not proceed with installation until defects are corrected.

3.02 INSTALLATION

A. Install sign and components at the locations indicated; securely mount with concealed theft-resistant fasteners. Attach signs to substrates in accor-dance with the manufacturer's instructions.

B. Install level, plumb, and at the proper height. Cooperate with other trades for installation of sign units to finish surfaces.

END OF SECTION 101416

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers and mounting clips.

B. Fire extinguisher identification decal.

1.02 RELATED SECTIONS

A. Section 042200 - Concrete Unit Masonry.

1.03 REFERENCES

A. ANSI/NFPA 10 - Portable Fire Extinguishers.

B. UL 299 - Dry Chemical Fire Extinguishers.

1.04 SUBMITTALS

A. Submit in accordance with Section 013300 - Submittals.
   1. Product Data:
   2. Extinguisher type, operational features, color.
   3. Materials, construction, features, dimensions and installation requirements.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 017800.

B. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.06 QUALITY CONTROL

A. Regulatory Requirements: Conform to NFPA 10 and local jurisdiction for requirements for extinguisher location and mounting.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperature may cause freezing of extin-guisher ingredients.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure of hydrostatic test according to NFPA 10.
      b. Faulty operation of valves or release levers.
   2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with project requirements, manufacturers offering Products that may be incorporated in the work include the following:

1. J.L. Industries, Bloomington, MN (800) 554-6077.
2. Larsen's Manufacturing Company, Minneapolis, MN (800) 527-7367.
3. Potter-Roemer, Incorporated, Cerritos, CA (800) 366-3473.
4. Or approved equal.

2.02 MATERIALS

A. Extinguisher: Provide multipurpose dry chemical type, UL 299; UL-rated A: B: C. 10-pound nominal capacity in enameled steel container at locations noted on plans.

B. Mounting Bracket: Provide surface mounted wall bracket mounting clips and all required accessories. Metal designed to prevent accidentally dislodging extinguisher, of size required for type and capacity of extinguisher specified. Bright chrome finish.

C. Identification: Decal complying with authorities having jurisdiction for style, size, spacing, and location.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify wall is finished and acceptable to receive bracket.

B. Verify location with Architect/Engineer in field before installation.

3.02 INSTALLATION

A. Install extinguisher and bracket in accordance with manufacturer's published instructions in locations required by authority having jurisdiction and where indicated by Architect/Engineer.

B. Mount brackets so top of extinguisher is maximum 54” above finished floor and bottom is a minimum of 12” above finished floor.

C. Install extinguisher clips plumb and level, secure rigidly in place.

D. Place extinguisher on clips.

E. Apply identification decal above fire extinguisher, size and location per local authority having jurisdiction.

END OF SECTION 104416

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pipe hangers for various installed pipe systems.

1.02 SUBMITTALS

A. Submit under provisions of Section 013300

1.03 REFERENCES

A. Underwriters Laboratories - UL Listing.

B. ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel

C. ASTM A123 - Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip

D. ASTM A653 - Specification for Steel Sheet, Zinc-Coated by the Hot-Dip Process

E. ASTM A1011 - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability (Formerly ASTM A570)

F. MSS SP58 - Manufacturers Standardization Society: Pipe Hangers and Supports- Materials, Design, and Manufacture

G. MSS SP69 - Manufacturers Standardization Society: Pipe Hangers and Supports- Selection and Application

H. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices

1.04 QUALITY ASSURANCE

A. Steel pipe hangers and supports shall have the manufacturers name, part number, and applicable size stamped in the part itself for identification.

B. Hangers and supports shall be designed and manufactured in conformance with MSS SP 58.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Anvil International (Grinnell)

B. Cooper B-Line, Inc.

C. Carpenter and Patterson

D. Fee and Mason

E. Hilti

F. Elcen

G. Piping Technology and Products, Inc.

H. Or Approved Equal

2.02 MATERIALS

A. Pipe Hangers & Supports:
   1. All pipe hangers and supports for copper tubing piping systems shall be of stainless steel construction. Provide dielectric/isolation wrapping or pipe insulation where dissimilar metals meet.
   2. All pipe hangers and supports for PVC piping systems shall be of galvanized steel construction, except where piping is used for chemical treatment.
   3. All pipe hangers and supports for chemical lines including calcium hypochlorite shall be of stainless steel construction.

B. Trapeze Hangers: Where three or more non-chemical lines of pipe run parallel, support them with galvanized trapeze hangers, Grinnell Figure 46. Trapeze to be supported by a minimum of two galvanized rods with Figure 60 washer plates. For top loading only.

C. Concrete Inserts: Anvil International Figure 282, MSS SP-58 (Type 18), galvanized, universal concrete inserts, adequately sized and correctly positioned to support full load operating systems.

D. C-Clamps: Anvil International Figure 86, MSS SP-58 (Type 23) galvanized with set screw and lock nut. Use these for attaching hangers to steel beams. Welding hanger rods to steel members is not permitted. Provide retaining clip for C-Clamps.

E. Malleable Beam Clamps: Anvil International Figure 218, MSS SP-58 (Type 30), galvanized. Use these for attaching hangers to bar joists. Provide retaining clip for all beam clamps.

F. Clevis Hangar (4" diameter Piping or Less): Anvil International Figure 67, MSS SP-58 (Type 5), galvanized. Use these for attaching hangers to bar joists, column or wall.

G. Clevis Hanger (4" diameter or Greater D.I. Piping): Anvil International Figure 590, MSS SP-58 (Type 1), galvanized.

H. Pipe saddle support: Pipe saddle with U-bolt and threaded pipe adjuster. Cooper B-Line Figure 318A, MSS SP-69 (Type 37), stainless steel. Pipe stand: Cooper B-Line Figure 316T, stainless steel.

I. All hangers and supports shall be UL Listed. Cooper B-Line Figure 318A & 316T,

J. Provide threaded rod in accordance with manufacturer instruction.

2.03 FINISHES

A. Indoor Finishes
   1. Hangers and clamps for support of bare copper piping shall be coated with copper colored epoxy paint, B-Line Dura-Copper®. Additional PVC coating of the epoxy painted hanger shall be used where necessary.
   2. Hangers for other than bare copper pipe shall be zinc plated in accordance with ASTM B633 OR shall have an electro-deposited epoxy finish.
   3. Strut channels shall be pre-galvanized in accordance with ASTM A653 SS Grade 33 G90 OR have an electro-deposited green epoxy finish.

B. Outdoor and Corrosive Area Finishes (Chemical Room)
   1. Hangers and strut located outdoors shall be hot dip galvanized after fabrication in accordance with ASTM A123. All hanger hardware shall be hot dip galvanized or stainless steel. Zinc plated hardware is not acceptable for outdoor or corrosive use.
   2. Hangers, strut, and clamps located in corrosive areas shall be type 316 stainless steel with stainless steel hardware.
   3. Provide dielectric/isolation wrapping in systems of dissimilar metals.

PART 3 - EXECUTION

3.01 SCHEDULES - HANGER SPACING

A. Copper Pipe
   1. Not more than 10'-0" o.c.

B. PVC Pipe
   1. 1/2 to 1-inch - 4'-0" o.c.
   2. 11/4 to 8-inches - 5'-0" o.c.

3.02 INSTALLATION

A. Support pipes on specified hangers so that equipment, pumps, and fittings do not bear weight of pipe.

B. Do not use perforated metal, strap iron, or band iron.

C. Do not make offsets in hangers.

D. Maximum allowable spacing of pipe hangers for horizontal piping is listed above. Space hangers and brackets at close intervals where necessary to maintain levels, slopes, and drainage, or to prevent sagging.

E. Place hangers within 12 inches of each horizontal elbow.

F. Use hangers with 1-1/2 inch minimum vertical adjustment.

G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

H. Allow for forces imposed by expansion joints, satisfy structural requirements and maintain proper clearances with respect to adjacent piping, equipment and structures. Hangers for insulated pipes shall be sized to accommodate insulation thickness.

I. Keep the different types of hangers to a minimum and provide hangers that are neat, without complicated bolting and with the number of parts of each hanger and its anchor kept to a minimum.

J. Make accurate weight balance calculations to determine the required supporting forces at each hanger or support location and the pipe weight load at each equipment connection.

K. Pipe hangers shall be capable of supporting the pipe in all conditions of operation. They shall allow free expansion and contraction of the piping, and prevent excessive stress resulting from transferred weight being induced into the pipe or connected equipment.

L. All hangers and supports that are not galvanized shall be painted or shop primed.

M. Provide means of preventing dissimilar metal contact such as plastic coated hangers, copper colored epoxy paint, or non adhesive isolation tape- B-Line Iso-pipe. Galvanized felt isolators sized for copper tubing may also be used, B-Line B3195CT.

N. Install hangers to provide a minimum of 1/2 inch space between finished covering and adjacent work.

O. Support Provide neoprene protection where dissimilar metals come into contact.

P. Maximum allowable spacing of pipe supports for vertical piping independently of connected horizontal piping. Support vertical pipes at every floor. Wherever possible, locate riser clamps directly below pipe couplings or shear lugs.

Q. Where several pipes can be installed in parallel and at the same elevation, provide trapeze hangers as specified. Trapeze hangers shall be spaced according to the smallest pipe size, or install intermediate supports according to schedule in section 3.01B.

R. Do not support piping from other pipes, ductwork or other equipment that is not building structure.
   1. Where horizontal piping movements are greater than 1/2 inch, or where the hanger rod angularity from the vertical is greater than four degrees from the cold to hot position of the pipe, the hanger pie and structural attachments shall be offset in such a manner that the rod is vertical in the hot position.

S. In the part of the building which is steel-framed, attach hangers to the building structural steel beams. Where hangers do not correspond with the building structural steel beams, provide supplemental steel members continuously welded or bolted to the building structural steel beams.

T. In the parts of the building which is a concrete structure, attach hangers to the concrete structure by installing anchors into the concrete.

END OF SECTION 220529

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Stencils

B. Pipe markers

C. Tags

1.02 REFERENCES

A. ASME A13.1 - Scheme for the Identification of Piping Systems

1.03 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Submit list of wording, symbols, letter size and color coding for mechanical identification.

C. Submit valve chart and schedule, including valve tag number, location, function and valve manufacturer's name and model number.

D. Product Data: Provide manufacturers catalog literature for each product required.

E. Manufacturer's Installation Instructions: Indicate special procedures and installation.

PART 2 - PRODUCTS

2.01 STENCILS

A. Manufacturers:
   1. SETON NAMEPLATE CO., New Haven, CT, Model SPS.

B. Stencils: With clean cut symbols and letters of following size:
   1. 3/4 to 1-1/4 inch (20-30 mm) Outside Diameter of Insulation or Pipe: 8 inch (200 mm) long color field, 1/2 inch (15 mm) high letters.
   2. 1-1/2 to 2 inch (40-50 mm) Outside Diameter of Insulation or Pipe: 8 inch (200 mm) long color field, 3/4 inch (20 mm) high letters.
   3. 2-1/2 to 6 inch (65-150 mm) Outside Diameter of Insulation or Pipe: 12 inch (300 mm) long color field, 1-1/4 inch (30 mm) high letters.
   4. 8 to 16 inch (200-250 mm) Outside Diameter of Insulation or Pipe: 24 inch (600 mm) long color field, 2-1/2 inch (65 mm) high letters.
   5. Equipment: 2-1/2 inch (65 mm) high letters.

C. Stencil Paint: Semi-gloss enamel, colors conforming to ASME A13.1.

2.02 PIPE MARKERS

A. Manufacturers:
   1. SETON NAMEPLATE CO., New Haven, CT., Set Mark Pipe Markers.
   2. BUNTING, Pittsburgh, PA, Wrap-Mark.

B. Color: Conform to ASME A13.1.

C. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed. For the following piping systems:
   1. Water Service
   2. Calcium Hypochlorite
   3. Domestic water.
   4. Drain Piping
   5. Air Relief Piping
   6. Sample Lines
   7. Pre-lubrication
   8. Hypochlorite injection lines
   9. Hot water supply

D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

E. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches (150 mm) wide by 4 mils (0.10 mm) thick, manufactured for direct burial service.

2.03 TAGS

A. Manufacturers
   1. SETON NAMEPLATE CO., New Haven, CT.
   2. Metal Tags: Brass with stamped letters.
   3. Tag Size Minimum: 1-1/2 inch diameter.
   4. Chart: Typewritten letter size.

B. Signage: Factory fabricated, flexible, semi-rigid plastic; minimum information indicating PID identification, contents, volume, installation date and right to know information, for the following piping systems:
   1. Chemical Injection Point
   2. Calcium Hypochlorite Tank
   3. Calcium Hypochlorite Pump
   4. Booster Pumps
   5. Motorized Butterfly Valves

PART 3 - EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with paint manufacturers recommendations.

3.02 INSTALLATION

A. Apply stencil painting in accordance with paint manufacturer’s application instructions.

B. Install plastic pipe markers in accordance with manufacturer's instructions at intervals of 8’-0” on center, or after any change in direction. Minimum of one marker per pipe section.

C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

D. Install underground plastic pipe markers 6 to 8 inches (150 to 200 mm) below finished grade, directly above buried pipe.

E. Identify piping, concealed or exposed, with plastic pipe markers or stenciled painting. Use tags on piping 3/4 inch (20 mm) diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

F. Install tags with stainless steel/brass S hooks on corrosion resistant chain.

G. Identify valves in main and branch piping with tags.

END OF SECTION 220553

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Copper piping, valves and accessories

B. PVC piping, valves and accessories

C. Reinforced flexible tubing and accessories

D. Curb stops

1.02 RELATION SECTIONS

A. Section 220529 - Hangers and Supports for Piping

B. Section 220553 - Identification for Mechanical Piping and Equipment

C. Section 312333 - Trenching

D. Section 331140 - Disinfection of Water Facilities

1.03 REFERENCES

A. ASME B16.23 - Cast Copper Alloy Solder - Joint Drainage Fittings -DWV

B. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV

C. ASME B31.3 - Process Piping

D. ASTM A403 - Wrought Austenitic Stainless Steel Fittings

E. ASTM B42 - Seamless Copper Pipe

F. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications

G. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

H. ASTM D1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120

I. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40

J. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

K. ASTM D2241 - Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)

L. ASTM D2564 - Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings

M. ASTM D2737 - Standard Specification for Polyethylene (PE) Plastic Tubing

N. ASTM D2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings

O. AWWA C800 - Underground Service Line Valves and Fittings

P. AWWA C901 - Polyethylene Pressure Pipe and Tubing, 1/3" to 3", for Water Service

1.04 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, hydrants and accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with the local water utility company requirements.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 016500.

B. Deliver and store items in shipping containers with labeling in place.

1.07 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 017839.

B. Accurately record actual locations of piping mains, valves, connections and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

D. Provide manufacturer's standard warranty for all applicable items under provisions of Section 017800.

PART 2 - PRODUCTS

2.01 COPPER PIPING, VALVES AND ACCESSORIES

A. All exposed small copper piping shall be Type "K" hard drawn copper tubing. All underground piping shall be soft annealed Type "K" copper tubing with compression fittings.

B. All brass valves and fittings installed on potable water supply piping shall be made of "low-lead" materials (UNS Copper Alloy C89833 or C89520) and have a maximum lead content of 0.25 percent by weight. All low lead brass fittings shall be stamped or embossed with a mark indicating that the product is manufactured from low-lead alloys.

C. Check valves shall be swing check renewable BUNA-N disc, all bronze, STOCKHAM Figure B-319Y (threaded end) or Figure B-309Y (solder end) - 250 to 300 psi non-shock water.

D. Ball valves for copper piping/tubing and galvanized piping shall be renewable reinforced Teflon seats, adjustable packing gland, non-blowout stem with run port opening. Ball valves shall be STOCKHAM Figure T or S-285 (threaded or soldered ends).

2.02 PVC PIPING, VALVES AND ACCESSORIES

A. PVC piping for all interior and exterior applications shall be polyvinyl chloride, Class 1245-B, Schedule 80, and shall conform to ASTM Specifications D2267, D2241, D1784 and D1785. All PVC piping shall conform to NSF-61 and be approved for potable water applications. Pipe shall be as manufactured by A.M. BEYERS or CHARLOTTE PIPE COMPANY or approved equal. Fittings for PVC piping shall conform to ASTM D2467 and be slip type and shall be of the same schedule approved for use by the pipe manufacturer. Pipe shall bear the trademark of the manufacturer.

B. Transitions from PVC to poly-tubing shall be made with barbed fittings and stainless clamps, or approved equal.

C. Ball valves shall be double union/double block with PVC body, ball, insert and stainless steel rod and stem with Teflon seats, Tru-Bloc by NIBCO CHEMTROL, SPEARS or approved equal.

D. Check valves shall be of the true union ball check type with a PVC body construction. The valves shall be rated at 150 psi. The valves shall be manufactured by HAYWARD CO., SPEARS or approved equal.

E. Strainers shall be Y type, of size indicated, PVC body with 40 mesh cylindrical stainless steel screen and shall be as manufactured by HAYWARD CO. or approved equal.

F. Pressure relief/backpressure valves shall be molded in-line valves with PVC body construction. Valves shall have a setting range from 5 to 100 psi and be compatible with chemicals in application. Valves shall be as manufactured by PLAST-O-MATIC VALVES, INC., WALLACE & TIERNAN, WALCHEM, or approved equal.

G. Globe valves shall be of thermoplastic construction rated to 150 psi with EPDM seals and flanged connections. Valves shall be as manufactured by ASAHI-AMERICA, NIBCO or approved equal.

H. Unions shall be UL listed, Oring unions with Teflon gaskets by HAYWARD CO. or approved equal.

I. Threads and dimensions: ANSI B1.1 and B18.2.

J. All wetted parts of PVC piping, valves and accessories shall be compatible with treatment chemicals.

K. Thread lubricant: Crane "Formula 425", or equal. (NOTE: Approved Teflon tape may be used).

L. Gaskets: Full face, 1/8-inch thick neoprene rubber.

M. Solvent welded joints for chemical piping shall be made using solvent cement that meets or exceeds ASTM F493, compatible with PVC pipe and fittings. Solvent cement shall be Low V.O.C., Heavy Duty Gray Industrial solvent cement by Oatey; Model EP42 or specifically approved equal.

N. Pressure connections to pressure switches, recorders, and indicating gauges shall be equipped with a snubber.

2.03 REINFORCED FLEXIBLE TUBING

A. PVC tubing with nylon inner braided reinforcing made from FDA approved materials, 65 Durometer, 175 psi working pressure for 1/2 to 1-1/2 inches ID. Install high pressure fittings with double stainless steel clamps for all connections to tubing.

B. HDPE translucent tubing, compatible with chemical transported, minimum 190 psi working pressure at 70F for 1/2" to 3/4" O.D. Install high pressure PVC compression fittings all connections to tubing.

2.04 CURB STOPS

A. All metal parts shall be constructed of water service bronze. The curb stop shall have a combined tee and cap and an inverted tapered key with 1/4-inch hole drilled in cap for attaching a stationary rod. The valve shall open to the left (counterclockwise).

B. All curb stops shall be by MUELLER COMPANY, No. H-15200, or specifically approved equal. Ball valve curb stop shall be by FORD METER BOX COMPANY, No. BH22-233, or specifically approved equal.

C. All curb stops shall be provided with an extension service box.

D. Extension service boxes with stationary rods to be by MUELLER COMPANY, No. H-10314 or approved equal. Cap shall be in accordance with the Owner's standard.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Clean inside of piping and tubing before installation. Keep installed piping clean and protect ends from foreign matter by capping or plugging.

B. Install piping and tubing so that it does not interfere with opening of doors or apparatus, access to equipment or any portion of electrical equipment.

C. Run piping and tubing in straight lines and square with building. Install rise plumb. Make offsets only where indicated and where necessary.

D. Install pipes so that expansion and contraction will not cause undue stress or strain to pipes or equipment. Provide offsets and expansion joints as shown on drawings.

E. Provide flanges and unions throughout the piping systems to make installation and removal of piping and equipment convenient. Make provisions for servicing and removal of equipment without dismantling piping.

F. Support pipe in accordance with provisions of Section 220529.

G. Install non-conducting dielectric connections wherever joining dissimilar metals.

H. Install valves with stems upright or horizontal.

I. Install water service lines in accordance with water utility standards.

J. All copper piping shall be cut square, burrs removed and reamed after cutting. Fitting sockets and tube ends shall be thoroughly cleaned to a bright finish. All solder joints shall be fluxed and soldered using 95-5 tin and antimony solder and water soluble flux.

K. All copper tubing connections shall be compression type.

L. PVC piping and fittings connections to treatment equipment and at ends of runs shall have screw type joints. In all other locations, solvent welded slip type joints shall be used.

M. Solvent welded joints shall be made using solvent cement that meets or exceeds ASTM F493, compatible with PVC pipe and fittings. Solvent cement shall be Heavy Duty Industrial orange solvent cement by Oatey, or specifically approved equal.

N. Install PVC pipe in such a manner that it is not forced out of line by pipe supports, hangers or other supporting members. Pipe hangers shall be clevis or strap type.

O. All fittings, except couplings, shall be supported and valves shall be braced to resist torque during valve manipulation.

P. All piping shall be free of traps and graded to permit complete drainage.

Q. Connect reinforced flexible tubing to transition couplings with stainless steel clamps and/or compression fittings in accordance with tubing manufacturer's installation instructions.

3.02 SERVICE CONNECTIONS AND TAPPING

A. Thoroughly clean water main to be tapped to remove all dirt and scale.

B. Maintain a minimum of 4'-6" (1.4 m) cover over the copper service pipe.

C. Install new copper service pipe in one continuous piece. Splicing will not be permitted.

D. Install parallel lines in neat fashion maintaining a minimum of 8" wall to wall separation. Each service line shall penetrate foundation separate from all other utility penetrations. Record origin of all service lines penetrating foundation.

E. Cuts made in copper service tubing for installation of valves or connection to the building shall be square, reamed and all burrs removed.

F. Solder used for service line fittings shall be lead-free, with a maximum lead content of 0.2 percent.

G. Connect copper service piping to building service piping with compression fitting.

3.03 FIELD QUALITY CONTROL

A. Flush piping prior to conducting pressure testing.

B. Piping shall be pressure tested with air before piping is concealed. All joints shall be checked for leakage while under air pressure by swabbing, utilizing a soap and water solution, and leaks found shall be repaired and rechecked. Pressure of air during testing shall be at least 50 percent higher than normal working pressure. Piping shall be tested for pressure and leakage in accordance with Section 017550.

C. Before piping and valves are concealed, recheck it for leaks.

D. Rework or replace defective and leaking joints, and joints which are otherwise unsatisfactory. Peening, caulking and doping are not permitted.

E. The Contractor shall furnish all labor, materials and equipment necessary to accomplish all testing and repairs.

3.04 VALVE ACCESS

A. Locate shutoff and control valves for easy access and operation. Where valves are located in enclosed spaces provide and install access doors.

3.05 TESTING

A. All small piping shall be tested for pressure and leakage, in accordance with AWWA Specification C600.

END OF SECTION 221113

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Floor Drains

B. Pressure Gauges

C. Relief Valves

D. Strainers

E. Backwater Valve

F. Pressure Regulators

G. Injection Quills

H. Solenoid Valves

1.02 REFERENCES

A. ASME A112.21.1 - Floor Drains

B. ASEE 1019 - Wall hydrants, Frost Proof Automatic Draining Anti-Backflow Types

C. ASME A112.26.1 - Water Hammer Arrestors

D. ASSE 1011 - Hose Connection Vacuum Breakers

E. PDI WH-201 - Water Hammer Arrestors

F. ANSI Z124.6 - Plastic Sinks

G. NSF 61 - Drinking Water System Components

1.03 SUBMITTALS FOR REVIEW

A. Submit in accordance with Section 013300.

B. Product Data: Provide component dimensions, weights, sizes, rough-in requirements, service sizes, and finishes.

C. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions including assembly and support requirements.

1.04 DELIVERY, STORAGE, AND PROTECTION

A. Transport, handle, store, and protect products in accordance with Section 016500.

B. Accept specialties on site in original factory packaging. Inspect for damage.

1.05 WARRANTY

A. Provide manufacturer’s standard warranty for all applicable items under provisions of Section 017800.

PART 2 - PRODUCTS

2.01 FLOOR DRAINS

A. Manufacturer:
   1. Zurn Model Z-415 EA-E-C

B. Other acceptable manufacturers offering equivalent products.
   1. Josam
   2. J. R. Smith

C. Assembly: ANSI A112.21.2

D. Body: Lacquered cast iron with sump

E. Strainer: Hinged removable polished bronze top

F. Accessories: Coordinate with type.
   1. Membrane flange and membrane clamp with integral gravel stop.
   2. Adjustable deck clamp

G. Accessories:
   1. Funnel (as required)
   2. Backwater valve
   3. Leveling frame
   4. Sediment Bucket

2.02 PRESSURE GAUGES

A. Pressure gauges for treatment chemicals shall be all Schedule 80 PVC construction, with pressure range from 0 to 150 psi, stem mounted 2-1/2 inches diameter provided with snubber and shut-off petcock valve.

B. Pressure gauges for discharge and face piping shall be manufactured by ASHCROFT, all Type "K" Copper construction, stem mounted 4” diameter, liquid filled, provided with snubber and shut-off petcock valve. Pressure range as indicated on Plans.

2.03 RELIEF VALVES

A. Air Release/Vacuum Valves
   1. Manufacturer:
      a. CRISPIN, "AL" series
      b. Approved equal
   2. Valve shall comply with ANSI/AWWA C512 Standards.
   3. The body and valve shall be constructed of cast iron conforming to ASTM A126, Class B.
   4. Spherical stainless steel float shall seal against a renewable Buna-N resilient seat.

B. Pressure relief & Backpressure / Anti-siphon valves
   1. Manufacturer:
      a. PLAST-O-MATIC VALVES, INC.
      b. GRIFFCO, PRG2050P & BPV05OP
      c. Approved equal
   2. Valves shall be molded in-line type with PVC body construction.

3. Valves shall have a setting range as specified on the plans and be compatible with chemicals in application. Size in accordance with the Plans.

2.04 STRAINERS

A. Strainers shall be Y type, of size indicated, PVC body with 40 mesh cylindrical stainless steel screen and shall be as manufactured by HAYWARD CO. or approved equal. Provide strainers of Clear PVC construction where indicated on contract drawings.

2.05 PRESSURE REGULATORS

A. Manufacturer:
   1. WILKINS/ZURN Model 500
   2. WATTS, Series 263A (3 way)
   3. or Approved Equal

B. Valves shall be of brass construction with Buna-N disc/diaphragm, inlets/outlet size to match piping, maximum working pressure 300 psi, adjustable range 3 psi to 50 psi.

C. Provide with pressure gauge and slotted adjusting screw.

2.06 INJECTION QUILLS

A. Injection quill assembly to be manufactured by SAF-T-FLO, complete with retractable solution tube, corporation stop, adapters, safety chain, restrain hook, and bushings. Must be rated to 150 psi. Solution tube sizing to match line sizing.
   1. Sequestering & Sodium Hypochlorite Injection: Brass corporation stop (S.S. where called for) and compression nuts, integral check valve with Viton seals, PVC solution tube with 45 degree bevel injection end. Solution tube length to be 1/2 diameter of pipe.

2.07 SOLENOID VALVES

A. Manufacturer:
   1. Red Hat II, Series 8210.
   2. Approved equal.

B. Provide normally closed valves, 120 volt AC, 304 stainless steel body. The construction material of all wetted parts shall be compatible with the product contained.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Mount sinks and faucets flush with mounting surfaces. Make all installations even and level. Caulk and/or seal all wall and floor penetrations. Use manufacturer provided/recommended mounting hardware.

C. Extend cleanouts to finished floor or wall surface, or exterior grade. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

D. Install interior floor cleanouts at elevation to accommodate finished floor.

E. Install exterior floor cleanouts in poured concrete pad at elevation to accommodate surrounding grade.

F. Install insulation kits on exposed lavatory and drain pipe.

END OF SECTION 221119

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Emergency eyewash.

1.02 REFERENCES

A. ANSI Z358.1. - Emergency Eyewash and Shower Equipment.

1.03 SUBMITTALS

A. Submit product data under provisions of Section 013300.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. HAWS CORP. of Sparks, NV

B. Eemmax Inc. of Oxford, CT.

C. or Approved Equal

2.02 MANUFACTURED UNITS

A. Emergency eye wash unit:
   1. Pedestal mounted, barrier free eye wash unit.
   2. Bowl: 11” diameter ABS plastic.
   3. Sprayhead Assembly: MSR eye/fact wash head
   4. Hinged Dust Cover: ABS plastic dust cover to keep contaminants, dust and debris from eye washing area.
   5. Foot Treadle: ABS plastic foot control assembly with chain.
   6. Waste: Inline mesh strainer and 1-1/4” drain fitting.
   7. Universal language emergency sign and inspection tag.
   8. Full, one year warranty.
   9. Compliance with ANSI Z358.1.

B. Emergency eye wash heater:
   1. Electric tankless commercial water heater sized for low flow
   2. Enclosure: NEMA-4X Enclosure
   3. Connections: 1/2-inch
   4. Maximum Pressure rating: 150 psig
   5. Temperature Control: Microprocessor with adjustable temperature range
   6. Mixing Valve included
   7. Mounting: Wall mounted
   8. Temperature Rise at Flow Rate: 17 deg. F at 2 gpm
   9. Electrical Characteristics: 4.1 kW at 208 V/1 Phase
   10. Compilance with NSF/ANSI 372 meeting lead-free content requirement

PART 3 - EXECUTION

3.01 INSTALLATION

A. Calibrate unit to provide 85 deg F supply water.

3.02 DEMONSTRATION

A. Demonstrate operation of emergency eyewash to Owner.

END OF SECTION 224500

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This section describes the general requirements for all mechanical items and systems required by the Contract Documents.

B. Comply with all Contract Requirements, General Conditions, Supplementary Conditions and Division 1 Sections applying to or affecting the Work of Division 23.

C. Unless specifically dimensioned, the Work shown on the Drawings is in diagrammatic form only to show general arrangement.

D. Include, in the Work, all accessories and appurtenances, necessary and integral, for the intended operation of any system, component or device, as such systems, components and devices are specified.

E. Do not install pipe or conduit through ductwork.

F. If the pipe or duct size shown on the Drawings does not match the connection size of the equipment that it is connected to, provide the necessary transition pieces at the piece of equipment.

G. Do not use or allow to be used asbestos or asbestos-containing materials on this project. Be rigorous in assuring that all materials, equipment, systems and components thereof do not contain asbestos. Any deviations from this requirement shall be remedied at the Contractor's expense without regard to prior submittal approvals.

1.02 RELATED DOCUMENTS

A. The General Conditions and General Requirements Division 1 apply to the Work of this Section.

1.03 REFERENCE STANDARDS

A. Compliance with the following codes and standards shall be required:

1.	Codes, Rules and Regulations of the State of New York	
2.	USAS	USA Standards Institute (Formerly ASA)
3.	AMCA	Air Moving and Conditioning Association
4.	ADC	Air Diffusion Council
5.	NEMA	National Electrical Manufacturers Association
6.	FM	Factory Mutual
7.	NFPA	National Fire Protection Association
8.	ASTM	American Society for Testing Materials
9.	UL	Underwriters Laboratories, Inc.
10.	NEC	National Electrical Code
11.	ASME	American Society of Mechanical Engineers
12.	ANSI	American National Standards Institute
13.	OSHA	Occupational Safety and Health Act
14.	BSA	Board of Standards and Appeals
15.	MEA	Materials and Equipment Acceptance
16.	DEC	New York State Department of Environmental Conservation - 6 NYCRR Part 613 Handling and Storage of Petroleum
17.	ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers.

18. AWWA American Water Works Association
19. MSS Manufacturer's Standardization Society of the Valve and Fitting Industry
20. ARI American Refrigeration Institute
21. SMACNA Sheet Metal and Air Conditioning Contractor's National Association
22. TEMA Tubular Exchanger Manufacturers Association
23. F.S. or FED Spec. Federal Specification
24. ASA Acoustical Society of America
25. NACE National Association or Corrosion Engineers
26. ASSE American Society of Sanitary Engineers
27. International Building Code
28. International Fire Code
29. International Existing Building Code
30. International Fuel Gas Code
31. International Plumbing Code
32. International Energy Conservation Code
33. International Mechanical Code
34. New York State Industrial Code Rules
35. IRI Industrial Risk Insurers
36. AGA American Gas Association
37. AABC American Air Balance Council
38. NEBB National Environmental Balancing Bureau
39. AWS American Welding Society

1.04 DEFINITIONS

A. "Provide" means furnish and install, complete the specified material, equipment or other items and perform all required labor to make a finished installation.

B. "Furnish and install" has the same meaning as given above for "Provide."

C. Refer to General Conditions for other definitions.

1.05 ABBREVIATIONS

A. Reference by abbreviation may be made in the Specifications and the Drawings in accordance with the following list:
1. HVAC Heating, Ventilating and Air Conditioning
2. CM Construction Manager
3. AC Air Conditioning
4. H & V Heating and Ventilating
5. AWG American Wire Gauge
6. BWG Birmingham Wire Gauge
7. USS United States Standard
8. B & S Brown & Sharpe
9. OS & Y Outside Screw and Yoke
10. IBBM Iron Body Brass Mounted
11. WSP Working Steam Pressure
12. PSIG Pounds per Square Inch Gauge
13. PRV Pressure Reducing Valve
14. GPM Gallons per Minute
15. MBH Thousand BTU per hour
16. BTU British Thermal Units
17. WG Water Gage

18. LB Pound (Also shown as: #)
19. ASME American Society of Mechanical Engineers
20. ASTM American Society for Testing Materials
21. ABMA American Boiler Manufacturers Association
22. ASA American Standards Associates
23. MER Mechanical Equipment Room

See Drawings for additional abbreviations

1.06 REVIEW OF CONTRACT DOCUMENTS AND SITE

A. Give written notice with the submission of bid to the Architect/Engineer of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules or regulations of Authorities having jurisdiction, and any necessary items of work omitted. In the absence of such written notice it is mutually agreed that the Contractor has included the cost of all required items in his proposal for a complete project.

B. Contractors shall acknowledge that they have examined the Plans, Specifications and Site, and that from his own investigations he has satisfied himself as to the nature and location of the Work; the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials; availability of labor, utilities, roads and uncertainties of weather; the composition and condition of the ground; the characters quality and quantity of subsurface materials to be encountered; the character of equipment and facilities needed preliminary to and during the execution of the Work; all federal, state, county, township and municipal laws, ordinances and regulations particularly those relating to employment of labor, rates of wages, and construction methods; and all other matters which can in any way affect the Work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with the available information concerning these conditions will not relieve him from the responsibility for successfully performing the Work.

C. Owner assumes no responsibility for any understanding or representation made during or prior to the negotiation and execution of this Contract unless such understanding or representations are expressly stated in the Contract and the Contract expressly provides that the responsibility, therefore, is assumed by the Owner.

1.07 MEASUREMENTS

A. Base all measurements, both horizontal and vertical from established bench marks. Make all Work agree with these established lines and levels. Verify all measurements at site; and check the correctness of same as related to the Work.

1.08 LABOR AND MATERIALS

A. Provide all materials and apparatus required for the Work of new and first-class quality. Furnish, deliver, arrange, erect, connect and finish all materials and equipment in every detail, so selected and arranged as to fit properly into the building spaces.

B. Remove all materials delivered, or work erected, which does not comply with Drawings or Specifications, and replace with proper materials, or correct such work as directed, at no additional cost to the Owner.

1.09 COVERING OF WORK

A. Do not cover up or hide from view any duct, piping, fitting, or other work of any kind before it has been examined or approved by the Architect/Engineer and/or other authority having jurisdiction over the same. Remove and correct immediately any unacceptable or imperfect

work or unauthorized or disapproved materials discovered immediately after being disapproved.

1.10 PROTECTION

A. Protect the Work and material of all trades from damage and replace all damaged material with new.

B. Protect work and equipment until the Work is finally inspected, tested, and accepted; protect the Work against theft, injury or damage; and carefully store material and equipment received on site which is not immediately installed; close open ends of work with temporary covers or plugs during construction to prevent entry of foreign material.

C. Preserve all public and private property, along and adjacent to the Work, and use every precaution necessary to prevent damage or injury thereto. Use suitable precautions to prevent damage to pipes, conduits and other underground structures or utilities, and carefully protect from disturbance or damage all property marks until an authorized agent has witnessed or otherwise referenced their location, and do not remove them until directed.

1.11 CUTTING AND PATCHING

A. Provide all cutting and rough patching required for the Work.

B. Furnish and locate all sleeves and inserts required before the floors and walls are built, pay the cost of cutting and patching required for pipes where sleeves and inserts were not installed in time, or where incorrectly located. Provide all drilling required for the installation of hangers.

C. Punch or drill all holes cut through concrete slabs or arches from the underside. Do not cut structural members without the approval of the Architect/Engineer. Perform all cutting in a manner directed by the Architect/Engineer.

D. Do not do any cutting that may impair strength of building construction. Do no drill any holes, except for small screws, in beams or other structural members without obtaining prior approval. All Work shall be done in a neat manner by mechanics skilled in their trades and as approved.

1.12 SUBMITTALS

A. Submit for review, shop drawings for all materials and equipment furnished and installed under this Contract. Submissions shall include but not be limited to:
   1. Ductwork layout drawings, air devices and accessories
   2. Automatic temperature control equipment, diagrams and control sequences
   3. Equipment, fixtures, and appurtenances

B. Reports
   1. Compliance with listings and approvals for equipment and for fire ratings.
   2. Acceptance certificates from inspecting agencies.
   3. Complete printed and illustrated operating instructions in report format.
   4. Manufacturer's performance tests of equipment.
   5. Field duct testing reports.
   6. Field operating test results for equipment.
   7. Performance report on the balancing of air systems.
   8. Manufacturer's reports on motorized equipment alignment and installation.

C. Specific references to any article, device, product or material, fixture or item of equipment by name, make or catalog number shall be interpreted as establishing a basis of cost and a

standard of quality. All devices shall be of the make and type listed by Special Agencies, such as the Underwriters' Laboratories, and where required, approved by the Fire Department.

1.13 SPACE ALLOTMENTS AND SUBSTITUTIONS

A. The space allotments and equipment layouts on the Drawings are based on the manufacturer's model indicated or scheduled as the "Basis of Design". Ensure that any equipment that is submitted other than the "Basis of Design" will fit in the space allotment and will provide the necessary maintenance clearances as recommended by the manufacturer. If maintenance clearances are not met, pay for any changes such that maintenance clearances will be met.

B. Bear all costs associated with re-layout of the equipment, changes to piping/ductwork, and other changes as required if approved equipment other than the "Basis of Design" equipment is purchased. This shall also include any structural steel modifications and structural steel design changes. Submit, at no cost to the Owner, a steel design stamped by a structural engineer licensed in the state in which the Work is to be performed for structural modifications that must be made resulting from the use of equipment other than the "Basis of Design" or not specified.

1.14 PAINTING

A. Prime paint all bare supplemental steel, supports and hangers required for the installation of Division 23 Work in accordance with "Painting" Specification Section. Touch up welds of galvanized surfaces with galvanizing primer.

1.15 MATERIAL SAFETY DATA SHEETS

A. Submit material safety data sheets (MSDS) for all chemicals, hydraulic fluids, seal oils, lubricating oils, glycols and any other hazardous materials used in the performance of the Work, in accordance with the US Department of Labor, Occupational Safety and Health Administration (OSHA) hazard communication and right-to-know requirements stipulated in 29 CFR 1910.1200 (g).

1.16 MOTORS AND STARTERS

A. Provide new NEMA Standard electric motors, sized and designed to operate at full load and full speed continuously without causing noise, vibration, and temperature rise in excess of their rating. Provide motors with a service factor of at least 1.15.

B. Equip motors for belt driven equipment with rails with adjusting screws for belt tension adjustment. Weather protect motors exposed to the weather.

C. Install high efficiency electric motors for air handling units, relief fans, and exhaust fans.

D. Provide all motors for use with Variable Frequency Drives with "high efficiency inverter duty" insulation class "F" with class "B" temperature rise and that conform to or exceed the International Energy Conservation Code or the Federal EP Act of 1992 requirements for efficiency.

E. Provide stainless steel nameplates, permanently attached to the motor, and having the following information as a minimum:
   1. Manufacturer
   2. Type
   3. Model
   4. Horsepower
   5. Service Factor
   6. RPM

7. Voltage/Phase/Frequency
8. Enclosure Type
9. Frame Size
10. Full-Load Current
11. UL Label (where applicable)
12. Lead Connection Diagram
13. Bearing Data
14. Efficiency at Full Load.

F. Provide motors whose sound power levels do not exceed that recommended in NEMA MG 1-12.49.

G. Provide motors with drive shafts long enough to extend completely through belt sheaves when sheaves are properly aligned and balanced.

H. Protect motor starters on equipment located outdoors in weatherproof NEMA 4X enclosures.

I. Provide weatherproof NEMA 4X disconnect switches when located outdoors.

J. Motor Characteristics:
1. 120V/1/60 Hz, 208V/1/60 Hz or 240V/1/60 Hz: Capacitor start, open drip-proof type, ball bearing, rated 40 C. continuous rise.
2. 208V/3/60 Hz, 240V/3/60 Hz or 460/3/60 Hz: NEMA B, normal starting torque, single speed, squirrel-cage type, open drip-proof, rated 40 C continuous rise, with ball bearings rated for B-10 life of 100,000 hours and fitted with grease fittings and relief ports. Provide motors with aluminum end brackets with steel inserts in bearing cavities.

1.17 ACOUSTICAL PERFORMANCE OF EQUIPMENT AND SYSTEMS

A. Install the Work in such a manner that noise levels from operation of motor driven equipment, whether airborne or structure-borne, and noise levels created by or within air handling equipment and air distribution and control media, do not to exceed sound pressure levels determined by the noise criteria curves published in the ASHRAE guide.

B. Acoustical Tests
1. Owner may direct the Contractor to conduct sound tests for those areas he deems too noisy.
2. If NC level exceeds the requirements of the Contract Documents due to improper installation or operation of mechanical systems, make changes or repairs to bring noise levels to within required levels.
3. Retest until specified criteria have been met.

1.18 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Instructions and Demonstration for Owner's Personnel
1. Provide operating and maintenance instruction to the Owner when project is completed and all HVAC equipment serving the building is ready to be turned over to the Owner.
2. Turn over the HVAC equipment to the Owner only after the final testing and proper balancing of HVAC systems.
3. Instruct the Owner's personnel in the use, operation and maintenance of all equipment of each system.
4. The above instruction requirements are in addition to that specified for specific equipment or systems. Conform to specified requirements if more stringent or longer instruction is specified for specific equipment or systems.

1.19 CODES, RULES, PERMITS & FEES

A. Give all necessary notices, obtain all permits and pay all government sales taxes, fees, and other costs, in connection with the Work. Unless indicated otherwise, fees for all utility connections, extensions, and tap fees for water, storm, sewer, gas, telephone, and electricity will be paid directly to utility companies and/or agencies by the Owner. File all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of inspection for the Work and deliver same to the Owner's Representative before request for acceptance and final payment for the Work.

B. Conform to the requirements of the NFPA, NEC, FM, UL and any other local or State codes which may govern.

1.20 RECORD DRAWINGS

A. During the progress of the Work, make a record set of drawings of all changes by which the actual installation differs from the Drawings.

B. Create all record drawings in AutoCAD version 2002 or later in .dwg format. Upon completion of the Work, submit to the Architect/Engineer for approval three complete sets of hard copies of the record drawings, of the same size as the Drawings for approval. Upon approval by the Architect/Engineer furnish the Owner a CD copy of the record drawings along with one hard copy for his records.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 CLEANING AND ADJUSTING

A. Cleaning
1. Clean all materials and equipment; leave in condition ready to operate and ready to receive final finishes where required.
2. Clean the operating equipment and systems to be dust free inside and out.
3. Clean concealed and unoccupied areas such as plenums, pipe and duct spaces and equipment rooms to be free of rubbish and dust.

B. Adjusting
1. Adjust and align equipment interconnected with couplings or belts.
2. Adjust valves of all types and operating equipment of all types to provide proper operation.
3. Clean all strainers after system cleaning and flushing and again before system startup.

C. Lubrication
1. Lubricate equipment as recommended by the manufacturer, during temporary construction use.
2. Provide complete lubrication just prior to acceptance.

D. Permanent Equipment Operating During Construction
1. Use only in same service as the permanent applications.
2. Use disposable filters during temporary operation.

3. Replace expendable media, including belts used for temporary operation and similar materials just prior to acceptance of the Work.
4. Repack packing in equipment operated during construction just prior to system acceptance, using materials and methods specified by the equipment manufacturer.

E. Retouch or repaint equipment furnished with factory finish as required to provide same appearance as new.

F. Tools
1. Provide one set of specialized or non-standard maintenance tools and devices required for servicing the installed equipment.

3.02 EQUIPMENT BASES, PLATFORMS AND SUPPORTS

A. Provide supporting platforms, steel supports, anchor bolts, inserts, etc., for all equipment and apparatus provided.

B. Obtain prior approval for installation method of structural steel required to frame into building structural members for the proper support of equipment, conduit, etc. Welding will be permitted only when approved by the Architect/Engineer.

C. Submit shop drawings of supports to the Architect/Engineer for approval before fabricating or constructing.

D. Provide leveling channels, anchor bolts, complete with nuts and washers, for all apparatus and equipment secured to concrete pads and further supply exact information and dimensions for the location of these leveling channels, anchor bolts, inserts, concrete bases and pads.

E. Where supports are on concrete construction, take care not to weaken concrete or penetrate waterproofing.

3.03 ACCESSIBILITY

A. Install items requiring access conveniently and accessibly located with reference to the finished building.

3.04 USE OF EQUIPMENT

A. The use of any equipment, or any part thereof, even with the Owner's consent, is not an indication of acceptance of the Work on the part of the Owner, nor shall it be construed to obligate the Owner in any way to accept improper work or defective materials.

3.05 MODIFICATIONS OF EXISTING WORK

A. Coordinate the Work with all other contractors and provide necessary dimensions for all openings. Provide all cuts and openings which are necessary for the Work for passage of piping and ductwork

B. Upon completion, remove all temporary piping and equipment, shoring, scaffolds, etc., and leave all areas clean and free from material and debris resulting from the Work performed under this Section. Provide rough patching in areas required.

3.06 EQUIPMENT INSTALLATION

A. Locate and set equipment anchor bolts, dowels and aligning devices for equipment requiring them.

B. Level and shim the equipment; coordinate and oversee the grouting work.

C. Perform field assembly, installation and alignment of equipment under direct supervision provided by the manufacturer or with inspections, adjustments and approval by the manufacturer.

D. Alignment and Lubrication Certification for Motor Driven Apparatus
   1. After permanent installation has been made and connections have been completed, but before the equipment is continuously operated, have a qualified representative of the equipment manufacturer inspect the installation and report in writing on the manufacturer's letterhead on the following:
      a. Whether shaft, bearing, seal, coupling, and belt drive alignment and doweling is within the manufacturer’s required tolerances so that the equipment will remain aligned in the normal service intended by the Contract Documents and that no strain or distortion will occur in normal service.
      b. That all parts of the apparatus are properly lubricated for operation.
      c. That the installation is in accordance with manufacturer's instructions.
      d. That suitable maintenance and operating instructions have been provided for the Owner's use.
      e. Make any corrections to items that are required or recommended based on the manufacturer’s inspection and have the equipment re-inspected.

E. Machinery Guards
   1. Protect motor drives by guards furnished by the equipment manufacturer or in accordance with the Sheet Metal and Air Conditioning Contractors National Association's Low Pressure Duct Manual. Provide guards of all types approved as acceptable under OSHA Standards.

F. Equipment Start-up
   1. Require each equipment manufacturer to provide qualified personnel to inspect and approve equipment and installation and to supervise the start-up of the equipment and to supervise the operating tests of the equipment.
   2. If a minimum number of hours for start-up and instruction are not stated with the equipment specifications, these shall be 2 full 8-hour working days as a minimum.
   3. Advise Owner of start-up at least 72 hours in advance.

3.07 CLOSEOUT PROCEDURES

A. General Operating and Maintenance Instructions: Arrange for each installer of operating equipment and other work that requires regular or continuing maintenance, to meet at the site with the Owner's personnel to provide necessary basic instructions in the proper operation and maintenance of the entire Work. Where installers are not expert in the required procedures, include instruction by the manufacturer's representatives.

B. Where applicable, provide instruction and training, including application of special coatings systems, at manufacturer's recommendation.

C. Provide a detailed review of the following items:
   1. Maintenance manuals
   2. Record documents and catalog cuts for each piece of equipment.
   3. Spare parts and materials
   4. Tools
   5. Lubricants
   6. Fuels

7. Identification systems
8. Control sequences
9. Hazards
10. Cleaning

D. Warranties, bonds, maintenance agreements, and similar continuing commitments.

E. Demonstrate the following procedures:
1. Start-up
2. Shut-down
3. Emergency operations
4. Noise and vibration adjustments
5. Safety procedures
6. Economy and efficiency adjustments
7. Effective energy utilization.

F. Prepare instruction periods to consist of approximately 50% classroom instruction and 50% "hands-on" instruction. Provide minimum instruction periods as follows:

Systems or Equipment	Training Time (Hours)
All Equipment	4 hrs.

END OF SECTION 230010

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This Section describes the marking and identification materials for identifying mechanical equipment.

B. Mark and identify all mechanical equipment described herein, and as shown and specified in the Contract Documents.

1.02 REFERENCES

A. Z53.1 - Safety Color Code for Marking Physical Hazards.

B. OSHA 29 CFR 1910 - Subpart J, General Environmental Controls

1.03 SUBMITTALS

A. Identification Scheme - Submit scheme of identification codes.

B. Samples - Submit samples of tags, attachments, labeled and identified.

C. Equipment Schedules - Submit mechanical equipment schedules, listing proposed equipment numbers, and their location and function.

D. Product Data: Provide manufacturers catalog literature for each product required.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

A. Seton

B. Bunting

C. W.H. Brady Company

2.02 MECHANICAL EQUIPMENT MARKERS

A. Identify all mechanical equipment, bare or insulated, installed in the rooms or on the roof, by means of lettered and numbered nameplate (not stenciled) identifying the equipment and service. Refer to the Drawings for equipment identifications. Nameplates shall be aluminum with permanent 1 ½ inch high white letters on a black background, mechanically affixed and installed in a readily visible location on the equipment. Coordinate the final equipment designation with the Owner.

B. In addition to markers, all mechanical equipment shall be furnished with the manufacturer’s identification plate showing the name of equipment, manufacturer’s name and address, date of purchase, model number and performance data.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Apply all tags in accordance with the manufacturer’s instructions.

END OF SECTION 230555

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The Work specified as part of this Section consists of the work required to achieve operational and coordinated Sequences of Operation as described. Work includes coordination of functions of controllers supplied as part of equipment packages, sizing of control valves, interconnection of systems, provision and installation of all accessory devices required for complete system operation including devices not provided as part of equipment, coordination of start up and testing and demonstration of the operation of Sequences of Operation to the Owner and his representatives.

B. The control system operation of all equipment shall be subject to the operational modes, conditions and logic described in this Section and the controlled equipment manufacturer's recommendations.

C. Training of the Owner's personnel in the operation, trouble shooting, adjustment and repair of all system controls.

1.02 RELATED SECTIONS AND WORK

A. Division 26

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 GENERAL

A. General
   1. Conform to the requirements of the Owner's standards for all electrical work and devices.

3.02 SEQUENCE OF OPERATION - ELECTRIC UNIT HEATER (EUH-1 & EUH-2)

A. General
   1. The heater shall be provided with a remote mounted thermostat by Contract 'E'.

B. Heating
   1. The heating set point temperature shall be 60°F (adjustable). When the space temperature falls below the set point temperature, the heater shall turn on in order to maintain the set point temperature.

3.03 SEQUENCE OF OPERATION - ELECTRIC WALL HEATER (EUH-3)

A. General
   1. The heater shall be provided with an integral thermostat.

B. Heating
   1. The heating set point temperature shall be 55°F (adjustable). When the space temperature falls below the set point temperature, the heater shall turn on in order to maintain the set point temperature.

3.04 SEQUENCE OF OPERATION -EXHAUST FAN AND MOTORIZED LOUVER (EF-1, L-1)

A. General
   1. The exhaust fan shall be provided with a Hand-Off-Auto switch and a remote mounted thermostat by Contract 'E'.
      a. Hand Mode: Exhaust fan shall operate and motorized louver shall open.
      b. Off Mode: Exhaust fan shall be off and motorized louver shall be closed.
      c. Auto Mode: Fan shall run and motorized louver shall open when space temperature rises above the set point of 90°F (adjustable).

3.05 SEQUENCE OF OPERATION -EXHAUST FAN AND MOTORIZED LOUVER (EF-2, L-1)

A. General
   1. The exhaust fan shall be provided with a Hand-Off-Auto switch and a remote mounted thermostat by Contract 'E'.
      a. Hand Mode: Exhaust fan shall operate and motorized louver shall open.
      b. Off Mode: Exhaust fan shall be off and motorized louver shall be closed.
      c. Auto Mode: Fan shall run and motorized louver shall open when space temperature rises above the set point of 85°F (adjustable).

3.06 SEQUENCE OF OPERATION -EXHAUST FAN AND MOTORIZED LOUVER (EF-3, L-2)

A. General
   1. The exhaust fan shall be provided with a Hand-Off-Auto switch, a time clock, and door contact(s) by Contract 'E'.
      a. Hand Mode: Exhaust fan shall operate and motorized louver shall open.
      b. Off Mode: Exhaust fan shall be off and motorized louver shall be closed.
      c. Auto Mode: Exhaust fan operation shall be interlocked with all doors leading into the Chemical Room. Fan shall run and motorized louver shall open for a minimum of ten (10) minutes when any door is opened, or when scheduled by the time clock.

END OF SECTION 230993

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide exhaust fans, as specified herein, of sizes and capacities scheduled and in locations shown on drawings.

1.02 REFERENCE CODES AND STANDARDS

A. AMCA 99 - Standards Handbook

B. AMCA 210 - Laboratory Methods of testing Fans for Rating

C. AMCA 300 - Reverberant Room Method for Sound Testing of Fans

D. ASHRAE Handbook, HVAC Applications Volume “Sound and Vibration Control”

E. UL listed and labeled.

1.03 SUBMITTALS

A. Shop Drawings - Show fan layout, housing, materials, gauges, dimensions, weights and installation details

B. Product data - Manufacturer’s fan performance (data includes cfm, rpm, bhp, motor nameplate data, tip speed, outlet velocity and static pressure) and sound performance (data includes sound power level ratings by octave bands) as tested in accordance with AMCA Standards 210 and 300.

C. Fan performance curves - Submit curves for all fans with system performance shown, and for plus or minus 10 percent and plus or minus 20 percent change in fan rpm. Curves shall include plotted rpm, horsepower, cfm, static pressure, and fan surge line and operating point.

D. Certified AMCA Ratings - Submit ratings for air and sound performance.

E. UL Listing - Submit listing if specified.

1.04 QUALITY ASSURANCE

A. Factory balance each fan statically and dynamically, test run before shipment, and key fan wheel to fan shaft. Fans shall operate quietly and without pulsation or vibration. Conduct sound power level tests for each type fan at the factory in accordance with AMCA 300.

B. Fans shall operate in the stable range of their performance curves.

C. The fan external static pressures shown in the schedules are those required by the ductwork and apparatus, and do not include the internal and intake fan losses, inlet vanes or integral outlet dampers, inlet screens, outlet velocity heads or drive losses.

D. Factory performance test each fan assembled in or as part of apparatus specified to be performance tested. Test shall display scheduled performance characteristics, using certified, calibrated testing instruments provided by the manufacturer of the apparatus.

E. All fan performance ratings shall be based up on factory tests performed in accordance with AMCA 210. One fan of each type specified shall have actual factory performance tests performed prior to shipment. All fans shall be certified by AMCA and carry its seal.

PART 2 - PRODUCTS

2.01 DIRECT DRIVE SIDEWALL MOUNTED PROPELLER FANS

A. General Description:
   1. Fans shall be model SE as manufactured by Greenheck or approved equal.
   2. Fan arrangement shall be either supply or exhaust, see Fan Schedule.
   3. Sidewall mounted applications.
   4. Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number.

B. Wheel:
   1. Propeller shall be aluminum blade riveted to steel hub.
   2. A standard square key and set screw or tapered bushing shall lock the propeller to the motor shaft.
   3. Statically and dynamically balanced in accordance with AMCA Standard 204-05.
   4. The propeller and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency.

C. Motors:
   1. Motor enclosure: Open drip proof
   2. Motors are permanently lubricated, sleeve bearing type or ball bearing type to match with the fan load and furnished at the specific voltage and phase.
   3. Accessible for maintenance

D. Drive Frame:
   1. Drive frame assemblies and fan panels shall be galvanized steel.
   2. Drive frame shall have welded wire or formed channels and fan panels shall have prepunched mounting holes, formed flanges and a deep formed one piece inlet venturi.

E. Options/Accessories:
   1. All options and accessories shall be as called for on the equipment schedules.

PART 3 - EXECUTION

3.01 GENERAL

A. Install fans, including all necessary structural supports and bracings as scheduled and located on the contract drawings in accordance with manufacturer's instructions and approved submittals.

B. Connect duct to fans to allow for straight and smooth air flow.

C. Provide flexible connections (minimum of 4") between fan and duct.

D. Install fan level: +/- 5 degrees vertical. Final installation shall be free of all leaks from both fan and associated ductwork.

3.02 START-UP, TESTING, DEMONSTRATION

A. Start-up fans after checkout to insure proper alignment and phased electrical con-nections.

B. Test fans individually and as part of system.

C. Insure fans are properly interlocked with supply fans and with control system.

D. Demonstrate operation to Owner and instruct maintenance personnel in operation of equipment.

END OF SECTION 233416

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Electric Unit Heaters

B. Electric Wall Heaters.

1.02 REFERENCES

A. Electric unit heaters shall meet the requirements of the National Electric Code (NEC) and shall be UL listed.

1.03 SUBMITTALS

A. Submit under provisions of Division 1.

B. Submit manufacturer's product data and installation instructions to Engineer.

C. Submittal data shall include capacity and size of each heater and wiring instructions.

PART 2 - PRODUCTS

2.01 ELECTRIC UNIT HEATERS

A. Electric unit heater shall be Model HVH as manufactured by Chromalox or approved equal. Heater shall be suitable for horizontal or vertical mount. Refer to the drawings for mounting type.

B. Heater to be of the KW rating, voltage and phase specified in the schedule.

C. Unit cabinet shall be 20 gauge die formed furniture grade steel with integral adjustable louvers to provide control of discharged air. All metal surfaces of the case shall be phosphate coated to resist corrosion, and finished in attractive two-tone powder coated paint.

D. The electric heating bank shall be metal sheath fintube heating elements with furnace brazed fins for improved heat transfer. Automatic reset thermal overheat protection shall be wired for instantaneous de-energizing of built-in control of contactor holding coil in case of thermal overload.

E. Motor shall be of the totally enclosed continuous fan-duty sleeve bearing type equipped with built-in thermal overload protection. Each unit shall be equipped with a combination motor support resiliently mounted at four points to absorb any motor vibration. Fans shall be aluminum, directly connected to fan motor, dynamically balanced and designed specifically for unit heater application.

F. Electrical: All units shall have built-in contactors and low voltage control circuit transformers to provide single-source power connection. Factory mounted disconnect switches shall be provided. A wiring diagram and grounding lug shall be included in each control compartment.

G. Supports: Stainless steel hanger rods, double nuts, and ceiling/wall bracket.

H. All options and accessories shall be as called for on the equipment schedules.

2.02 ELECTRIC WALL HEATERS

A. Wall mounted electric automatic fan forced heaters shall be Model AWH as manufactured by QMark or approved equal. The heaters shall be UL listed and be designed for wall, recess, or surface mounting. Refer to equipment schedule for mounting type.

B. Heater Assembly: The heater assembly shall consist of a fan panel upon which is mounted all of the operational parts of the heater.

C. Heating Element: The heating element shall be of non-glowing design consisting of an 50/20 nickel chromium resistance wire enclosed in a steel sheath to which plate fins are copper brazed. It shall be warranted for 5 years.

D. Fan and Fan Motor: The fan shall be five-bladed aluminum. The fan motor shall be totally enclosed.

E. Fan Delay Switch: Fan control shall be of bi-metallic, snap action type, and shall activate fan after heating element reaches operating temperature. The fan shall continue to operate after the thermostat is satisfied and until the heating element is cool.

F. Thermostat: The tamper-proof thermostat shall be of the bi-metallic, snap-action type with enclosed contracts. It shall be completely concealed behind the front cover to become tamper proof.

G. Thermal Cutout: A thermal cutout shall be built into the system to shut off the heater in the event of over-heating.

H. Disconnect Switch: A double-pole single throw disconnect switch shall be mounted on the back box for positive disconnect of power supply. It will be completely concealed behind the front grid panel.

I. Back Box: The back box shall be designed for duty as a recessed rough-in box in either masonry or frame installations and for use with a surface mounting frame in surface mounting installations. The back box shall be 20-gauge galvanized steel and shall contain knockouts through which power leads are brought.

J. Front Panel: The front panel shall be of the bar grille type and shall be constructed of 16 gauge cold rolled steel, welded into a uniform grille and finished in baked enamel to direct the warmed air toward the floor. The front grille shall be surrounded by a decorative satin-finish aluminum frame.

K. All options and accessories shall be as called for on the equipment schedules.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install unit in accordance with manufacturer's published installation instructions.

B. Do not install horizontal unit heaters closer than 12 inches to combustible materials in any direction.

END OF SECTION 238239

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Excavation and backfill for electrical work.

B. Secondary power wiring and distribution system.

C. Lighting, including lamps.

D. Wiring devices.

E. Electrical control systems and interlock wiring.

F. Wiring for built-in equipment.

G. Motor Control Centers.

H. Distribution panels and switches.

I. Engine generator system and automatic transfer switch.

J. Sound acoustical generator enclosure.

K. Instrumentation and Controls.

1.02 RELATED WORK

A. Foundations and pads required for equipment furnished under this division of speci-fications.

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 specifica-tions 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.

1.05 PERMITS AND FEES

A. The Contractor shall obtain and pay for all permits, construction charges, fees, licenses, certificates, inspections and other use charges required in connection with the work.

B. Such permits include, but are not limited to:
1. Transportation and disposal of debris.
2. Temporary Electrical Services and Permanent Electrical Service.
3. Telephone Service.
4. Electrical Inspectors, Inc., or a pre-approved electrical inspection agency.
5. Road opening permits.

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 speci-fied, 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 dia-grammatic 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 preceding 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. Motor Control Centers including all individual devices.
   2. Distribution panels.
   3. Disconnect switches.
   4. Transfer switches.
   5. Individually mounted circuit breakers.
   6. Relays.
   7. Pilot lights and control switches.
   8. Service entrance equipment and main circuit breaker.

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 260000

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Electrical demolition.

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 con-trol.

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

2.01 NOT USED.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify field circuiting arrangements at all Plant sites and Administration Building.

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.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new con-struction, as indicated on drawings.

B. Repair adjacent construction and finishes damaged during demolition and extension work.

C. Provide caps and filler plates/plugs for all openings in equipment and enclosures after removal of conduits.

D. Remove demolished materials from site as work progresses.

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 260010

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
   3. Communication cables

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 conduc-tors; 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

B. Outdoor Use in Conduits:
1. The 300-volt instrumentation signal cable for outdoor use in conduits 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 chlorinated polyethylene (CPE). 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. 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 CPE 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 as follows:
    a. Cablec APZIC
    b. Okonite AOkobon 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 applica-tions.

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.

2.04 BELOW GRADE EXTERIOR SPLICES

A. Manufacturer: 3M or approved equal

B. Model: 72-N series for inline splices

C. Model: 90-B1 for WYE splices

D. Splices shall be weatherproof, made with epoxy resin UL listed for dierect burial.

E. For use with all exterior pull boxes and hand holes where splices are made.

F. Provide all connectors and crimp couplings as required.

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. 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, 3f	208Y/120 Volt, 3f	240/120 Volt, 3f
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

WIRE NUMBER	COLOR
1	Black

WIRE NUMBER	COLOR
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

3.02 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 megohmeter 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 260519

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. Rod Electrode: Copper, 3/4-inch diameter, 10 feet long.

D. 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. Effectively bond all grounding conductors to grounding rod electrodes, equipment enclosures and ground busses.
   3. Locate all grounding attachments away from areas subject to physical damage. Provide protective covering as required.
   4. Install service entrance building ground as per NEC and LIPA requirements.
   5. Service entrance shall be bonded to street side of first flange or coupling of incoming main water line with heavy duty ground clamp. Bonding conductor to be sized in accordance with NFPA 70.
   6. Building steel shall be bonded to ground bus on main service with a conductor the same size as in B.1 below.
   7. Install new service grounds and grounding systems for new service as per LIPA and NEC requirements.
   8. Generators shall have a dedicated grounding system for a separately derived system for switching neutrals.

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.

C. Transformers:
   1. Transformers shall be grounded and grounding conductors and conduits sized in accordance with NFPA 70.

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 260526

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.

E. Provide end caps for all channels.

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 permit-ted.

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 260529

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 above and below ground.
   2. Conduit Use - PVC Sch. 80
      a. Secondary service power feeds from LIPA transformers only.
   3. Conduit Use - Flexible Liquid-tight Metal Conduit:
      a. Connecting motors, generators and other equipment subject to vibration, maximum length - 3 feet.
      b. Passing through building expansion joints.

B. Device Boxes: Provide each fixture switch, receptacle and other wiring device with a box of appropriate size and depth for its particular location use unless indicated otherwise.

C. Pull boxes, junction boxes and wire troughs

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. NEMA TC 3 - PVC Fittings for use with Rigid PVC conduit and tubing.

F. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.

G. ANSI/NEMA OS1 - Sheet-steel outlet boxes, device boxes, covers and box supports.

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 consid-ered 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 PVC CONDUIT

A. PVC conduit shall be manufactured by WHEATLAND, TRIANGLE REPUBLIC or approved equal.

B. Description: NEMA TC 2; Schedule 80 PVC.

C. Fittings and Conduit Bodies: NEMA TC3.

2.03 PVC COATED METAL CONDUIT

A. PVC Coated Metal Conduit shall be PLASTI-BOND RED by Robroy Industries or equal.

B. Description: NEMA RN 1; galvanized rigid steel conduit with external PVC coating, 40 mil thick and red urethane internal coating.

C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; galvanized steel fittings with external PVC coating and red urethane internal coating to match conduit.

2.04 DUCT SEAL

A. RectorSeal or approved equal.

B. Model #: 81881

2.05 FLEXIBLE LIQUID-TIGHT METAL CONDUITS AND FITTINGS

A. Liquid-tight flexible metal conduit shall be ANACONDA or approved equal.

B. Description: Interlocked steel construction with PVC jacket.

C. Provide flexible liquid-tight conduits and fittings as manufactured by THOMAS & BETTS CORP., O.Z. GEDNEY CO. or approved equal. Catalog numbers used below are those of the THOMAS & BETTS CORP., based on 3/4" size and are to be considered as standards by which equivalents are to be judged. All conduit shall be liquid-tight flexible type, UL type UA, or suitable for exposure to continuous or intermittent moisture.

D. Flexible liquid-tight connectors shall be Series 5333 or approved equal.

2.06 OUTLET AND DEVICE BOXES

A. Acceptable Manufacturers: Raco, General Electric or approved equal.

B. Sheet Metal Outlet Boxes - All concealed boxes shall be NEMA OSI, galvanized steel:
   1. Luminare and Equipment Supporting Boxes: Rated for weight of equipment supported. Provide 1/2" male fixture stubs where required.

C. Concrete Ceiling Boxes: Concrete type.

D. Cast Boxes: All exposed surface mounted boxes shall be NEMA FB1, Type FD, cast feralloy. Provide gasketed cover by box manufacturer.

2.07 PULL BOXES

A. All pull boxes used for this project shall be minimum LIPA B-3-6 or specifically approved equal for all customer installed power and control circuits.

B. Provide H-20 Cast-Iron Traffic Load Cover. Cover shall have 3” high logo “Electric”.

2.08 JUNCTION BOXES

A. Acceptable Manufacturers: RACO, GENERAL ELECTRIC or approved equal.

B. Sheet metal boxes: NEMA OS1, galvanized steel.

C. Covers: Galvanized steel.

2.09 WIRE TROUGH

A. Wireways shall be manufactured by Square D, Class 526, rain tight trough or approved equal.

B. Wireway shall be completely enclosed with removable covers.

C. Construction: 16 Gauge Galvanized Steel. 8-inch and 12-inch wire trough shall be 14-gauge galvanized steel.

D. Finish: ANSI-49 epoxy paint applied by cathodic electro-deposition paint process over a corrosion resistant phosphate preparation.

E. UL listed.

PART 3 - EXECUTION

3.01 INSTALLATION OF CONDUITS

A. Minimum size of conduits shall be 3/4-inch.

B. Minimum conduit depth shall be 24" 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 con-duit ends will butt in couplings, connectors and fittings.

D. All threaded conduits and fittings shall have KOPR-SHIELD compound applied to all threads prior to assembly.

E. Make bends or offsets with standard ells or field bends with an approved bender.

F. 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.

G. Secure conduits to all boxes and cabinets with double locknuts and bushings so system will be electrically continuous from service to all outlets.

H. Install conduit in accordance with NECA Standard of Installation.

I. Cap ends of conduits to prevent entrance of water and other foreign material during construction.

J. Complete all conduit systems before pulling conductors.

K. Support conduits under provisions of Section 260529.

L. Provide approved expansion joints or fittings and bonding jumpers where conduits in concrete pass through building expansion joints.

M. Provide cable supports in conduits rising vertically in accordance with the National Electric Code, Article 300-19.

N. Provide No. 12 AWG copper pull wires or nylon cord in all empty conduits. Steel wire not acceptable as pull wire.

O. Install conduit to preserve fire resistance rating of partitions and other elements.

P. Ground and bond conduit under provisions of Section 260526.

Q. Where neither length of conduit can be rotated, ERICKSON couplings Series 676 shall be used.

R. 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, com-plete with recessed sealing "O" ring, shall be used, Series 370-379 . DO NOT use die cast material.

S. In concrete slabs block up conduit from forms and securely fasten in place. All conduits in slabs shall be installed below concrete slab.

T. 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 direc-tion. Pro-vide supports as required on each side of expansion joint, all in accordance with seismic requirements of specific area.

U. Failure to route conduit through building without interfering with other equipment and construction shall not constitute a reason for an extra charge. Equipment, con-duit 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.

V. Arrange supports to prevent misalignment during wiring installation.

W. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

X. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.

Y. Do not support conduit with wire or perforated pipe straps. Remove wire used for tem-porary supports.

Z. Do not attach conduit to ceiling support wires.

AA. Arrange conduit to maintain headroom and present neat appearance.

AB. Route exposed conduit parallel and perpendicular to walls.

AC. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

AD. Route conduit in and under slab from point-to-point.

AE. Do not cross conduits in slab.

AF. Maintain adequate clearance between conduit and piping.

AG. Maintain 12-inch clearance between conduit and surfaces with temperatures exceeding 104°F (40°C).

AH. Bring conduit to shoulder of fittings; fasten securely.

AI. Use conduit hubs with sealing locknuts to fasten conduit in damp and wet locations.

AJ. 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.

AK. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

AL. Do not use dissimilar strap or clamp supports. Provide dielectric tape, fittings, straps, and bushings where dissimilar metals are used.

AM. 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 seal-ing 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.

AN. 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.

AO. Install a copper jumper across all flexible conduit including lighting fixtures, controls and other utilization equipment.

AP. Install liquid-tight flexible conduit in such a manner as to prevent liquids from run-ning on surface toward fittings.

AQ. Allow sufficient slack conduit to reduce the effect of vibration.

AR. Complete all conduit systems before pulling the conductors.

AS. Support in accordance with requirements of National Electric Code.

3.02 INSTALLATION OF BOXES

A. Install boxes concealed in finished walls.

B. Locate boxes to prevent moisture from entering or accumulating within them.

C. Support boxes independently of conduit, as required by the National Electric Code.

D. Provide 4" x 1-1/2" octagonal, 4" x 1-1/2" square or 4" x 2-1/8" square ceiling outlet boxes.

E. Where required to hang a specific fixture, provide a fixture stud of the no-bolt, self-locking type on ceiling outlets.

F. Provide 2-1/2" x 3-3/4" one gang masonry boxes for switches and receptacles installed concealed in concrete block walls. For increased cubic capacity, provide 3-1/2" x 3-3/4" one gang masonry boxes. Where more than two conduits enter the box from one direction, provide 4" square boxes with square cut device covers not less than 1" deep specifically designed for this purpose. Use round edge plaster rings only if the block walls are to be plastered. Use sectional or gang-type outlet boxes only in drywall construction.

G. Provide 4-11/16" square outlet boxes with square cut device corners for block walls or round edge plaster rings for plastered walls for telephone outlets. Single gang device boxes are not acceptable.

H. Provide fittings with threaded hubs for screw connections and with the proper type covers for switches and receptacles served by exposed conduit. Use pressed steel outlet only for ceiling fixture outlets.

I. Provide condulets with threaded hubs and covers and with proper configurations for all changes of direction of exposed conduits. Standard conduit ells may be used if they do not interfere or damage or mar the appearance of the installation.

J. Use boxes of sufficient cubic capacity to accommodate the number of conductors to be installed, in accordance with the National Electric Code.

K. Effectively close unused openings in boxes with metal plugs or plates.

L. Set boxes so that front edges are flush with finished surfaces.

M. Support boxes from structural members with approved braces.

N. Install blank device plates on outlet boxes left for future use.

O. Provide bushings in holes through which cords or conductors pass.

P. Install boxes so that the covers will be accessible at all times.

3.03 INSTALLATION OF PULL BOXES, JUNCTION BOXES AND WIRE TROUGHS

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. Mini-mum 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 ade-quate support.

D. Install boxes with covers in accessible locations. Size boxes in accordance with the National Electric Code.

E. Do not install pull boxes or 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 + 6".

3.04 CONDUIT LOCATIONS

A. Route all conduit concealed in walls or above finished ceilings. Provide boxes and conduits concealed in walls for all power and controls. Conduit will not be permitted within new floor slab at treatment building.

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 trolly beams which would prevent removal of pump motors.

END OF SECTION 260533

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, han-dling, 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 back-ground.

B. Locations:
1. Motor Control Centers.
2. Distribution panelboards.
3. All control switches and pilot light devices.
4. Transfer Switches.
5. Generator Enclosure.

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.

2.03 CONDUIT MARKERS

A. Manufacturers:
1. THOMAS & BETTS CORP.
2. Substitutions shall be permitted only after receiving written approval from the Engineer.

B. Description: Self-sticking vinyl; black letters on orange background.

C. Location: Furnish markers for each conduit longer than 6 feet (1.8 m).

D. Spacing: 20 feet (6 m) on center.

2.04 UNDERGROUND WARNING TAPE

A. Manufacturers:
1. THOMAS & BETTS CORP., Model NA-0708.
2. Substitutions shall be permitted only after receiving written approval from the Engineer.

B. Description: 6 inch (150 mm) wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.

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 fin-ished locations.

D. Apply conduit markers at 20 foot (6 m) intervals.

E. 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 260553

SECTION 260574 - ARC FLASH HAZARD ANALYSIS AND SHORT CIRCUIT COORDINATION STUDY
H2M

PART 1 - GENERAL

1.01 SCOPE

A. The contractor shall furnish short-circuit and protective device coordination studies as prepared by the equipment manufacturer being furnished on the project. **Third Party Studies Shall Not Be Acceptable**.

B. The contractor shall furnish an Arc Flash Hazard Analysis Study per the requirements set forth in the current version of NFPA 70E - Standard for Electrical Safety in the Workplace. The arc flash hazard analysis shall be performed according to the IEEE Standard 1584-2002, the IEEE Guide for Performing Arc-Flash Calculations.

C. The scope of the studies shall include new distribution equipment supplied under this contract.

1.02 REFERENCES

A. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   1. IEEE 141 - Recommended Practice for Electric Power Distribution and Coordination of Industrial and Commercial Power Systems
   2. IEEE 242 -Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
   3. IEEE 399 - Recommended Practice for Industrial and Commercial Power System Analysis
   4. IEEE 241 -Recommended Practice for Electric Power Systems in Commercial Buildings
   5. IEEE 1015 - Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems.
   6. IEEE 1584 -Guide for Performing Arc-Flash Hazard Calculations

B. American National Standards Institute (ANSI):
   1. ANSI C57.12.00- Standard General Requirements for Liquid-Immersed Distribution, Power, and .Regulating Transformers
   2. ANSI C37.13- Standard for Low Voltage AC Power Circuit Breakers Used in Enclosures
   3. ANSI C37.010- Standard Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis
   4. ANSI C 37.41- Standard Design Tests for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches and Accessories.

C. The National Fire Protection Association (NFPA)
   1. NFPA 70 -National Electrical Code, latest edition
   2. NFPA 70E- Standard for Electrical Safety in the Workplace

1.03 SUBMITTALS FOR REVIEW/APPROVAL

A. The studies shall be submitted to the design engineer prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment drawings for manufacturing. If formal completion of the study may cause delays in equipment shipments, approval from the Engineer may be obtained for a preliminary submittal of data to ensure that the selection of device ratings and characteristics will be satisfactory to properly select the distribution equipment. The formal study will be provided to verify preliminary findings.

1.04 SUBMITTALS FOR CONSTRUCTION

A. The results of the short-circuit, protective device coordination and arc flash hazard analysis studies shall be summarized in a final report. A minimum of five (5) bound copies of the complete final report shall be submitted. For large system studies, submittals requiring more

than five (5) copies of the report will be provided without the section containing the computer printout of the short- circuit input and output data. Electronic PDF copies of the report shall be provided upon request.

B. The report shall include the following sections:
   1. Executive Summary including Introduction, Scope of Work and Results/Recommendations.
   2. Short-Circuit Methodology Analysis Results and Recommendations
   3. Short-Circuit Device Evaluation Table
   4. Protective Device Coordination Methodology Analysis Results and Recommendations
   5. Protective Device Settings Table
   6. Time-Current Coordination Graphs and Recommendations
   7. Arc Flash Hazard Methodology Analysis Results and Recommendations including the details of the incident energy and flash protection boundary calculations, along with Arc Flash boundary distances, working distances, Incident Energy levels and Personal Protection Equipment levels.
   8. Arc Flash Labeling section showing types of labels to be provided. Section will contain descriptive information as well as typical label images.
   9. One-line system diagram that shall be computer generated and will clearly identify individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current a each bus location, device numbers used in the time-current coordination analysis, and other information pertinent to the computer analysis.

1.05 QUALIFICATIONS

A. The short-circuit, protective device coordination and arc flash hazard analysis studies shall be conducted under the responsible charge and approval of a Registered Professional Electrical Engineer skilled in performing and interpreting the power system studies.

B. The Registered Professional Electrical Engineer shall be an employee of the equipment manufacturer or an approved engineering firm.

C. The Registered Professional Electrical Engineer shall have a minimum of five (5) years of experience in performing power system studies.

D. The approved engineering firm shall demonstrate experience with Arc Flash Hazard Analysis by submitting names of at least ten actual arc flash hazard analyses it has performed in the past year.

E. The engineering firm shall have a minimum of twenty-five (25) years of experience in performing power system studies.

1.06 COMPUTER ANALYSIS SOFTWARE

A. The studies shall be performed using SKM Systems Analysis Power*Tools for Windows (PTW) software program.

PART 2 - PRODUCT

2.01 STUDIES

A. The contractor shall furnish an Arc Flash Hazard Analysis Study per NFPA 70E -Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D. This study shall also

include short-circuit and protective device coordination studies. All studies to be prepared by Square D Engineering Services.

2.02 DATA

A. Contractor shall furnish all data as required for the power system studies. The Engineer performing the short circuit, protective device coordination and arc flash hazard analysis studies shall furnish the Contractor with a listing of required data immediately after award of the contract. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to the release of the equipment for manufacturing.

B. Source combination may include present and future motors and generators.

C. Load data utilized may include existing and proposed loads obtained from Contract Documents provided by Owner, or Contractor.

D. If applicable, include fault contribution of existing motors in the study. The Contractor shall obtain required existing equipment data, if necessary, to satisfy the study requirements.

2.03 SHORT-CIRCUIT ANALYSIS

A. Transformer design impedances shall be used when test impedances are not available.

B. Provide the following:
   1. Calculation methods and assumptions
   2. Selected base per unit quantities
   3. One-line diagram of the system being evaluated that clearly identifies individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location and other information pertinent to the computer analysis
   4. The study shall include input circuit data including electric utility system characteristics, source impedance data, conductor lengths, number of conductors per phase, conductor impedance values, insulation types, transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit calculations.
   5. Tabulations of calculated quantities including short-circuit currents, X/R ratios, equipment short-circuit interrupting or withstand current ratings and notes regarding adequacy or inadequacy of the equipment rating.
   6. Results, conclusions, and recommendations. A comprehensive discussion section evaluating the adequacy or inadequacy of the equipment must be provided and include recommendations as appropriate for improvements to the system.

C. For solidly-grounded systems, provide a bolted line-to-ground fault current study for applicable buses as determined by the engineer performing the study.

D. Protective Device Evaluation:
   1. Evaluate equipment and protective devices and compare to short circuit ratings
   2. Adequacy of switchgear, motor control centers, and panelboard bus bars to withstand short circuit stresses
   3. Square D shall notify Owner in writing, of any circuit protective devices improperly rated for the calculated available fault current.

2.04 PROTECTIVE DEVICE TIME-CURRENT COORDINATION ANALYSIS

A. Protective device coordination time-current curves (TCC) shall be displayed on log-log scale graphs.

B. Include on each TCC graph, a complete title with descriptive device names.

C. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.

D. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.

E. Plot the following characteristics on the TCC graphs, where applicable:
   1. Electric utility's overcurrent protective device
   2. Medium voltage equipment overcurrent relays
   3. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands
   4. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands
   5. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves
   6. Medium voltage conductor damage curves
   7. Ground fault protective devices, as applicable
   8. Pertinent motor starting characteristics and motor damage points, where applicable
   9. Pertinent generator short-circuit decrement curve and generator damage point
   10. The largest feeder circuit breaker in each motor control center and applicable panelboard.

F. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.

G. Provide the following:
   1. A One-line diagram shall be provided which clearly identifies individual equipment buses, bus numbers, device identification numbers and the maximum available short-circuit current at each bus when known.
   2. A sufficient number of log-log plots shall be provided to indicate the degree of system protection and coordination by displaying the time-current characteristics of series connected overcurrent devices and other pertinent system parameters.
   3. Computer printouts shall accompany the log-log plots and will contain descriptions for each of the devices shown, settings of the adjustable devices, and device identification numbers to aid in locating the devices on the log-log plots and the system one-line diagram.
   4. The study shall include a separate, tabular printout containing the recommended settings of all adjustable overcurrent protective devices, the equipment designation where the device is located, and the device number corresponding to the device on the system one-line diagram
   5. A discussion section which evaluates the degree of system protection and service continuity with overcurrent devices, along with recommendations as required for addressing system protection or device coordination deficiencies.
   6. Square D shall notify Owner in writing of any significant deficiencies in protection and/or coordination. Provide recommendations for improvements.

2.05 ARC FLASH HAZARD ANALYSIS

A. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E-2009, Annex D. The arc flash hazard analysis shall be performed in conjunction with the short-circuit analysis (Section 2.03) and the protective device time-current coordination analysis (Section 2.04)

B. The flash protection boundary and the incident energy shall be calculated at significant locations in the electrical distribution system (switchboards, switchgear, motor-control centers, panelboards, busway and splitters) where work could be performed on energized parts.

C. Circuits 240V or less fed by single transformer rated less than 125 kVA may be omitted from the computer model and will be assumed to have a hazard risk category 0 per NFPA 70E.

D. Working distances shall be based on IEEE 1584. The calculated arc flash protection boundary shall be determined using those working distances.

E. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short circuit and coordination study model. Ground overcurrent relays should not be taken into consideration when determining the clearing time when performing incident energy calculations

F. The short-circuit calculations and the corresponding incident energy calculations for multiple system scenarios must be compared and the greatest incident energy must be uniquely reported for each equipment location in a single table. Calculations must be performed to represent the maximum and minimum contributions of fault current magnitude for normal and emergency operating conditions. The minimum calculation will assume that the utility contribution is at a minimum. Conversely, the maximum calculation will assume a maximum contribution from the utility. Calculations shall take into consideration the parallel operation of synchronous generators with the electric utility, where applicable as well as any stand-by generator applications.
   1. The Arc-Flash Hazard Analysis shall be performed utilizing mutually agreed upon facility operational conditions, and the final report shall describe, when applicable, how these conditions differ from worst-case bolted fault conditions.

G. The incident energy calculations must consider the accumulation of energy over time when performing arc flash calculations on buses with multiple sources. Iterative calculations must take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors should be decremented as follows:
   1. Fault contribution from induction motors should not be considered beyond 5 cycles.

H. For each piece of ANSI rated equipment with an enclosed main device, two calculations shall be made. A calculation shall be made for the main cubicle, sides, or rear; and shall be based on a device located upstream of the equipment to clear the arcing fault. A second calculation shall be made for the front cubicles and shall be based on the equipment's main device to clear the arcing fault. For all other non-ANSI rated equipment, only one calculation shall be required and it shall be based on a device located upstream of the equipment to clear the arcing fault.

I. When performing incident energy calculations on the line side of a main breaker (as required per above), the line side and load side contributions must be included in the fault calculation.

J. Mis-coordination should be checked amongst all devices within the branch containing the immediate protective device upstream of the calculation location and the calculation should utilize the fastest device to compute the incident energy for the corresponding location.

K. Arc Flash calculations shall be based on actual overcurrent protective device clearing time. A maximum clearing time of2 seconds will be used based on IEEE 1584-2002 section B.1.2. Where it is not physically possible to move outside of the flash protection boundary in less than 2 seconds during an arc flash event, a maximum clearing time based on the specific location shall be utilized.

L. Provide the following:
   1. Results of the Arc-Flash Hazard Analysis shall be submitted in tabular form, and shall include device or bus name, bolted fault and arcing fault current levels, flash protection boundary distances, working distances, personal-protective equipment classes and AFIE (Arc Flash Incident Energy) levels.
   2. The Arc-Flash Hazard Analysis shall report incident energy values based on recommended device settings for equipment within the scope of the study.
   3. The Arc-Flash Hazard Analysis may include recommendations to reduce AFIE levels and enhance worker safety.

PART 3 - EXECUTION

3.01 FIELD ADJUSTMENT

A. Contractor shall adjust relay and protective device settings according to the recommended settings table provided by the coordination study.

B. Contractor shall make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.

C. The equipment manufacturer shall notify Owner in writing of any required major equipment modifications.

3.02 ARC FLASH LABELS

A. The equipment manufacturer shall provide a 4.0 in. x 4.0 in. Brady thermal transfer type label of high adhesion polyester for each work location analyzed.

B. The labels shall be designed according to the following standards:
   1. UL969 - Standard for Marking and Labeling Systems
   2. ANSI Z535.4- Product Safety Signs and Labels
   3. NFPA 70 (National Electric Code)- Article 110.16

C. The label shall include the following information:
   1. System Voltage
   2. Flash protection boundary
   3. Personal Protective Equipment category
   4. Arc Flash Incident energy value (cal/cm2)
   5. Limited, restricted, and prohibited Approach Boundaries
   6. Study report number and issue date

D. Labels shall be printed by a thermal transfer type printer, with no field markings.

E. Arc flash labels shall be provided for equipment as identified in the study and the respective equipment access areas per the following:
   1. Floor Standing Equipment - Labels shall be provided on the front of each individual section. Equipment requiring rear and/or side access shall have labels provided on each individual section access area. Equipment line-ups containing sections with multiple

incident energy and flash protection boundaries shall be labeled as identified in the Arc Flash Analysis table.

2. Wall Mounted Equipment- Labels shall be provided on the front cover or a nearby adjacent surface, depending upon equipment configuration.
3. General Use Safety labels shall be installed on equipment in coordination with the Arc Flash labels. The General Use Safety labels shall warn of general electrical hazards associated with shock, arc flash, and explosions, and instruct workers to turn off power prior to work.

F. Labels shall be field installed by Contractor. The technician providing the installation shall have completed an 8-Hour instructor led Electrical Safety Training Course with includes NFPA 70E material including the selection of personal protective equipment.

3.03 ARC FLASH TRAINING

A. The vendor supplying the Arc Flash Hazard Analysis shall train the owner's qualified electrical personnel of the potential arc flash hazards, associated with working on energized equipment (minimum of 4 hours). The training shall be certified for continuing education units (CEUs) by the International Association for Continuing Education Training (IACET) or equivalent. The trainer shall be an authorized OSHA Outreach instructor.

B. The vendor supplying the Arc Flash Hazard Analysis shall offer instructor led and online NFPA 70E training classes.

END OF SECTION 260574

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surge protection device.

1.02 STANDARDS

A. The specified suppressor shall be designed, manufactured, tested and installed in compliance with:
   1. American National Standards Institute and Institute of Electrical and Electronic Engineers (ANSI/IEEE C62.11, C62.41 and C62.45).
   2. Federal Information Processing Standards Publication 94 (FIP PUB 94).
   3. National Electrical Manufacturer Association (NEMA LS-1).
   4. National Fire Protection Association (NFPA 20, 70, 75 and 78).
   5. Underwriters Laboratories (UL 1449).
   6. CAN/C22.2 No. 8-M1986; CSA Electrical Certification Notice No. 516.
   7. The system individual units shall be UL listed under UL 1449 Standard for Transient Voltage Surge Suppressions (TVSS) and the surge ratings shall be permanently affixed to the TVSS.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. MCG ELECTRONICS, INC., Deer Park, New York.

B. Approved equal.

2.02 MANUFACTURED UNITS

A. Surge suppression shall be series Surge Free Model No. 400LS-277Y.

2.03 SYSTEM REQUIREMENTS

A. The specified surge protective device shall provide effective high energy surge diversion for application ANSI/IEEE C62.41-1991 Location Category C3 environments. Testing per ANSI/IEEE C62.45-1992 using ANSI/IEEE C62.41 Category C3 waveforms and amplitudes. UL 1449 listing. The specified surge protective device shall provide:
   1. 400,000 transient amps, per phase of surge protection.
   2. Peak surge current ratings must be independently tested and verified.
   3. All mode protection, L-N, L-G, L-L, N-G.
   4. Integral disconnect with safety dead front.
   5. Each MOV protected from over-current, thermal overload and monitored individually.
   6. Self diagnostics with comprehensive LED bar graph on front panel showing the exact % level of protection available.
   7. Audible fault alarm with silence switch.
   8. Event counter, indication of time and date of last event (battery backup for time and date).
   9. Remote alarm relay contacts (surge protected), Form C.
   10. Micro-Z low impedance installation cable.
   11. Twenty year warranty on entire system.
   12. LIFETIME “NO NONSENSE” WARRANTY ON FIELD REPLACEABLE POWER MODULES AND FUSES.

B. Environmental Requirements:

1. Magnetic Fields: Connection shall be made using low impedance Micro-Z cabling provided with the suppressor for maximum magnetic field cancellation. Unit shall be shunt-installed with no series connected elements.
2. Operating Temperature: Operating temperature range shall be -40° to +71° C (-40° to +160° F).
3. Storage Temperature: Storage temperature range shall be -40° to +85° C.
4. Relative Humidity: Operation shall be reliable in an environment with 0% to 95% non-condensing relative humidity.
5. Operating Altitude: The system shall be capable of operation up to an altitude of 13,000 feet above sea level.
6. Operating Voltage: Maximum continuous operating voltage shall be no less than 115% and no greater than 140% of the nominal rated line voltage.
7. Power Frequency: The power frequency range shall be 47 to 440 Hertz.

C. Electrical Requirements:
1. Unit Operating Voltage Requirements:

Voltage:	Description:	Joules (8/20us):	Vpeak L-N (20kV, 10kA):	Vpeak L-N (6kV, 500A):
277/480 VAC	3phase, 4W + gnd, wye	80,640	1130V	1000V

2. Unit shall be installed in parallel with the protected equipment. No series connected protective elements shall be used.
3. The maximum surge current capacity per phase of the specified system, based on the standard IEEE 8/20 microsecond waveform, shall be at least: 1 Event at 400 kA. The surge life (8/20us) shall be at least 10,000 @ 15 kA occurrences. The transient suppression capability shall be bi-directional and suppress both positive and negative impulses.
4. The suppressor shall be capable of interrupting a 100 kA, short circuit current delivered from the AC power line. The interrupt capability must be confirmed and documented by a recognized independent testing laboratory.
5. The suppressor shall be designed so as to minimize the internal surge path impedance. Direct point-to-point internal wiring is inherently inductive and not acceptable. Connection to the power service shall be constructed for best performance.
6. Equipment shall be as manufactured by MCG Electronics, Inc.: Model: 400LS-Family or engineering department approved equal with supporting test data.

D. Protection System Components:
1. Replaceable modules: The suppressor shall be constructed using field replaceable protection modules. The suppressor shall have individually fused and monitored 40mm Metal Oxide Varistors (MOV's), including neutral to ground protection mode. Each module will provide five times (5X) redundant protection, with three modules per each phase and five fuses per module. The status of each module shall be locally monitored with a green LED that becomes red in a fault condition. The transient Ipeak rating of the fuse shall be coordinated with the Ipeak handling capability of the MOV so that the surge path capability is not limited by the series fusing. In addition, each MOV shall incorporate a thermal disconnect means to remove a shorted MOV safely from the protection system.
2. Self-Diagnostics: Red, green and yellow solid state LED indicators shall be provided on the hinged front cover to indicate protection status. An illuminated green LED indicates power is present at the protector on all phases, and an illuminated red LED shall indicate that one or more of the modules have reduced protection. An illuminated yellow LED shall indicate a suppression event. Both front panel and internal LEDs are required to provide power and fault indications in the event of even the loss of a single fuse or MOV. Relay operation shall be in a fail-safe operating mode (i.e., continuously energized so that

power failure, reduced protection, or a break in the remote monitoring line will cause a fault indication at the remote monitor).

3. Remote Alarm Capability: Relay alarm contacts shall be provided for remote alarm monitoring capability of unit status. Form C normally open and normally closed contacts shall be provided with voltage and current limiting protection.
4. Audible Alarm: The specified system shall be equipped with an audible alarm which shall be activated when any one or more of the modules has a reduced protection condition. A mute option shall be provided for the audible alarm.
5. Advanced Diagnostic LED Display: A front panel, microprocessor controlled LED display, in the form of a bar graph, will indicate the protection status of each MOV on each phase including neutral to ground. A event counter will display number of suppressed transient events with a time and date stamp.
6. Integral Disconnect: Unit shall be provided with dead front disconnect to remove power from protector for maintenance access. The disconnect should not be accessed from the front panel unless the unit meets the minimum clamp voltage requirements.
7. NEMA 12 Enclosure: 14 gauge steel, with stainless steel hardware.

PART 3 - EXECUTION

3.01 INSTALLATION AND MAINTENANCE

A. The unit shall be factory installed in the motor control center by the Motor Control Center manufacturer, in accordance with the manufacturer's printed instruction to maintain warranty. All local and national codes must be observed.

B. Units shall be installed as close as possible to the load side lugs of the transfer switch to which it is connected using low impedance Micro-Z cabling.

C. A 3-pole disconnect shall be provided to insure safety of maintenance personnel.

3.02 TWENTY YEAR WARRANTY

A. Manufacturer to provide twenty (20) year warranty to cover repair or replacement with a new device. Manufacturer to provide no cost replacement of fused protection modules for the life of the suppressor.

END OF SECTION 261823

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Dry type transformers.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electric Code.

B. NEMA ST20 - Dry Type Transformers for General Applications.

1.03 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Provide outline and support point dimensions of enclosures and accessories, unit weight, voltage, KVA and impedance ratings and characteristics, tap configurations, insulation system type and rated temperature rise.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Dry type transformers shall be manufactured by General Electric Type QL.

B. Approved equal.

2.02 EQUIPMENT REQUIREMENTS

A. Three-phase and Single-phase general purpose dry type transformers be self-cooled, with ratings (KVA) as indicated on the drawings.

B. Copper windings.

C. Sound levels not to exceed the following:
   1. 0-9 KVA: 40 db.
   2. 10-50 KVA: 45 db.
   3. 51-150 KVA: 50 db.
   4. 151-300 KVA: 55 db.
   5. 301-500 KVA: 60 db.
   6. 501-700 KVA: 62 db.

D. Three-phase transformers rated above 15 KVA to be insulated with UL listed Class 220 rated materials; and have a maximum average full load temperature rise of 115 degrees C.

E. Transformers to have voltage ratios as indicated on drawings. Transformers between 15 KVA and 300 KVA to be provided with six 2-1/2% full capacity taps, two above and four below primary rated voltage.

F. Nameplate: Include transformer connection data.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install transformers in accordance with manufacturer's recommendations.

B. Provide both primary and secondary protection as shown on drawings.

C. Set transformer plumb and level.

D. Provide grounding and bonding in accordance with provisions of Section 260526.

E. Transformers shall be factory installed in the Motor Control Center by the manufacturer of Motor Control Center where indicated on drawings.

3.02 FIELD QUALITY CONTROL

A. Check for damage and tight connections prior to energizing transformer.

B. Measure primary and secondary voltage and make appropriate tap adjustments.

END OF SECTION 262200

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Switchboards.

1.02 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Include electrical ratings, dimensions, mounting, material, running overcurrent protection, branch circuit overcurrent protection, wiring diagrams and accessories.

C. Provide detailed scaled 1/2² = 1¢-0² drawings of switchboard including any and all instrumentation and control drawings on 24² x 36² blueprints for floor plans showing switchboard layout, locations and clearances.

D. Provide detailed scaled 3/4² = 1¢-0² elevation drawings of switchboard including instrumentation and controls. Elevation drawings shall show all switches, circuit breakers, transfer switches, CT area, power monitors, etc., scaled locations of all knockouts and cutouts on exterior of enclosures for review and approved by Engineer.

E. Provide detailed scaled 3/4² = 1¢-0² elevation drawings of switchboard including instrumentation and controls for interior mounting of all equipment. Drawings shall show all protective devices, circuit breakers, fuses, wiring, timers, terminal blocks and cable connection points.

F. Provide catalog cuts for each device including pilot lights, switches, timers, circuit breakers, fuses, meters, protective devices, etc.

1.03 REFERENCES

A. National Electrical Manufacturers Association (NEMA) - No. ICS-1, General Standards for Industrial Control and Systems; No. ICS-2, Industrial Control Devices, Controllers and Assemblies; No. ICS-6, Enclosures for Industrial Control and Systems.

B. ANSI/NFPA 70 - National Electrical Code.

C. ASTM D 178 - Specification for Rubber Insulating Matting.

D. Underwriters Laboratories, Inc. (UL) - No. 891, Switchboards.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. SIEMENS SENTRON SB3.

B. Specifically Approved Equal. Substitute manufacturers shall be responsible to meet the exact dimensions detailed on the drawings. Switchboard manufacturer shall provide applicable U.L. labeling for all sections shown on drawings and for complete installation of all equipment specified to be packaged into the Switchboard. All equipment specified to be installed in Switchboard shall be factory installed by Switchboard manufacturer. No exceptions.

2.02 SWITCHBOARDS

A. Switchboards shall be in accordance with UL, NEMA, NEC and as shown on the Drawings.

B. Switchboard center is based on SIEMENS SENTRON SB3 dimensions. Contractor shall be responsible to meet dimension requirements if substitution is proposed.

C. Switchboard shall be complete, floor mounted, metal enclosed, grounded, indoor type. The switchboard shall be NEMA Standard, Class 11, Type C except where other NEMA Standard classes and types are shown on the Drawings.

D. Ratings shall be 100,000 AIC for all switchboards with 65,000 AIC for Main Circuit Breaker.

E. Shall conform to the arrangements and details of the Drawings and to the spaces designated for installation.

F. All switchboard doors shall be removable with a wiring plug harness for quick removal of doors with disconnecting wire terminations.

G. Design the switchboard to withstand the mechanical stresses caused by rough handling during shipment in addition to the electrical and mechanical stresses which will occur during operation of the switchboards.

H. Coordinate components of the switchboards and their arrange-ments electrically and mechanically. The components and the control wiring shall conform to the approved shop drawings as furnished for the various applicable electrical and mechanical sections of the specifications.

I. Assemble, connect and wire the switchboards at the factory in accordance with the NEMA Standard class and type for each switchboard.

J. Thoroughly clean, phosphatize and paint the metal surfaces at the factory with primer and baked enamel or lacquer finishes.

K. Switchboard shall have the following features:
   1. Standard Vertical Sections:
      a. Approximately 90 inches high, front and rear line-up, fabricated by a single manufacturer.
      b. Rugged steel assemblies with bracing, reinforcing gussets and jig-welding to assure rectangular rigidity. The sections shall be completely metal-enclosed, including their bottoms.
      c. Steel shall not be less than code gauge, leveled.
      d. Bolts, nuts and washers shall be rustproof metal.
      e. Spaces within the sections shall be suitable and adequate.
      f. Mount the sections on adequate structural steel supports at the factory, front and rear, for the full length of each center. Install the centers so the supports will rest on top of the concrete floor surfaces except where concrete pads are indicated. Anchor the centers with bolts, not less than 1/2-inch diameter.
      g. End panels shall be screw-removable to facilitate future additions.
      h. Removable panels shall have screws which remain in the panels when the panels are removed. Screws shall be received by self-aligning, self-retaining nuts attached within the assemblies.
   2. Bus Bars and Interconnections:

a. Shall be copper, rated as indicated on drawings. Minimum size shall be 800 amps and shall adhere to all other applicable codes having jurisdiction.
b. Shall be totally enclosed with all spacing as required by all applicable codes having jurisdiction.
c. Bus bar joints and interconnection joints shall be plated with silver, tin, nickel or cadmium, constant high-pressure type with high strength copper-silicon bolts and nuts.
d. Insulation:
    1) High strength polyester glass or equal.
    2) High track-resistance.
    3) High impulse and dielectric strength, especially at elevated temperatures, for withstanding the maximum short circuit currents.
    4) High flame-retardant, self-extinguishing.
    5) NEMA Standard for 65°C temperature rise shall apply.
e. Shall have horizontal main buses and vertical buses for connecting the circuit breakers and switches.
f. Shall have an adequate ground bus that extends across the entire width of each center.
g. Bus bars shall be designed to extend to additional sections when so shown on the Drawings in addition to extending through dead corner cubicles.
h. Temperature rises shall not exceed the NEMA Standards.

3. Completely equipped spaces for future circuit breakers and switches.
4. Identify each circuit breaker, switch or other device with a separate nameplate of laminated black phenolic resin with white core and engraved lettering not less than 3/16-inch high. Identify each device by its name or other designation as indicated in drawings.

L. Test the switchboard at the factory to assure that the switchboards do not have any defects. Additional “spot” testing such as contact resistance shall be conducted at bus connections between switchboard sections installed at the site.

M. Electrical Matting: Dielectric strength 30,000 volts, 3 feet wide, 1/4 inch thick corrugated ASTM D 178 Type 2, Class II.

N. All circuit breakers shall be rated 65,000 AIC. AIC based on stand alone ratings. Manufacturers rating using combined systems ratings to use lower AIC rated breakers is not acceptable.

PART 3 - EXECUTION

3.01 PREPARATION

A. Provide and install concrete housekeeping pad as shown on drawings

B. Provide and install electrical matting to extend 24 inches beyond end of switchboard. Cut matting clear of obstructions.

C. Shop inspect and test switchboard in accordance with NEMA PB 2.

D. Make completed switchboard available for inspection at manufacturers factory prior to packaging for shipment. Notify Owner at least seven (7) days prior to inspection.

E. Allow witnessing of factory inspections and tests at manufacturers test facility. Notify Owner at least seven (7) days before inspections and tests are scheduled.

3.02 INSTALLATION

A. Install switchboard in location as indicated on contract drawings in accordance with NEMA, NEC and manufacturer's instructions.

B. Tighten accessible bus connections and mechanical fasteners after placing switchboard.

C. Install fuses in each switch.

D. Meter pans, meters, current transformers, and ground fault protection (where applicable) shall be factory installed into switchboards as per LIPA specifications.

3.03 ADJUSTING

A. Adjust all operating mechanisms for free mechanical movement.

B. Tighten bolted bus connections in accordance with manufacturers instructions.

C. Adjust circuit breaker trip and time delay settings to values as indicated by Architect/Engineer in field.

3.04 SOURCE QUALITY CONTROL

A. Provide Owner and Architect/Engineer with a copy of all test records.

B. Provide Owner and Architect/Engineer with Operations and Maintenance Manual prior to contract closeout.

C. Touch up scratched or marred surfaces to match original finishes.

END OF SECTION 262300

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Distribution panel boards.

B. Retrofit panel boards.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electric Code.

B. NECA Standard of Installation.

C. NEMA AB1 - Molded Case Circuit Breakers.

D. NEMA PB1 - Panel Boards.

E. NEMA PB1.1 - Instructions for Safe Installation, Operation and Maintenance of Panel Boards Rated 600 Volts or Less.

F. NEMA ICS2 - Industrial Control Devices, Controllers and Assemblies.

G. NEMA KS1 - Enclosed Switches.

1.03 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Indicate outline and support point dimensions, voltage, main bus ampacity, inte-grated short circuit ampere rating, and circuit breaker arrangement and sizes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Panelboards
   1. Panel Boards shall be manufactured by Siemens.
   2. Approved equal.

2.02 PANELBOARD REQUIREMENTS

A. Provide panel boards of circuit breaker, dead-front safety type, UL labeled, and meeting all applicable requirements of the National Electrical Manufacturers Association.

B. Provide panel boards with lugs (both main lugs and branch circuit lugs) suitable and UL approved for both aluminum and copper conductors.

C. Provide electrically isolated neutral bars.

D. Provide separate ground bars complete with lugs or connectors on bar.

E. Provide key operated door with lock. Door shall prevent access to operate circuit breakers.

F. Provide panel boards with sequence phased bus bars or distributed phase bussing for voltage and phase as indicated on drawings.

G. Refer to drawings for numbers of branch circuits, their ratings, number of poles, arrangements, etc.

H. Provide typed circuit directory cards.

I. Provide front filler plates for unused breaker knockouts.

J. Refer to drawings for Ratings and Features.

K. All bus bars, including ground bars shall be tin-plated copper.

L. All circuit breakers shall be bolt-on type.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Ground separate ground bars to panel boxes and to the main service entrance ground bus with a code-sized grounding conductor installed in the same conduit as the phase and neutral conductors under provisions of Section 260526.

B. Install all circuits using a common neutral bus bay in accordance with the National Electric Code. Balance all circuits to achieve not greater than 7% unbalanced neutral cur-rent in panel feeders.

C. Provide six circuit breaker handle lock-on devices for each lighting and miscella-neous power panel board for installation by the contractor on circuits as directed by the Engineer to prevent unauthorized personnel from turning off circuits to controls, unit heaters, autodial alarm system, etc. Provide spare lock-on devices over to the Engineer.

D. Install panel boards in accordance with NEMA PB 1.1.

E. Install panel boards plumb.

F. Height: 6 feet (2 m) to top of panel board.

G. Provide typed circuit directory for each branch circuit panel board. Handwritten circuit directory cards will not be accepted. Revise directory to reflect circuiting changes required to balance phase loads.

H. For all existing circuits terminated to a new panelboard, contractor shall trace out and update the circuit directory in accordance with NEC sections 110.22 and 408.4. Include all costs for this work in base bid.

I. Revise directory to reflect circuiting changes required to balance phase loads.

J. Provide engraved plastic nameplates under the provisions of Section 260553.

K. Panel Boards shall be factory installed in the motor control center by the manufacturer of Motor Control Center where indicated on drawings.

3.02 FIELD QUALITY CONTROL

A. Maintain proper phasing for multi-wire branch circuits.

B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION 262400

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Switches, receptacles, thermostats, device plates and other wiring devices as indi-cated on Drawings.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electric Code.

B. NEMA WD1 - General Purpose Wiring Devices.

1.03 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Provide manufacturer's catalog information showing dimensions, colors and configu-ration.

1.04 REGULATORY REQUIREMENTS

A. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.01 SWITCHES

A. Manufacturers: HUBBELL, BRYANT, GENERAL ELECTRIC.

B. Single pole, 20 amp, 120/277 VAC, NEMA WD-1, heavy duty, UL20.

C. Device Plate: Stainless steel.

2.02 RECEPTACLES

A. Manufacturers: HUBBELL, BRYANT, GENERAL ELECTRIC.

B. 20 amp, 125 VAC, NEMA WD-1, heavy duty.

C. 20 amp, 125 VAC, NEMA WD-1, heavy duty, ground fault circuit interrupter.

D. Duplex type.

E. Device Plate: Stainless steel.

2.03 EMERGENCY KILL MUSHROOM SWITCH

A. Acceptable Manufacturers: SQUARE D Model No.: 9001KR9P1RH1321 or approved equal.

B. Operator: 2-POSITION MAINTAINED PULL-MAINTAINED PUSH ILLUMINATED FLASHING mushroom head pushbutton. Switch head shall only be flashing in the “pushed” position.

C. Mushroom Head: 2-1/4-inch diameter head.

D. Nameplate: Large 2.92-inch square, Red nameplate with engraved logo “Emergency Stop”, unless noted otherwise on drawings.

E. Enclosure: Heavy duty, one opening, sheet steel enclosure, NEMA 12.

2.04 LINE VOLTAGE THERMOSTAT

A. Acceptable Manufacturers: HONEYWELL, Model No. T651A3018, or approved equal.

B. Heating/Cooling Rated

C. Ratings: 120 volts, 22 amps resistive SPDT switch.

D. Temperature Range: +44º to + 86º F.

2.05 LOW VOLTAGE THERMOSTAT

A. Acceptable Manufacturers: HONEYWELL, Model No, T87N1000/U, or approved equal.

B. Heating/Cooling Rated.

C. Ratings: 20 to 30 Vac, 0.02-1.0A.

D. Temperature Range: +40º to + 90º F.

2.06 CHEMICAL RECEPTACLES AND PLUG ENDS

A. Acceptable Manufacturers: HUBBEL or approved equal.

B. 20A, 125 VAC, NEMA L5-20R, Safety-Shroud twist lock receptacle Model No. HBL2310SR, for Well No. 15-1 Tablet Chlorinator and Caustic Pump.

C. 20A, 125 VAC, NEMA L5-20P, Safety-Shroud twist lock plug Model No. HBL2311S, for Well No. 15-1 Tablet Chlorinator and Caustic Pump.

2.07 MANUAL MOTOR RATED THERMAL SWITCH

A. Acceptable Manufacturers: SQUARE D, Class 2510, Type KG1A, Type KG2C (3-pole, 600V) or approved equal.

B. Contractor shall coordinate voltage, phase and current rating with equipment.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Mounting:
   1. Mount all switches 46-inches above finished floor to center line of switch unless noted otherwise.
   2. Mount all receptacles 18-inches above finished floor to center line of receptacle unless noted otherwise.
   3. Install switches with OFF position down.

B. Polarity: Properly wire all receptacles so that the hot wire, the neutral wire and the ground wire connect to the proper terminal on all receptacles.

C. Grounding: Install all devices in boxes specified under Section 260533 and install a No. 12 green ground wire from device grounding terminal to the outlet box in accordance with the National Electric Code.

D. Install device plates on switch, receptacle and blank outlets in full contact with wall surface.

E. Provide new SO cord for all chemical pumps and install plug end to match receptacle.

3.02 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify that each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

END OF SECTION 262726

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Motor starters.

1.02 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Include electrical ratings, dimensions, mounting, materials, running overcurrent protection, branch circuit overcurrent protection, wiring diagrams, starting characteristics, interlocking and accessories.

C. Submit 5 copies of a summary list to the Engineer indicating and identifying each motor controller installed, including catalog numbers for the correct size of protective devices for the motor controllers.

1.03 REFERENCES

A. ANSI/NFPA 70 - National Electric Code.

B. NEMA No. ICS-1, General Standards for Industrial Control and Systems; No. ICS-2, Industrial Control Devices, Controllers and Assemblies; No. ICS-6, Enclosures for Industrial Con-trol and Systems.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with NEMA ICS 2.3.

1.05 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc.

1.06 EXTRA MATERIALS

A. Ten (10) spare pilot light bulbs.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Full Voltage Non-Reversing and Reversing (FVNR):
   1. SIEMENS, Class 14.
   2. Specifically approved equal.

2.02 MOTOR STARTERS

A. Motor starters shall have the following features:
   1. Enclosed type as shown on the Drawings.
   2. Circuit breakers within the motor controller enclosures shall have external operating handles with lock-open padlocking provisions and shall indicate the ON and OFF positions.
   3. Motor Control Circuits:

a. Shall operate at not more than 120 volts.
b. Shall be grounded except as follows:
1) Where isolated control circuits as shown.
2) Where manufacturers of equipment assemblies recommend that the control circuits be isolated.
c. Incorporate a separate, heavy duty, control transformer within each motor controller enclosure to provide the control voltage for each motor operating over 120 volts.
d. Incorporate overcurrent protection for control power transformers in accordance with NFPA 70.

4. Overload Current Protective Devices:
a. SIEMENS, Solid State Model ESP100 overloads for all contactors including bypass contactors. Provide only SIEMENS thermal overloads on all output contactors for variable speed drives.
b. One for each pole.
c. Manual reset on the door of each motor controller enclosure to reset Motor from any condition which tripped motor, such as high pressure, overload or incomplete valve cycle.
d. Correctly sized for the associated motor's rated full load current.
5. Provide three (3) N.C. and (3) N.O. auxiliary contacts, H-O-A,O-C-A, sequence selectors selector switches, pilot lights, and other devices and accessories as shown on the Drawings for each starter.
6. Elapsed non-resettable time meters as indicated on the Drawings. As manufactured by Fourth Dimension, 2-1/2" diameter minimum.
7. Ammeters and 4 position phase selector switch (3-1/2" Square minimum) as manufactured by SIMPSON.
a. Boosters A, B, & C: 0-150 amps.
8. Provide current and potential transformers for all three phases for ammeters and voltmeters.
9. Voltmeters and seven position selector switch (3 1/2" square minimum) as manufactured by SIMPSON.
10. Enclosures:
a. Shall be the NEMA Type 1.
b. Where the types of motor controller enclosures are not indicated, they shall be the NEMA types which are the most suitable for the environmental conditions where the motor controllers are being installed.
c. Doors mechanically interlocked to prevent opening unless the breaker or switch within the enclosure is open.
d. Thoroughly clean and paint the enclosures at the factory with manufacturer's prime coat and standard finish.
11. Pilot lights shall be LED type press-to test 30.5 mm Heavy Duty Oiltight pushbuttons. No incandescent pilot lights shall be permitted.
12. Pushbuttons and selector switches shall be 30.5 mm Heavy Duty Oiltight.

B. Motor controllers incorporated with equipment assemblies shall also be designed for the specific requirements of the assemblies.

2.03 FULL VOLTAGE STARTERS

A. All Full Voltage Starters shall be NEMA rated for the load it serves.

B. Manufacturers: SIEMENS, Class 14.

2.04 MISCELLANEOUS CONTROLS AND EQUIPMENT

A. Provide phase failure/phase reversal relays and voltage sensitive relays for undervoltage and overvoltage protection for all phases. Relays shall be SIEMENS, or approved equal. The Contacts for these relays shall be in series with all Motor Starter Control Circuits.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation shall be in accordance with NFPA 70 and as shown on the Drawings.

B. All starters shall be factory installed in Motor Control center.

3.02 DESCRIPTION OF CONTROL, VARIABLE SPEED DRIVES/ISOLATION/OUTPUT/BYPASS CONTACTORS

A. In the AUTOMATIC position the H-O-A selector switch will provide control power to the motor starter circuit through the isolation and output contactors and variable speed drive. The bypass contactor will be electrically and mechanically interlocked via the bypass starter.

B. In the HAND position the H-O-A switch the motor shall start and run whether or not the demand is called for based on level controls. Motor shall operate as in A above except speed control will be via the speed control potentiometer.

C. In the AUTOMATIC position of the bypass-automatic selector switch, the switch shall provide control power to the HAND-OFF-AUTOMATIC (H-O-A) selector switch and the motor shall be controlled as described in A & B above. In the bypass position the selector switch shall provide control power to the H-O-A selector switch to maintain either automatic or manual motor control with the addition of disabling both the isolation and output contactor and the variable speed drive from the running/starting sequence. In bypass position, the motor shall start and run via bypass contactor (full voltage starter) which is electrically and mechanically interlocked via the bypass contactor.

END OF SECTION 262913

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Motor control centers.

1.02 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Include electrical ratings, dimensions, mounting, material, running overcurrent protection, branch circuit overcurrent protection, wiring diagrams and accessories.

C. Provide detailed control drawings on 24² x 36² blueprints for all motor controls which shall include al interface wiring between motor controls and instrumentation drawings as described in Section 265012 - Description of Controls. Provide point to point wiring diagrams showing interface between motor controls and instrumentation drawings.

D. Provide detailed scaled 1/2² = 1¢-0² drawings of motor control center including instrumentation and control drawings on 24² x 36² blueprints for floor plans showing MCC layout, locations and clearances.

E. Provide detailed scaled 3/4² = 1¢-0² elevation drawings of motor control center including instrumentation and controls. Elevation drawings shall show all switches, pilot lights, timers, keypads, timers and meters including scaled locations of all knockouts and cutouts on exterior of enclosures for review and approved by Engineer.

F. Provide detailed scaled 3/4² = 1¢-0² elevation drawings of motor control center including instrumentation and controls for interior mounting of all equipment. Drawings shall show sealed locations of all drives, starters, contactors, relays, protective devices, circuit breakers, fuses, wiring, timers, terminal blocks and cable connection points.

G. Provide catalog cuts for each device including pilot lights, switches, timers, breakers, fuses, meters, protective devices, etc.

1.03 REFERENCES

A. National Electrical Manufacturers Association (NEMA) - No. ICS-1, General Standards for Industrial Control and Systems; No. ICS-2, Industrial Control Devices, Controllers and Assemblies; No. ICS-6, Enclosures for Industrial Control and Systems.

B. ANSI/NFPA 70 - National Electrical Code.

C. ASTM D 178 - Specification for Rubber Insulating Matting.

D. Underwriters Laboratories, Inc. (UL) - No. 845, Motor Control Centers, Electric.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. SIEMENS: Tiastar.

B. Specifically Approved Equal. Substitute manufacturers shall be responsible to fit MCC line-up as detailed on drawings to the exact dimensions detailed on the drawings. Motor Control Center manufacturer shall provide applicable U.L. labeling for all sections shown on drawings

and for complete installation of all equipment specified to be packaged into the Motor Control Center. All equipment specified to be installed in Motor Control Center shall be factory installed by Motor Control manufacturer. No exceptions.

2.02 MOTOR CONTROL CENTERS

A. Motor control centers shall be in accordance with UL, NEMA, NEC and as shown on the Drawings.

B. Motor control center shall be same manufacturer for motor controls and all instrumentation and control cubicles.

C. Motor control center is based on SIEMENS system Tiastar dimensions. Contractor shall be responsible to meet dimension requirements if substitution is proposed.

D. Motor control centers shall be complete, floor mounted, metal enclosed, grounded, indoor type. The motor control centers shall be NEMA Standard, Class 11, Type C except where other NEMA Standard classes and types are shown on the Drawings.

E. Ratings shall be 65,000 AIC for all motor control centers.

F. Shall conform to the arrangements and details of the Drawings and to the spaces designated for installation. All MCC door enclosures shall open 90° with all accessories mounted. All doors shall be hinged left hand side.

G. All MCC doors shall be removable with a wiring plug harness for quick removal of doors with disconnecting wire terminations.

H. Design the centers to withstand the mechanical stresses caused by rough handling during shipment in addition to the electrical and mechanical stresses which will occur during operation of the centers.

I. Coordinate components of the centers and their arrange-ments electrically and mechanically. The components and the control wiring shall conform to the approved shop drawings as furnished for the various applicable electrical and mechanical sections of the specifications.

J. Assemble, connect and wire the centers at the factory in accordance with the NEMA Standard class and type for each of the centers.

K. Thoroughly clean, phosphatize and paint the metal surfaces at the factory with primer and baked enamel or lacquer finishes.

L. Shall have the following features:
   1. Standard Vertical Sections:
      a. Approximately 90 inches high, front and rear line-up, fabricated by a single manufacturer.
      b. Rugged steel assemblies with bracing, reinforcing gussets and jig-welding to assure rectangular rigidity. The sections shall be completely metal-enclosed, including their bottoms.
      c. Steel shall not be less than code gauge, leveled.
      d. Bolts, nuts and washers shall be rustproof metal.
      e. Spaces within the sections shall be suitable and adequate.
      f. Mount the sections on adequate structural steel supports at the factory, front and rear, for the full length of each center. Install the centers so the supports will rest on top of the concrete floor surfaces except where concrete pads are indicated. Anchor the centers with bolts, not less than 1/2-inch diameter.

g. Each present and future motor controller shall have an individual door with hinges and latches.
h. End panels shall be screw-removable to facilitate future additions.
i. Removable panels shall have screws which remain in the panels when the panels are removed. Screws shall be received by self-aligning, self-retaining nuts attached within the assemblies.
j. Isolated vertical full height wiring troughs.

2. Bus Bars and Interconnections:
   a. Shall be copper, rated as indicated on drawings. Minimum size shall be 800 amps for the Treatment Building and 600 amps for Well No. 2-1.
   b. Shall be totally enclosed.
   c. Bus bar joints and interconnection joints shall be plated, constant high-pressure type with high strength copper-silicon bolts and nuts.
   d. Provide continuous bars through dead corner cubicles to adjoining cubicles.
   e. Insulation:
      1) High strength polyester glass or equal.
      2) High track-resistance.
      3) High impulse and dielectric strength, especially at elevated temperatures, for withstanding the maximum short circuit currents.
      4) High flame-retardant, self-extinguishing.
      5) NEMA Standard for 65°C temperature rise shall apply.
   f. Shall have horizontal main buses and vertical buses for connecting the motor controllers, circuit breakers and switches.
   g. Shall have an adequate ground bus which extends across the entire width of each center.
   h. Bus bars shall be designed to extend to additional sections when so shown on the Drawings in addition to extending through dead corner cubicles.
   i. Temperature rises shall not exceed the NEMA Standards.
3. Completely equipped spaces for future motor controllers, circuit breakers and switches.
4. Motor Controllers:
   a. Stab-on type except for large ratings which require bolted connections.
   b. Shall conform to the applicable requirements in Section 262913. Include built-in H-O-A selector switches and red and green pilot lights.
   c. Products of a single manufacturer, SIEMENS, or approved equal.
   d. Interchangeable for the same ratings in all of the motor control centers being installed for this contract.
   e. Disconnecting contact devices:
      1) Silver plated copper, full-floating, self-aligning, self-coupling, designed for cleaning action during engaging and disengaging movements.
      2) Adequate flexibility between the stationary and movable components.
      3) Adequate pressure maintained on the contacts.
      4) Shall engage silver plated buses.
   f. Doors mechanically interlocked to prevent their opening unless the disconnect is opened. Incorporate "defeater" mechanisms for inspection by qualified personnel.
   g. External operating handles with lock-open pad-locking provisions and ON and OFF position indicators.
5. Identify each motor controller, circuit breaker and switch with a separate nameplate of laminated black phenolic resin with white core and engraved lettering not less than 3/16-inch high. Identify each motor by its number or other designation and indicate function fulfilled by the motor. Identify pilot light with ON and OFF designation.
6. Line Monitoring Devices:
   a. The motor control center shall be equipped with a three phase monitoring relay to interlock each starter upon phase failure, phase loss or phase reversal. The phase monitor shall be manufactured by SIEMENS, Class 47.

b. A separate line voltage monitor shall be included in the motor control center for each motor to interlock motor when either undervoltage, overvoltage phase loss or phase reversal occurs.

M. Test the motor control centers at the factory to assure that the centers do not have any defects.

N. Electrical Matting: Dielectric strength 30,000 volts, 2 feet wide, 1/4 inch thick corrugated ASTM D 178 Type 2, Class II.

O. All circuit breakers shall be rated 65,000 AIC. AIC based on stand alone ratings. Manufacturers rating using combined systems ratings to use lower AIC rated breakers is not acceptable.

P. Pilot Lights shall be LED type with push-to-test capabilities. No incandescent pilot lights shall be permitted.

2.03 POWER MONITOR

A. Manufacturer: ACCUENERGY
   1. Model No: ACUVIM II Series.
   2. 480 volt.

B. Quantity: One (1) required, 480V, 3 phase 4w.

C. Provide current and potential transformers for all three phases and neutral for digital ammeters/voltmeters.

D. The power monitor shall incorporate a vacuum display and keypad to allow the user to read the following parameters:
   1. Voltage V1, V2, V3.
   2. Current I1, I2, I3, In, Iavg.
   3. Power P1, P2, P3, Psum.
   4. Reactive Power Q1, Q2, Q3, Qsum.
   5. Apparent Power S1, S2, S3, Ssum.
   6. Frequency.
   7. Power Factor.
   8. Energy.
   9. Reactive Energy.
   10. Apparent Energy.
   11. Demand.
   12. Load Features.
   13. Four Quadrant Powers.
   14. Power Quality.
   15. Voltage Harmonics.
   16. Current Harmonics.
   17. Voltage Crest Factor.
   18. Current K Factor.
   19. Voltage Unbalance Factor.
   20. Current Unbalance Factor.
   21. Max/Min Statistics with Time Stamps.

E. Power monitor shall have the following features:
   1. Alarms
   2. I/O Option Module
   3. Anti-tampering Seal

4. Data Logging (8mb)
5. Automatic Frequency adaption.
6. Power Quality Event Logging.
7. Communication
    a. Modbus RTU Protocol and DNP 3.0 via RS485
    b. Ethernet (Modbus TCP, HTTP, SMTP, SNTP)
    c. Profibus DP
    d. BACnet IP, BACnet MS/TP
    e. Dual RS485 Communication Ports
8. 0.2% accuracy.

F. Power monitors shall be factory installed on the Switchboard enclosure doors as indicated on drawings.
    1. The power monitor shall be installed in ATS cabinet on the load side and shall monitor Utility power only.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with NEC and manufacturer's instructions, and as shown on the Drawings.

B. Install electrical matting to extend 24 inches beyond end of motor control center. Cut matting clear of obstructions.

C. Install clear lexan window to allow visual indication of surge protection status.

END OF SECTION 262915

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Automatic transfer switch.

1.02 REFERENCES

A. NFPA 70 - National Electrical Code.

B. NEMA ICS 1 - General Standards for Industrial Control and Systems.

C. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers, and Assemblies.

D. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

1.03 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Submit product data for transfer switches showing overall dimensions, electrical connections, electrical ratings, environmental restrictions, voltage, short circuit ratings, enclosure details and all accessories.

C. Submit manufacturer’s installation instructions. Include instructions for storage, handling, protection, examination, preparation, installation and starting of product.

D. Submit manufacturer’s operation and maintenance manual as part of shop drawing submittal.

1.04 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 017823.

B. Include instructions for operating equipment.

C. Include instructions for operating equipment under emergency conditions.

D. Identify operating limits which may result in hazardous or unsafe conditions, whether switch is being operated automatically or manually.

E. Document ratings of equipment and each major component.

F. Include manufacturer’s recommended routine preventative maintenance schedule.

G. List any special tools, maintenance materials and recommended spare parts.

1.05 EXTRA SERVICES

A. The supplier shall include as a part of the package a 5-year warranty and 5-year planned maintenance agreement at no additional cost to the Owner. The agreement shall include, as a minimum, one service call per year. The services must be performed by the authorized distributor of the equipment furnished and may not be subcontracted. The following services shall be performed once a year.
   1. Check switches for loose, bare or broken wiring (replace as needed).
   2. Test transfer switch operation, time delays and manual operators.
   3. Test transfer switch operations and plant exerciser.

B. Manufacturer's Instructions: The manufacturer's instructions shall 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.

1.06 REGULATORY REQUIREMENTS

A. Conform to all applicable national, state, city or local codes for standby electrical systems.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Transfer switch shall be ONAN Model OTPC. Motor Control Centers and sizing restrictions were designed with ONAN Model OTPC.

B. Transfer switch shall be supplied and warranted for five (5) years including 100% parts and labor, including a five-year planned maintenance agreement by the single system source supplier. No exceptions.

C. Proposal for any substitute equipment shall provide complete submittal data, as specified to the Engineer for approval or disapproval. Physical dimensions of transfer switches are based on ONAN Model OTPC. Substitute equipment shall be field verified for adequate equipment spacing relative to other equipment to be installed in the same locations.

D. It is intended that all products specified herein be of standard ratings, therefore, the ampere ratings, withstand and closing ratings, etc., shall be the manufacturer's next available larger size of rating until the specifications are exactly met.

2.02 AUTOMATIC TRANSFER

A. Description: NEMA ICS 2; automatic transfer switches.

B. The switches shall be mechanically held, electrically operated and shall be interlocked mechanically and electrically to insure that normal power and emergency power mixing is impossible. The automatic transfer switches shall be suitable for use with emergency sources.

2.03 AUTOMATIC TRANSFER SWITCH

A. Sequence of Operation: Automatic switching shall occur from normal power to emergency power when there is a phase reversal or when any phase of the normal power drops between an adjustable voltage range of 75 to 98% voltage and to automatically restore the load to normal when all phases are between an adjustable voltage range of 75 to 98% normal voltage or phase rotation is corrected.

B. Main switch contacts shall be high-pressure silver alloy in order to improve interrupting and withstand capabilities. Main contacts shall be rated for 600 volts AC minimum. Contact assemblies shall have arc chutes for positive arc extinguishment. Arc chutes shall have insulating covers to prevent interphase flashover.

C. Transfer switches shall be equipped with transparent protective covers over all live parts of the switch. These covers are to serve as protection to operators or service personnel from contact with live parts, and from contact with arcing by-products if the switches operate with the door open. Barriers shall be transparent to allow for visual inspection for contact position and for damage.

D. Automatic transfer switches utilizing components of molded case circuit breakers are not acceptable.

E. All transfer switches and accessories shall be UL listed and labeled, tested per UL Standard 1008 and CSA approved.

F. Solid state undervoltage sensors shall simultaneously monitor all phases of both sources. Pick-up and drop-out setting shall be adjustable between 75 and 98% of system voltage. Voltage sensors shall allow for adjustment to sense partial loss of voltage on any phase. Voltage sensors shall have field calibration of actual supply voltage to nominal system voltage. Switches that do not monitor all three phases of both normal and emergency sources will not be acceptable.

G. Provide frequency sensing relay which will not permit transfer to emergency power until the generator set is operating at 60 Hz.

H. Control wiring shall be terminated interlocking, plug-type connectors. Operating current for the transfer shall be obtained from the source to which the load is to be transferred.

I. The controls shall include latching diagnostic indicators to pinpoint the last successful step in the sequence of control functions, and to indicate the present status of the control functions in real time, as follows:
   1. Source 1 OK.
   2. Start Generator Set.
   3. Source 2 OK.
   4. Transfer Timing.
   5. Transfer Complete.
   6. Retransfer Timing.
   7. Retransfer Complete.
   8. Timing for Stop.

2.04 RATINGS

A. Ratings shall be as follows:
   1. Voltage: 277/480 volts, three phase, four wire, 60 Hz.
   2. Switched Poles: 4, (overlapping neutral not acceptable).
   3. Load Inrush Rating: Combination Load.

B. All automatic transfer switches shall meet the following withstand ratings as a minimum. In order to protect the system under current or possible future conditions, whether protected by circuit breakers or current limiting fuses, the transfer switches must meet both of the following molded case circuit breaker and current limiting fuse withstand and closing ratings as a minimum. Ratings are stated in symmetrical RMS amperes for three phase faults.
   1. Transfer Amperage: 800
   2. WCR @ 480 Volts W/Molded Case C/B'S: 65,000
   3. WCR @ 480 Volts W/Current Limit Fuses: 200,000

C. Transfer switches shall be continuously rated in ambient temperatures of -40 to +50 degrees C, relative humidity up to 95% (non-condensing), and altitudes up to 10,000 feet.

2.05 AUTOMATIC SEQUENCE OF OPERATION

A. Initiate Time Delay to Start Alternate Source Engine Generator: Upon initiation by normal source monitor.

B. Time Delay to Start Alternate Source Engine Generator: 0 to 15 seconds, adjustable.

C. Engine Start: Automatic controls shall signal the engine-generator set to start upon a signal from normal source sensors, after time delay to start has terminated.

D. Initiate Transfer Load to Alternate Source: Upon initiation by normal source monitor and permission by alternate source monitor.

E. Time Delay Before Transfer to Alternate Power Source: 2 to 120 seconds, adjustable.

F. Initiate Retransfer Load to Normal Source: Upon permission by normal source monitor.

G. Time Delay Before Retransfer to Normal Power: 0 to 30 minutes, adjustable; bypass time delay in the event of the alternate source failing.

H. Time Delay Before Engine Shut Down: 0 to 10 minutes, adjustable, of unloaded operation; factory set at 5 minutes.

I. Engine Exerciser: An Exerciser shall, once a week, start the generator set, transfer building load to the generator sets and after a set period of time, transfer the building load back to normal power. It shall be readily accessible and easy to start. Exercisers shall be furnished with load/no load selector switches. Provide bypass exerciser controls if the normal source fails during the exercise period.

2.06 ENCLOSURE

A. Enclosures: Transfer switch shall be provided as open type for installation in the motor control center by the motor control center manufacturer. All controls which will be located on cabinets shall be key operated. Manual operating handles and all control switches, (other than key-operated switches) shall be accessible to authorized personnel only by opening the key-locking cabinet doors. Transfer switches with manual operating handles and/or non key-operated control switches located on the outside of the cabinet do not meet this specification and are not acceptable.

2.07 ACCESSORIES

A. Indicating Lights: Mounted in cover of MCC by MCC manufacturer to indicate the following. Source lights shall be 30.5 mm heavy duty oiltight press-to-test by SIEMENS.
   1. NORMAL SOURCE AVAILABLE.
   2. EMERGENCY SOURCE AVAILABLE.
   3. NORMAL SWITCH POSITION.
   4. EMERGENCY SWITCH POSITION.
   5. AC POWER FAILURE.

B. Test Switches: Mounted in enclosure of MCC by MCC manufacture to simulate failure of normal source. Switches to be keyed operated. Provide TEST/NORMAL/RETRANSFER positions. Retransfer position to provide immediate Retransfer to normal, bypassing time delay. The test switch shall be capable of receiving a remote signal. The generator load shed control panel shall provide a signal to initiate transfer to emergency source based on facility load. After the facility load has reduced the PLC shall deenergize the start signal. The transfer switch shall retransfer to the normal source and go into engine cool down mode 0-10 minutes adjustable.

C. Emergency Kill Switch Pushbutton (Maintained): When depressed shall shut down generator. This switch shall be in series with new exterior emergency kill switch.

D. Transfer Switch Main Shaft Auxiliary Contacts: Two normally open; two normally closed. Wired to terminal block for easy access for indication of switch position. Rated at 10 Amps continuous and 250 VAC maximum.

E. Transfer switches are to be equipped with permanently attached operating handles and quick-break, quick-make mechanisms suitable for normal operation under load. Loose manual operating handles that need to be field attached for operation will not be acceptable.

F. All transfer switches shall be provided with a field adjustable time delay during the switching in both directions, during which time the load is isolated from both power sources, to allow load residual voltage to decay before closure to opposite source. The delay feature shall have an adjustable range of 0 to 7.5 seconds. Phase angle monitor/inphase type monitors are not acceptable.

G. Provide a voltage monitoring relay and pneumatic time delay relay control circuit to energize a relay contact when power to the load terminals of the transfer switch is lost for a pre-selected time interval. The voltage phase monitor relay shall monitor 3-phase voltage, phase failure, phase reversal and voltage imbalance. The phase monitor shall have a normally closed contact in Series with a time delay relay. The pneumatic time delay relay shall have a 0-5 minute timer with automatic reset when power is restored to the coil. The normally open contact of the time delay relay shall be input to the PLC.

H. Provide generator 20 light remote annunciator located inside the Treatment Building on the ATS Cubicle. Interface generator set controls with battery charger and fuel tank alarms for all status conditions. Provide all power, control wiring including conduits.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation of transfer switches shall be by the Motor Control Center manufacturer. Motor Control Center manufacturer shall provide applicable U.L. labeling for installed system.

3.02 POWER OUTAGE

A. After the transfer switch is installed, the Contractor shall be responsible to inspect the installation and field verify that the switch has been installed per manufacturer’s recommendations. Owner’s operating personnel shall be instructed on the use and service requirements of the transfer switch by the manufacturer. A minimum of two (2) hours manufacturers training is required.

3.03 DEMONSTRATION

A. Demonstrate operation of transfer switch under provisions.

END OF SECTION 262916

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Variable frequency controller.

1.02 RELATED SECTIONS

A. Section 012500 - Substitution Procedures.

B. Section 262913 - Motor Controllers.

C. Section 262915 - Motor Control Centers.

D. Section 260526 - Grounding and Bonding for Electrical Systems.

E. Section 260553 - Identification for Electrical Systems.

F. Section 265010/265011 - Programmable Logic Controllers. (Compact Logix has different Section #)

G. Section 265012 - Description of Controls.

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 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Furnish products listed and tested by Underwriters Laboratories, Inc. as suitable for purposes specified indicated.

1.05 EXTRA MATERIALS

A. Provide two of each fuse size and type.

B. Provide one complete set of spare logic boards for each system provided.

PART 2 - PRODUCT

2.01 MANUFACTURERS

A. Yaskawa IQPump.

B. Approved equal.

2.02 DESCRIPTION

A. Provide enclosed variable frequency controllers suitable for operating the indicated loads. Conform to requirements of NEMA ICS 3.1.

B. Minimum efficiency at full load: 98 percent.

2.03 ENVIRONMENT RATINGS

A. Operating Ambient: 0 degrees C to 40 degrees C.

B. Relative Humidity: 5 to 95% non-condensing, all power ratings.

C. Altitude: 3,300 feet (1,000 meters) maximum without derating.

D. Vibration: 0.006 inches (0.152 mm) displacement, 1G peak.

E. Shock: 15G peak for 11ms duration (+-1.0 ms).

2.04 INPUT POWER RATINGS

A. Voltage:	460V AC +-10%
B. Frequency:	48 to 62 Hz
C. Phase:	3-phase
D. Motor Horsepower:	Refer to drawings for H.P. sizes
E. Line Transient Protection:	Line transients up to 5,000 volts peak. 320 Joules phase-to-phase 380 Joules phase-to-ground.
F. Logic Power Ride-Thru:	2 seconds or longer -- subject to the integrity of user supplied external circuits.
G. Drive Characteristics:	Drive shall use isolated gate bi-polar technology.
H. Control Logic Noise Immunity:	Showering arc transients from 350 to 2,000 volts peak.
I. Voltage:	**Drive Rating BOO3-B200** 0 to applied input voltage, 230V AC, maximum output voltage cannot exceed applied input voltage.
J. Frequency Range:	0 to 250 Hz with local programmable minimum and maximum limits

K. Frequency Resolution:	**Digital** Preset speeds (serial interface or pulse train input) to 0.005 Hz of set frequency within the minimum and maximum limits. **Analog** Equal divisions between minimum and maximum limits to the nearest 0.005 Hz as a function of signal type. Local speed pot, 1003 divisions. Remote speed pot, 633 divisions. 4 to 20 mA input (TB2, Terminals 4 and 6), 726 divisions.
L. Frequency Regulation:	Digital Frequency Source: 0.0013% of set frequency, 0 to 40°C temperature range.
M. Volts-per-Hertz:	Fully programmable - Minimum 1 to 14.3 V/Hz through local programming.
N. Intermittent Overload Capability:	Programmable MOPC from 50 to 150% of rated output current for up to 1 minute maximum.
O. Carrier Frequency:	Carrier frequency shall be adjustable up to 15 Khz. No exceptions.

2.05 DRIVE ACCESSORIES

A. Display: Provide integral digital display to indicate output voltage, output frequency, and output current. Display shall be flush mounted on VFD enclosure door.

B. Elapsed Time Meter: Non-resettable 6 digit.

C. Input Signal: - 20 mA DC.

D. Disconnecting Means: Include integral circuit breaker on the line side of each controller.

E. One (1) 0 to 30 mA D.C. ammeter to monitor 4-20 mA input signal from PID controller. (3-1/2” square minimum).

F. Hand-Off-Automatic Selector Switch.

G. Drive-Bypass Selector Switch

H. Ten (10) turn speed control pot.

I. Isolation contactor (NEMA Rated).

J. Output/Bypass contactors (NEMA Rated).

K. Start Delay Timer: Eagle Cycle-Flex.

L. Auxiliary NO and NC contacts.

M. Three (3) programmable preset speeds to be initiated through contact closure.

N. Lightning/surge arrestor with individual line to line and individual line to ground protection. Clamping voltage levels shall be specifically sized for the applied system voltage.

O. Provide solid state overload relay on load size of bypass contactor and thermal overload relay on load side of output contactor as manufactured by SIEMENS.

P. Fast-acting fuses on load side of main circuit breaker sized in accordance with manufacturers recommendations.

Q. Isolated 4-20 mA input for follower signal input.

R. Smart Keypad: Key pad shall have 1K memory for downloading information to any drive. Removable flush mounted on enclosure door.

S. 4-20 mA scaled output proportional to drive speed. Input to PLC.

T. Drive shall have three inputs for preset speeds initiated by remote contacts.

U. Drive shall have speed contacts to close when speed is reached and be input to the PLC.

V. Drive shall have fault and not in Auto Contacts and shall be input to the PLC.

2.06 VARIABLE SPEED DRIVE SYSTEM

A. The variable speed drive system shall include a diode bridge converter, filter network and a transistorized inverter section. Base driver signals used to control firing of the power transistors shall be designed with optically-coupled-isolators for optimum drive protection. The output must be sinusoidal wave, pulse width modulated, voltage wave form for reduced harmonic heating in the motor. The systems shall include all the necessary control circuits, synchronizing the equipment and protective devices as required by design. The drive unit shall be able to withstand a phase-to-phase and a phase-to-ground short without damage to the drive unit. The systems protection as a minimum shall provide the following:

Current Limit:	115% of rated current
Overcurrent:	180% of rated output current IET (trip fault)
Shortcircuit:	Phase-to-phase (trip fault)
Overvoltage:	High D.C. bus voltage (trip fault)
Undervoltage:	20% below line voltage (trip fault)
Momentary Power Failure:	30 to 500 milliseconds
Burn-out:	D.C. bus fuse protection or 3 phase input fusing
Terminal Strip for Remote Alarms:	Fault contact (Form C)
Digital Indication Individual Fault Condition:	Overcurrent of a transistor. Output overcurrent or shortcircuit. Overcurrent while running. Thermal overload. Overvoltage of the D.C. bus due to regeneration. Overvoltage of the D.C. bus due to high line voltage. Overtemperature of the enclosure. Ground fault.
LED Indication:	D.C. bus capacitator charge

Stall Protection:	Prevents current limit activation during overload condition to prevent stall
Ground Fault:	Detects output shortcircuit due to a ground (trip fault)
Voltage Limit:	Prevents the overvoltage of the D.C. bus during deceleration
Accel & Decel Time:	Fully programmable.

The control shall contain system adjustments. The adjustments shall be by potentiometers. The potentiometer shall be accessible through the front portal door on the unit which prevents exposure to lethal voltage to the operator.

The system parameters shall be shown on the digital display meter before, during and after the adjustment. The digital display shall indicate the actual setting of the adjustment, not percentage of setting. The following adjustment shall be provided:

Acceleration:	0.1 to 60 seconds
Deceleration:	0.1 to 60 seconds
Upper Frequency Limit:	0 to 80 Hz
Lower Frequency Limit:	0 to 80 Hz
Auto Reference Bias:	0 to 80 Hz
Auto Reference Gain:	0 to 80 Hz

The unit shall be self-protecting to prevent any misadjustments by the operator. The upper limit cannot be set below the lower limit, and will signal the operator of this misadjustment.

2.07 DESIGN

A. Employ microprocessor based inverter logic isolated from power circuits.

B. Employ IGBT inverter system.

C. Adjustable carrier frequency up to 15 KHz.

D. Employ switching power supply operating off DC link.

E. Design for ability to operate controller with motor disconnected from output.

F. Design to attempt five automatic restarts following fault condition before locking out and requiring manual restart.

G. In the event of sustained power loss, the control shall shut down safely without component failure. In the event of momentary power loss, the control shall shut down safely without component failure. Upon return to power the system shall automatically return to normal operation, being able to restart into a rotating motor, regaining positive speed control without power failure.

2.08 FABRICATION

A. Wiring Terminations: Match conductor materials and sizes indicated.

B. Enclosure: NEMA 250, Type 1.

C. Finish: Manufacturer's standard enamel.

2.09 SOURCE QUALITY CONTROL

A. Inspect and production-test each product specified in this section.

B. Test shall include simulated operation.

C. Notify engineer at least five (5) days prior to test. Owner or Engineer may witness test.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Controllers shall be factory installed in Motor Control Center by same manufacturer of Motor Control Center.

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 262923

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Overfill/leakage alarm panel.

B. Level monitoring probes..

C. Level and leak alarm probes.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electric Code.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.03 SYSTEM DESCRIPTION

A. Overfill and Leakage Alarm: System capable of sensing and indicating product overfill and leakage of fuel oil storage tank. System shall be capable of sensing WARNING, low and FULL level conditions.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide technical data for alarm system.

C. Shop Drawings: Indicate pertinent dimensions, lengths of probes, plan layout of equipment, mounting details, construction details, required clearances, power requirements and wiring diagrams.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Underwriters Laboratories, Inc. Include instructions for storage, handling, protection, examination, preparation, installation and starting of products.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 017823.

B. Operation Data: Indicate procedures and methods required for proper operation of alarm system.

C. Maintenance Data: Provide spare parts list and name of local parts supplier.

1.06 REGULATORY REQUIREMENTS

A. Conform to the requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.07 COORDINATION

A. Installation of alarm system shall be coordinated by generator enclosure manufacturer.

B. Coordinate with all adjacent electrical and mechanical work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. OMNTEC MFG., INC.

B. Substitutions shall be permitted only after receiving written approval from the Engineer.

C. Substitutions shall be accepted and approved by the Suffolk County Department of Health Services.

2.02 COMPONENTS

A. Overfill/Leakage Alarm Panel: Model L1PD2, NEMA 4X enclosure with internal steel component mounting back panel for wall mounting; housing the controlling electronic circuitry, including panel mounted audible alarm with time out and auto reset, and pushbutton switches for audible alarm silencing and system test; capable of continuously monitoring all sensor circuits; 120 volt, single phase, 60 Hz; complete with transformer type lights with push-to-test func-tion having the following lens colors:
   1. Green Lens: Normal conditions.
   2. Yellow Lens: Warning conditions.
   3. Red Lens: Failure/alarm conditions.

B. High & Low Level Alarm Probe: Model L-2-5, combination high-low level probe, capable of transmitting an electric signal to the control panel at tank warning level (90 percent capacity) and full level (95 percent capacity); automatically resetting once tank is less than 90 percent capacity; compatible diesel fuel oil. Model L-1-D low level probe. Probe shall also indicate a 10% capacity low level indication.

C. Secondary Containment Alarm Probe: Model PDS-ASC, photooptic type, capable of transmitting an electric signal to the control panel during a leakage situation within the walls of the tank and secondary containment; capable of distinguishing between the presence of product and water; automatically resetting when leaked product is no longer present.

2.03 ACCESSORIES

A. Alarm Panel Guard: Wire mesh construction, sized to fit over and protect the remote alarm from damage.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify all openings in tank are properly located and sized and ready to receive work of this section.

3.02 PREPARATION

A. Clean all parts and components of the alarm system such that they are free from dirt, water and other debris.

3.03 INSTALLATION

A. Installation shall comply with Suffolk County Department of Health Services requirements.

B. Generator enclosure manufacturer shall install alarm system in accordance with manufacturer's instructions and approved shop drawings.

C. Generator enclosure manufacturer shall verify lengths of alarm probes for each fuel tank.

D. Install overfill/leakage alarm panel at the location as indicated on the plans. Panel must be easily accessible for testing and reading of indication lights during an alarm situation.

E. Install alarm condition into generator controls and for remote annunciator. Provide all wiring as required.

F. Install high and low level alarm probe at location indicated on the plans.

G. Install secondary containment alarm probe between the inner and outer walls of the fuel tank and located 1/4 inch (6 mm) above the bottom inner surface of the outer tank wall.

END OF SECTION 263217

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Programmable logic controllers.

B. Input/output hardware.

C. Programmer/programming requirements.

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 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 PLC's and existing controls.

1.04 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 CompactLogix with 1769-L3x Controller.

B. Approved equal.

2.02 PROGRAMMABLE LOGIC CONTROLLER HARDWARE CHARACTERISTICS

A. The Programmable Controller shall have downward compatibility whereby all new module designs can be interchanged with all similar modules in an effort to reduce obsolescence.

B. The Controller shall have the capability of addressing up to 960 local discrete points or 240 local analog points. The digital calculations is based upon 32 points per module * 30 local modules (maximum for CompactLogix). The analog calculations is based upon 8 channels per module * 30 local modules (maximum for CompactLogix).

C. The 30 maximum local I/O modules can be installed in up to 3 local I/O banks. Each bank will be a seamless extension to the local bank but will be electrically isolated from the other banks.

D. The Programmable controller shall have the ability to be updated electronically to interface with new modules.

E. All hardware of the Programmable Controller shall operate at an ambient temperature of 0 to 60 degrees C (32 to 140 degrees F), with an ambient temperature rating for storage of -40 to +85 degrees C (- 40 to +185 degrees F).

F. The Programmable Controller hardware shall function continuously in the relative humidity range of 5% to 95% with no condensation.

G. The Programmable Controller shall have the ability to communicate with multiple distributed I/O racks or devices configured with multiple I/O modules. CIP Networks that allow distributed I/O ControlNet, EtherNet/IP, and DeviceNet.

H. Connections can be made to other remote CompactLogix inputs and outputs over Devicenet.

I. Connections can be made to other remote Point inputs and outputs bridging through Devicenet, EtherNet/IP, or ControlNet.

J. Connections can be made to remote Flex inputs and outputs over Devicenet, ControlNet or EtherNet/IP. Each Flex I/O input and output module shall be mechanically joined to form an assembly. These assemblies with their respective modules shall contain up to 256 (8 modules x 32pts/module) unique points.

K. Connections can be made to remote ControlLogix inputs and outputs over Devicenet, ControlNet or EtherNet/IP. For remote ControlLogix I/O, each input and output module shall be mechanically joined in a Chassis to form a bank. These banks with their respective modules shall contain up to 512 (16 modules x 32pts/module, using a 17 slot chassis) unique points.

L. Real Time Produced/Consumed Connections can made and data seamless exchanged between multiple CompactLogix Controllers or CompactLogix controllers and any other Logix based controller.

M. The Programmable Controller shall use multiple independent, asynchronous scans. These concurrent scans shall be designated for processing of input and output information, program logic, and background processing of other processor functions. Input and output devices located in the same backplane (local I/O) as the CPU will be produced at the rate of configured RPI (Requested Packet Interval).

N. It shall be possible to communicate with distributed I/O racks or other PLCs via fiber optic cable by inserting fiber optic converters into the links. The fiber link must support distances between converters up to 6500 cable feet on “RIO” or 12 KM on ControlNet. Redundant fiber optic cabling shall be an option.

O. The Programmable Controller shall have the ability to support multiple data communications links by using ControlNet, DeviceNet, Ethernet, and DH-485 networks.

P. The Programmable Controller shall have at least one dedicated serial port, which supports RS-232-C signals. It shall be accessible in control logic and provide support for DF1 Master, DF1 Point to point, DF1 Slave and DH-485 communication protocols. Alternatively, it must be usable for programming and data monitoring purposes. The serial port will also provide support for ASCII communications.

2.03 MEMORY CHARACTERISTICS

A. The program storage medium shall be of a battery backed RAM.

B. Memory shall contain battery back-up capable of retaining all stored program data through a power failure. A low battery condition must be detectable in ladder logic, but shall not automatically generate a major fault. A low battery condition will generate a minor fault and will be detectable in ladder logic and will be indicated on a diagnostic indicator mounted on the front of the controller.

C. The controllers shall provide the capability to use CompactFlash as nonvolatile memory storage. The CompactFlash card shall be available from the supplier as an industrial rated device suitable for use in the same environment as the controller. The CompactFlash shall support a Windows file system allowing multiple files to be stored on the card. The user can manually trigger the controller to save or load from CompactFlash and also configure the controller to load from CompactFlash on power up or when an issue is detected with the data in RAM. Additionally when memory is restored a user selectable option to be restored in Run mode or Program mode shall be provided.

D. The operator should be able to backup volatile memory, including data, and program logic onto a CompactFlash storage device. In addition, the controllers current firmware should also be stored on the CompactFlash card.

E. All user memory in the processor not used for program storage shall be allocable from main memory for the purpose of data storage. The Programmable Controller system shall be capable of storing 3 data types:
   1. Predefined.
   2. User-defined.
   3. Module-defined

F. If contacts or entire rungs are intentionally deleted from an existing logic program, the remaining program shall be automatically repositioned to fill this void. Whenever contacts or entire rungs are intentionally inserted into an existing program, the original program shall automatically be repositioned to accommodate the enlarged program. All rung comments shall maintain their original links.

G. It shall be possible to program application logic more than once into memory.

H. The number of times a normally open (N.O.) and/or normally closed (N.C.) contact of an internal output can be programmed shall be limited only by the memory capacity to store these instructions.

I. The number of times a timer or counter can be programmed shall be limited only by the memory capacity to store these instructions.

J. Control logic programs shall have immediate access to the subelements of control structures by address and subelement mnemonic, such as timer accumulator value, timer done bit, or PID Process Variable value.

K. Data in the controller should be user defined and tag based and not restricted to any fixed data register format.

2.04 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.

2.05 SPECIFIC FUNCTION CHARACTERISTICS

A. Program timers shall be available in both on-delay and off-delay with a time base selection of 0.01 seconds, and timer range from 0.01 to 327.67 seconds. Additional time bases and longer timing intervals can also be supported.

B. Counters shall be available in both count up and count down with a range of -32,768 to 32,767.

C. Sequencers shall have a minimum capacity of 16 bits by 100 steps and be cascadable, time-driven or event-driven.

D. Shift registers shall be available with a minimum of 16 bit groups and be cascadable, time-driven or event-driven.

2.06 POWER SOURCE

A. The PLC's power supply shall accept AC power of 85-132 volts at 60 Hz. It shall be capable of withstanding a power loss for a minimum of 20 milliseconds while still remaining in operation.

B. Input power requirements for AC input power shall not exceed 180 VA.

C. On AC powered PLC system with DC inputs, 200 mA at 24 VDC should be available to the user to power external 24 volt drives.

2.07 PROGRAMMABLE LOGIC CONTROLLER (CPU) HARDWARE

A. The CPU shall be a self-contained unit, and will provide control program execution and support remote or local programming. This device will also supply I/O scanning and inter-processor and peripheral communication functions.

B. The user program and data shall be contained in battery backed memory. The operating system firmware shall be contained in non-volatile memory.

C. The operating system firmware can be updated via a separate update tool to allow for easy field updates. CompactLogix controllers that support CompactFlash shall allow the operating system to be updated using a suitably configured CompactFlash card.

D. The controller memory should be 1.5MB.

E. The CPU within the system shall perform internal diagnostic checking and give visual indication to the user by illuminating a “green” (OK) indicator when no fault is detected and a “red” (OK) indicator (Blinking or Solid) when a fault is detected.

F. The front panel on the Controller shall include color indicators showing the following status information:
   1. Program or Run mode of the controller.
   2. The fault status of the controller.
   3. I/O Status.
   4. RS-232 activity.
   5. Battery Status.
   6. Force LED.

G. The front panel of the Controller shall include a mounted keyswitch. The key shall select the following Controller modes: RUN - No control logic edits possible, program always executing; PROGRAM - Programming allowed, program execution disabled; and REMOTE - Programming terminal can make edits and change processor mode, including test mode, whereby the logic executes and inputs are monitored, but edits are not permanently active unless assembled

H. The Controller shall include a holder and a connector for a lithium battery. The battery shall provide power backup for user programs and data when the main power supply is not available.

I. The front panel of the Controller shall include at least one 9-pin D-shell serial RS232 port, which supports DF1, DH-485 (messaging only no programming) and ASCII protocols.

J. All system modules, local and remote chassis shall be designed to provide for free airflow convection cooling. No internal fans or other means of cooling, except heat sinks, shall be required.

K. The Controller shall include an integrated Real Time Clock (RTU). This clock value should be in a form of a predefined tag and should be accessible via logic or remotely.

2.08 POWER SUPPLIES

A. The Programmable Controller shall operate in compliance with an electrical service of 85 to 132 VAC or 120 to 220 VAC, single phase, in the frequency range from 47 to 63 Hz, or 16-32 VDC or 19.2 to 32 VDC.

B. The manufacturer shall be able to provide as standard equipment a system power supply capable of converting AC standard low voltage line power to the DC power required to operate the Programmable Controller system.

C. A single main power supply shall have the capability of supplying power to the CPU and local input/output modules. Other power supplies shall provide power to remotely located racks.

D. The power supply shall automatically shut down the Programmable Controller system whenever its output power is detected as exceeding 125% of its rated power.

E. The power supply shall monitor the incoming line voltage for proper levels. When the power supply is wired to utilize AC input, the system shall function properly within the range of 85 to 265 VAC. When the power supply is wired to utilize DC input, the system shall function properly within the range of 19.2 to 32 VDC. In addition, the power supply shall provide surge protection, isolation, and outage carry-over up to 2 cycles of the AC line.

F. Design features of the Programmable Controller power supply shall include a diagnostic indicator mounted in a position to be easily viewed by the user. This indicator shall provide the operator with the status of the DC power applied to the backplane. In addition, a means of disabling power to the CPU shall be possible from a power disconnect switch mounted in a position easily accessible by the operator.

G. At the time of power-up, the power supply shall inhibit operation of the processor and I/O modules until the DC voltages of the backplane are within specifications.

H. In addition to the electronic protection described above the power supply shall offer a failsafe fuse that is not accessible by the customer.

I. Provide one (1) spare power supply to District.

2.09 PROGRAM STORAGE

A. The program storage medium shall be of solid-state RAM (volatile) type.

B. Memory capacity shall be sized to allow for future programming expansion of 30% minimum.

C. Memory shall contain battery backup capable of retaining all stored program data through a continuous power outage of 12 months under worst case conditions. The capability shall exist to remove all batteries from the system without removing system power.

2.10 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.

2.11 INPUT/OUTPUT MODULES

A. The programmable controller shall utilize discrete input/output hardware consisting of the following as required of this project:
   1. Inputs (Isolated type):
      a. AC/DC input for devices which operate at 120 VAC, 50/60 Hz or 120 VDC, 220 VAC, 50/60 Hz or 220 VDC.
      b. Isolated AC input which provides isolation of 120 VAC or 120 VDC input signals.

2. Outputs (Isolated type):
   a. AC output for devices which operate at 120 VAC, 50/60 Hz.
   b. Isolated AC output which provides six (6) isolated outputs capable of switching 120 VAC or 220 VAC power.
   c. Contact output which provides four (4) normally open and four (4) normally closed reed relay outputs.
3. Provide 16 spare input and 16 spare output I/O points as spare including all rack for each PLC furnished as part of this project.

2.12 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.
   2. Current range: 4 to 20 mA.

C. Provide eight (8) additional input and eight (8) additional output I/O points as spare including all racks for each PLC and remote I/O furnished as part of this project.

2.13 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 is 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 annotated source code to District for each CPU furnished as part of this project.

C. Inputs/Outputs:
   1. Refer to Specification 265011 - Programmable Logic Controller - Appendix A - PLC Inputs/Outputs.

2.14 PLC SURGE PROTECTION

A. PLC surge protection shall be provided for PLC circuits.

B. Manufacturer shall be MCG ELECTRONICS, INC., Model PLC-15A-60V.

C. Surge protection shall be for both AC power and 4-20 mA loop data lines.

D. Provide surge protection for each new PLC including remote I/O.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions on PLC.

B. Install PLC units in control panel “CP”.

C. Install all analog and digital spare I/O. Label as spare.

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.

3.03 MANUFACTURER'S FIELD SERVICE

A. Provide operating instruction manuals with adequate information pertaining to the following:
   1. Annotated 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 265011

Specification 265011 - Programmable Logic Controller
Appendix A - PLC Inputs/Outputs
Riverhead Water District
Booster Pumping Station at Plant No. 15

Abbreviations	
DI:	Digital Input
DO:	Digital Output
AI:	Analog Input
AO:	Analog Output
MB:	Modbus
EN:	Ethernet

Well No. 25A Building (CP-1) I/O List

No.	Description	Signal Type	Quantity	Range	Units	Notes
1	Booster A H-O-A Switch	DI	3	N/A	N/A	
2	Booster A Normal/Bypass Selector Switch	DI	2	N/A	N/A	
3	Booster A Discharge High Pressure Safety Switch	DI	1	N/A	N/A	
4	Booster A Discharge Check Valve Limit Switch (Chemical Safety)	DI	1	N/A	N/A	
5	Booster A Run (Chemical Safety)	DI	1	N/A	N/A	
6	Booster A Overload	DI	1	N/A	N/A	
7	Booster A Fault	DI	1	N/A	N/A	
8	Booster A Reset	DI	1	N/A	N/A	
9	Booster A Discharge High Pressure Safety Enable/Disable Selector	DI	2	N/A	N/A	
10	Booster B H-O-A Switch	DI	3	N/A	N/A	
11	Booster B Normal/Bypass Selector Switch	DI	2	N/A	N/A	
12	Booster B Discharge High Pressure Safety Switch	DI	1	N/A	N/A	
13	Booster B Discharge Check Valve Limit Switch (Chemical Safety)	DI	1	N/A	N/A	
14	Booster B Run (Chemical Safety)	DI	1	N/A	N/A	
15	Booster B Overload	DI	1	N/A	N/A	
16	Booster B Fault	DI	1	N/A	N/A	
17	Booster B Reset	DI	1	N/A	N/A	
18	Booster B Discharge High Pressure Safety Enable/Disable Selector	DI	2	N/A	N/A	
19	Booster C H-O-A Switch	DI	3	N/A	N/A	
20	Booster C Normal/Bypass Selector Switch	DI	2	N/A	N/A	
21	Booster C Discharge High Pressure Safety Switch	DI	1	N/A	N/A	
22	Booster C Discharge Check Valve Limit Switch (Chemical Safety)	DI	1	N/A	N/A	
23	Booster C Run (Chemical Safety)	DI	1	N/A	N/A	
24	Booster C Overload	DI	1	N/A	N/A	
25	Booster C Fault	DI	1	N/A	N/A	
26	Booster C Reset	DI	1	N/A	N/A	
27	Booster C Discharge High Pressure Safety Enable/Disable Selector	DI	2	N/A	N/A	
28	Motorized Butterfly Valve MBV-1 O-S-C-A Switch	DI	4	N/A	N/A	
29	Motorized Butterfly Valve MBV-1 “Closed”	DI	1	N/A	N/A	
30	Motorized Butterfly Valve MBV-1 “Open”	DI	1	N/A	N/A	
31	Motorized Butterfly Valve MBV-2 O-S-C-A Switch	DI	4	N/A	N/A	
32	Motorized Butterfly Valve MBV-2 “Open”	DI	1	N/A	N/A	
33	Motorized Butterfly Valve MBV-2 “Closed”	DI	1	N/A	N/A	
34	AC Power Loss Alarm	DI	1	N/A	N/A	
35	Generator "Run" Status	DI	1	N/A	N/A	
36	Generator Trouble Alarm	DI	1	N/A	N/A	
37	ATS in Normal Position	DI	1	N/A	N/A	
38	ATS in Emergency Position	DI	1	N/A	N/A	
39	Normal Power Available	DI	1	N/A	N/A	
40	Emergency Power Available	DI	1	N/A	N/A	
41	Intrusion Alarm (Door Contact Tripped)	DI	1	N/A	N/A	
42	Booster A E-Stop Pressed (MCC-7A)	DI	1	N/A	N/A	
43	Booster B E-Stop Pressed (MCC-8A)	DI	1	N/A	N/A	
44	Booster C E-Stop Pressed (MCC-9A)	DI	1	N/A	N/A	
45	Booster Pump Master E-stop No. 1 (PESP1) Pressed (Pump Room)	DI	1	N/A	N/A	
46	Booster Pump Master E-stop No. 2 (PESP2) Pressed (Pump Room)	DI	1	N/A	N/A	
47	Chemical Pump Master E-Stop No. 1 (CESP1) Pressed (Chemical Room)	DI	1	N/A	N/A	
48	Chemical Pump Master E-Stop No. 2 (CESP2) Pressed (Chemical Room)	DI	1	N/A	N/A	
49	Sodium Hypochlorite Pump Running	DI	1	N/A	N/A	
50	High/Low pH	DI	2	N/A	N/A	
51	High/Low Cl2	DI	2	N/A	N/A	
52	UPS alarm	DI	1	N/A	N/A	
53	Tank Mixer Running	DI	1	N/A	N/A	
54	Tank Mixer Fault	DI	1	N/A	N/A	
55	Tank Mixer Start/Stop Control	DI	1	N/A	N/A	
56	Ground Strage Tank High-High Level Float	DI	1	N/A	N/A	
57	Booster Pump Effluent Flow Meter - Minimum Flow Met (Chemical Safety)	DO	1	N/A	N/A	
58	CP-1 Audible Alarm	DO	1	N/A	N/A	
59	Booster A Start/Stop Control	DO	1	N/A	N/A	
60	Booster B Start/Stop Control	DO	1	N/A	N/A	
61	Booster C Start/Stop Control	DO	1	N/A	N/A	
62	Motorized Butterfly Valve MBV-1 Actuator Open Actuator	DO	1	N/A	N/A	
63	Motorized Butterfly Valve MBV-1 Actuator Close Actuator	DO	1	N/A	N/A	
64	Motorized Butterfly Valve MBV-1 Open/Close Status	DO	2	N/A	N/A	
65	Motorized Butterfly Valve MBV-1 Fail (Incomplete Valve Cycle)	DO	1	N/A	N/A	
66	Motorized Butterfly Valve MBV-2 Actuator Open Actuator	DO	1	N/A	N/A	
67	Motorized Butterfly Valve MBV-2 Actuator Close Actuator	DO	1	N/A	N/A	

Specification 265011 - Programmable Logic Controller
Appendix A - PLC Inputs/Outputs
Riverhead Water District
Booster Pumping Station at Plant No. 15

Abbreviations	
DI:	Digital Input
DO:	Digital Output
AI:	Analog Input
AO:	Analog Output
MB:	Modbus
EN:	Ethernet

Well No. 25A Building (CP-1) I/O List

No.	Description	Signal Type	Quantity	Range	Units	Notes
68	Motorized Butterfly Valve MBV-2 Open/Close Status	DO	2	N/A	N/A	
69	Motorized Butterfly Valve MBV-2 Fail (Incomplete Valve Cycle)	DO	1	N/A	N/A	
70	General Alarm	DO	1	N/A	N/A	
71	PLC Run Status	DO	1	N/A	N/A	
72	PLC Fault Status	DO	1	N/A	N/A	
73	Generator "Run" Status	DO	1	N/A	N/A	
74	Generator Trouble Alarm	DO	1	N/A	N/A	
75	ATS in Normal Position	DO	1	N/A	N/A	
76	ATS in Emergency Position	DO	1	N/A	N/A	
77	Normal Power Available	DO	1	N/A	N/A	
78	Emergency Power Available	DO	1	N/A	N/A	
79	High pH Alarm	DO	1	N/A	N/A	
80	Low pH Alarm	DO	1	N/A	N/A	
81	High CL2 Alarm	DO	1	N/A	N/A	
82	Low CL2 Alarm	DO	1	N/A	N/A	
83	Booster A VFD Speed	AI	1	0-60	Hz	
84	Booster B VFD Speed	AI	1	0-60	Hz	
85	Booster C VFD Speed	AI	1	0-60	Hz	
86	Flow Control Valve Position	AI	1	TBD	TBD	
87	Booster Pump Effluent Flow Meter (Chemical Safety)	AI	1	TBD	GPM	
88	System Pressure Transmitter	AI	1	TBD	PSI	
89	Chlorine Residual	AI	1	TBD	TBD	
90	pH Residual	AI	1	TBD	TBD	
91	Ground Storage Tank Level	AI	1	TBD	TBD	
92	Tank Mixer Running Current	AI	1	TBD	TBD	
93	Booster A VFD Speed Command	AO	1	0-60	Hz	
94	Booster B VFD Speed Command	AO	1	0-60	Hz	
95	Booster C VFD Speed Command	AO	1	0-60	Hz	
96	Booster Pump Effluent Flow	AO	1	TBD	GPM	
97	Ground Storage Tank Level	AO	1	TBD	TBD	
98	Flow Control Valve Position	AO	1	TBD	TBD	

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Programmable logic controller (PLC) software development

B. Instrumentation and Control System development

1.02 SUBMITTALS

A. Submit 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. Each line of program shall be annotated with brief description of function.

C. Provide submittal drawings for PLC/Communication panel(s).

PART 2 PRODUCTS

2.01 PLC PROGRAMMING

A. Instrumentation control system shall be integrated and manufactured by WIRE TO WATER, INC., FARMINGDALE, NEW YORK or approved equal. Instrumentation control system shall be provided by a single source supplier which includes manufacturing of the SCADA control panels, PLC programming, complete telemetry system, and all operator interface terminals (OIT).

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 SCADA/PLC experience to substantiate:
   1. That the instrumentation system supplier has been regularly engaged in providing similar SCADA/PLC services and equipment for a minimum of ten (10) years.
   2. That the instrumentation system supplier has provided at least five (5) SCADA/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. Spare parts including PLC’s, power supplies, I/O cards, processors, and OIT’s.
      b. 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.
      c. Office has a minimum of two (2) PLC programmers staffed full time at this location.
      d. Office has a minimum of two (2) electrical engineers staffed full time at this location experienced with SCADA systems, PLC’s and knowledge of water supply system operations.
      e. 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.
6. Provide final annotated program to Owner.

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, and to ensure compatibility across all applicable devices and equipment.

2.02 CONTROL SYSTEM

A. Drawings do not show all required wiring and conduits. Contractor shall refer to specifications Section 265011 for description of I/O for circuits required. Provide shielded twisted pairs for analog I/O and minimum 2c-#14AWG for each digital I/O.

B. Contractor shall provide minimum of two (2) 120 volt, 20 amps circuit from distribution system for all controls, at each location. Provide additional circuits for blow-off valves.

C. Digital I/O and 120 volt power shall be permitted in common conduit.

D. Analog signals shall be in dedicated conduit, no exceptions.-

E. Telephone circuits, Ethernet cables, and fiber optic cables shall be in dedicated conduit. Minimum size shall be 3/4". Bend radius shall meet manufacturer's requirements.

PART 3 EXECUTION

3.01 NORMAL OPERATING PROTOCOL

A. BRIEF PROTOCOL DESCRIPTION

1. Each well pump runs independently to fill the ground storage tank. The booster pumps run in a lead/lag 1/lag 2 prioritization and pump water from the ground storage tank to system.
2. WELL PUMP CONTROL
    a. When the Well H-O-A selector switch is in the “Auto” position, the Well shall start based on ground storage tank level setpoints (via the local OIT and/or SCADA).
    b. When the Well H-O-A selector switch is in the “Off” position, the Well will not start.
    c. The Well pumps shall operate in the same sequence in the “hand” position as in the automatic position, except that “hand” does not need an on signal from the PLC to start the Well.
    d. The flow control valve shall modulate flow into the tank based on tank level to control flow into the tank, while still maintaining an operator selectable pressure within the system.
    e. Contractor shall maintain all other existing control system features associated with control of existing Wells including but not limited to alarms, timers, blow-off, backspin, etc.
3. BOOSTER PUMP CONTROL
    a. Booster Pumps A (50 HP), B (75 HP) and C (75 HP) when in automatic control via the local OIT and/or SCADA shall run based on System Pressure or Ground Storage Tank Level. A selector switch shall be provided in the OIT/SCADA to allow operator selection of Booster Pump control based on System Pressure or Ground Storage Tank Level.
    b. Lead-Lag 1-Lag 2 setting shall be via the local OIT and/or SCADA. The prioritization setpoint screen shall enable the operator to select and configure the Lead booster, Lag 1 booster, and the Lag 2 booster. There shall also be an “Auto-Alternate” setting which shall automatically re-prioritize the pumps based on overall runtime after each use cycle in an effort to maintain equal usage of the pumps over time. This "Auto-Alternate" feature shall only alternate between the two 75 HP pumps (Pump B and Pump C), the 50 HP pump shall always remain in its assigned prioritization until modified manually by an operator via local OIT and/or SCADA.
    c. In the event of a low tank level alarm the PLC shall automatically shut down all booster pumps. The low tank level set point shall be user adjustable via the local OIT and/or SCADA.
    d. The Software Internal to the PLC shall coordinate the booster pumps to allow a lower priority pump to move up the priority string in the event of the next higher pump control faulting or switching to off, in order to maintain operation of the control system.
    e. A PID setpoint level shall be set via the local OIT and/or SCADA. The operator shall be able to input a single set of “start” and “stop” level setpoints. This will be the only setpoints for all pumps.
    f. Once the “start” level setpoint is reached a “start” time delay set via the local OIT and/or SCADA shall begin. After the time delay times out, the Lead pump shall start and run at a selectable speed for a selectable time (via the local OIT and/or SCADA). After this time elapses the lead pump shall follow the PID follower signal. The PID control shall be through the PLC.
    g. If the lead pump has run at 4mA and the “stop” level setpoint is reached for an adjustable time (via the local OIT and/or SCADA), the PLC shall stop the lead pump.
    h. If the Lead pump has run at 20mA and the system pressure remains at or below the “start” level setpoint, the Lag 1 pump shall be called to start and run at a selectable speed for a selectable time (via the local OIT and/or SCADA). After this time elapses the lead pump shall lock in at max speed and the Lag 1 pump shall follow the PID follower signal.
    i. If the Lead and Lag 1 pump have both run at 20mA and the system pressure remains at or below the “start” level setpoint, the Lag 2 pump shall be called to start and run at a selectable speed for a selectable time (via the local OIT and/or SCADA). After this

time elapses the Lead and Lag 1 pump shall lock in at max speed and the Lag 2 pump shall follow the PID follower signal.

j. If more than one pump is running, the lowest priority pump has been running at 4mA, and the “stop” level setpoint is reached for an adjustable time, the PLC shall stop the lowest priority pump and release the next highest priority pump to follow the PID follower signal.

k. The Booster pumps shall have a high-pressure safety circuit. When the enable/disable pressure switch selector is in the enable position, the high-pressure delay, which is set through the OIT and/or SCADA, shall be incorporated in the control sequence. If a high-pressure still exists after a user selectable time elapses, the Booster pumps shall shut down and must be manually reset. In the disable position the pressure switch will have no control over the transfer pumps.

l. The Booster pumps when transferred to hand shall start and be controlled from the speed potentiometer (Manual 4-20 mA input) when transferred to off, stop, ignoring level controls.

m. The Booster pumps shall have a mushroom emergency stop switch that shall be provided on the face of the MCC for each VFD. This switch shall be in series with the motor starter control circuit and when depressed immediately shut the motors off.

n. All timer and time delays for the Booster pumps system operation shall be set via the local OIT and/or SCADA.

o. In the event that a GST High-High Level Alarm is initiated from the GST High-High Level Float, the PLC shall shut down the wells and increase booster pump(s) speed to 100% until High-High Alarm is no longer active.

4. 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 (4-20mA) to regulate the speed of the VFD. At minimum output (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 applicable system pressure to a desired setpoint set through the local OIT and/or SCADA. 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. The PID control shall be through the PLC.

3.02 SECONDARY OPERATING PROTOCOL

A. BRIEF PROTOCOL DESCRIPTION

1. The distribution system will fill the ground storage tank.The flow control valve will open and close based upon the tank level transmitter and system pressure transmitter. The well pumps and booster pumps do not function as part of this protocol and will remain out of operation.

B. FLOW CONTROL VALVE OPERATION

1. When the "Secondary Operating Protocol" is selected in the local OIT/SCADA and the user selectable tank level set point is reached, the flow control valve shall open to allow water to flow from system into the tank.

2. The flow control valve shall modulate flow into the tank based on local system pressure to control flow into the tank from system, while still maintaining an operator selectable pressure within the system.
3. In the event that a GST High-High Level Alarm is initiated from the GST High-High Level Float, the flow control valve shall close completely preventing flow of water from system into the GST.

3.03 TERTIARY OPERATING PROTOCOL

A. BRIEF PROTOCOL DESCRIPTION
1. Each well will run independently to provide water directly to the distribution system, bypassing the ground storage tank. The booster pumps do not function as part of this protocol and will remain out of operation.
2. WELL PUMP CONTROL
   a. When the Well H-O-A selector switch is in the “Auto” position, the Well shall start based on system pressure setpoints (via the local OIT and/or SCADA).
   b. When the Well H-O-A selector switch is in the “Off” position, the Well will not start.
   c. The Well pumps shall operate in the same sequence in the “hand” position as in the automatic position, except that “hand” does not need an on signal from the PLC to start the Well.
   d. Contractor shall maintain all other existing control system features associated with control of existing Wells including but not limited to alarms, timers, blow-off, backspin, etc.

3.04 ALARM MONITORING

A. All alarms shall have independent time delay setpoints set through the local OIT and/or SCADA prior to being posted to the alarm screen summary.

B. The PLC shall provide a General Alarm in SCADA based on any one or more alarm conditions as follows:
1. Booster A, B, and C Failure (All Safety Shutdowns).
2. AC Power Loss.
3. Generator Running

3.05 AC POWER LOSS

A. The PLC shall monitor the input power to the UPS via a power monitor relay. If the relay senses no power the PLC shall sequence the pump to stop and de-energize the start signal contact.

B. Upon power restoration pumps shall restart if the control system as described above is calling for a start.

3.06 DEMONSTRATION

A. Demonstrate operation of control system.

B. Demonstrate procedure for changing set points and timer settings.

3.07 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 two (2) 8-hour days for demonstration of the new control system to the Owner's personnel. The demonstration shall include all the plant's PLC and OIT, and system communication. This service shall proceed once the system is completely debugged and up and running and written acceptance issued.

3.08 CONTROL MODIFICATIONS

A. The Contractor shall provide the services of the control system integrator to provide an additional five (5) - eight (8) hour days of field programming changes as requested by the engineer based on start-up and field testing for the whole new system. Contractor shall make all requested control changes and incorporate into PLC programs and include changes as part of final closeout documentation. Control software changes shall include PLC, OIT or PC (Admin). Change notice will be provided by the engineer for each plant and/or system (PLC/OIT)

B. Per unit prices for 3.8 above shall be as indicated in the proposal items. The District reserves the right to direct the Contractor to make changes at either the Plant No. 15 or the Administration Building and to make changes to enhance the system once the District has had the system on-line and alternative control sequences are desired. The District shall increase the contract amount or decrease the contract amount by the actual number of hours used based upon the per-unit cost per hour as indicated in the proposal items.

END OF SECTION 265012

1. Each well will run independently to provide water directly to the distribution system, bypassing the ground storage tank. The booster pumps do not function as part of this protocol and will remain out of operation.
2. WELL PUMP CONTROL
    a. When the Well H-O-A selector switch is in the “Auto” position, the Well shall start based on system pressure setpoints (via the local OIT and/or SCADA).
    b. When the Well H-O-A selector switch is in the “Off” position, the Well will not start.
    c. The Well pumps shall operate in the same sequence in the “hand” position as in the automatic position, except that “hand” does not need an on signal from the PLC to start the Well.
    d. Contractor shall maintain all other existing control system features associated with control of existing Wells including but not limited to alarms, timers, blow-off, backspin, etc.

3.04 ALARM MONITORING

A. All alarms shall have independent time delay setpoints set through the local OIT and/or SCADA prior to being posted to the alarm screen summary.

B. The PLC shall provide a General Alarm in SCADA based on any one or more alarm conditions as follows:
    1. Booster A, B, and C Failure (All Safety Shutdowns).
    2. AC Power Loss.
    3. Generator Running

3.05 AC POWER LOSS

A. The PLC shall monitor the input power to the UPS via a power monitor relay. If the relay senses no power the PLC shall sequence the pump to stop and de-energize the start signal contact.

B. Upon power restoration pumps shall restart if the control system as described above is calling for a start.

3.06 DEMONSTRATION

A. Demonstrate operation of control system.

B. Demonstrate procedure for changing set points and timer settings.

3.07 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 two (2) 8-hour days for demonstration of the new control system to the Owner’s personnel. The demonstration shall include all the plant’s PLC and OIT, and system communication. This service shall proceed once the system is completely debugged and up and running and written acceptance issued.

3.08 CONTROL MODIFICATIONS

A. The Contractor shall provide the services of the control system integrator to provide an additional five (5) - eight (8) hour days of field programming changes as requested by the engineer based on start-up and field testing for the whole new system. Contractor shall make

all requested control changes and incorporate into PLC programs and include changes as part of final closeout documentation. Control software changes shall include PLC, OIT or PC (Admin). Change notice will be provided by the engineer for each plant and/or system (PLC/OIT)

B. Per unit prices for 3.8 above shall be as indicated in the proposal items. The District reserves the right to direct the Contractor to make changes at either the Plant No. 15 or the Administration Building and to make changes to enhance the system once the District has had the system on-line and alternative control sequences are desired. The District shall increase the contract amount or decrease the contract amount by the actual number of hours used based upon the per-unit cost per hour as indicated in the proposal items.

END OF SECTION 265012

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.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. ALLEN BRADLEY PanelView Plus 7 Performance Graphics Terminal

2.02 OPERATOR INTERFACE TERMINAL (OIT)

A. Operator Terminal shall have the following features:
   1. 15-inch, TFT 1024x768 XGA, 18-bit color graphics.
   2. Full Analog resistive Touch screen. Actuation rating: 1 million presses. Operating force: 100grams.
   3. 512MB of RAM and 512 MB of storage. 80MB, approx nonvolatile storage for applications.
   4. Panel mount design to fit into control panel door.
   5. NEMA 4X enclosure.
   6. Luminance of at least 300cd/m2
   7. Audio visual feedback each time a touch cell is depressed.
   8. Built-in diagnostics, including “PLC communications lost” and “battery test fail”.
   9. Complete FactoryTalk View Studio for Machine Edition, FactoryTalk ViewPoint, version 2.6 or later.
   10. Windows CE Operating System with Extended Features and MS Office Viewers (includes FTP, VNC client server, ActiveX controls, PDF reader, third-party device support).
   11. Provide two (2) copies of Panelview screen development software to district.
   12. Provide cable to allow download/upload of panelview operator terminal to PC computer.
   13. Provide cable to connect the operator terminal to the PLC at each site complete with connectors.
   14. Provide access code security to be assigned to any screen.
   15. Install OIT unit in location as shown on plans.

16. Provide LED type pilot lights with push-to-test capabilities. No incandescent pilot lights shall be permitted.

PART 3 - EXECUTION

3.01 GUI FUNCTION

A. The GUI terminal shall allow operator access to the operating system to view the system overview, view and acknowledge alarms, view and change the variable settings. Access code is required for changing setpoints, alarms acknowledge and resetting. The system shall provide an editing page to assign the password code to the superintendent and its delegates. Every employee shall be assigned his own access code.

B. 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 and automatically included in the system.

C. All setpoints changed will be recorded in the system including the date, time and the authorized person.

END OF SECTION 265013

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Removal and storage of subsoil.

B. Cutting, grading, filling and rough contouring the site prior to placement of topsoil or pavement base for final grading.

1.02 RELATED SECTIONS

A. Section 311000 - Site Clearing

B. Section 312316.13 - Excavation.

C. Section 312317 - Backfill.

1.03 REFERENCES

A. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 kg) Rammer and 18 inch (457 mm) Drop.

1.04 SUBMITTALS

A. Submit under provisions of 013300.

B. Sieve Analysis: Submit a sieve analysis of all types of fill material to be used.

1.05 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of utilities remaining, by horizontal dimensions, elevations or inverts, and slope gradients.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not place wet or frozen material.

B. Do not place material in wet or frozen ground or when precipitation is occurring.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Subsoil: Reused, excavated material, graded, free of lumps, rocks and gravel larger than 3 inches (75 mm) in size, debris, and contaminants.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Vertify site conditions.

B. Verify that survey benchmark and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours and datum.

B. Identify known underground, aboveground and aerial utilities. Stake and flag locations.

C. Coordinate the removal or relocation of utilities with the necessary utility companies.

D. Protect above and below-grade utilities which are to remain.

E. Protect plant life, lawns, rock outcroppings and other features remaining as a portion of final landscaping.

F. Protect benchmarks, existing structures, fences, sidewalks, paving and curbs from excavation equipment and vehicular traffic.

3.03 APPLICATION

A. Excavate subsoil from areas to be further excavated, relandscaped or regraded. Do not excavate wet subsoil.

B. Stockpile in area designated on site. Remove excess subsoil not being reused from site.

C. Stockpile subsoil to a height not exceeding 8 feet (2.4 m). Cover to protect from erosion.

D. When excavation through roots is necessary, perform work by hand and cut roots with sharp axe.

E. Fill areas to contours and elevations with unfrozen subsoil material with allowances made for topsoil, aggregate base course or paving.

F. Place and compact subsoil fill material in continuous layers not exceeding 6 inches (150 mm) compacted depth, compacted to 95 percent maximum dry density in accordance with ANSI/ASTM D1557.

G. Maintain optimum moisture content of fill materials to attain required compaction density.

H. Make grade changes gradual. Blend slope into level areas.

I. Remove surplus fill materials from site.

3.04 TOLERANCES

A. Maximum Variation From Top Surface of Subgrade: 1 inch (25 mm).

3.05 FIELD QUALITY CONTROL

A. Perform field testing under provisions of Section 014500.

B. Perform tests and analysis of fill material in accordance with ANSI/ASTM D1557.

C. Compaction tests are to be performed at a rate of one for every 10 cubic yards (7.6 cu m) of material placed.

END OF SECTION 312213

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Utility connections, conduit and foundation backfilling to subgrade elevations.

B. Site filling and backfilling.

C. Fill under sidewalks, border treatment and paving.

D. Consolidation and compaction.

E. Fill for over-excavation.

1.02 RELATED SECTIONS

A. Section 014500 - Quality Control

B. Section 312413 - Landscape Grading and Topsoil.

C. Section 312316 - Excavation.

D. Section 312318 - Trenching.

E. Section 030000 - Concrete.

1.03 REFERENCES

A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.

C. ANSI/ASTM D1557 - Standard Test Methods for Laboratory Compaction Charac-teristics of Soil Using Modified Effort.

D. ANSI/ASTM D1556 - Standard Test Methods for Density and Unit Weight of Soil in Place by the Sand Cone Method.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

A. Type A - Coarse Stone, Gravel: Angular, washed natural stone; free of shale, clay, friable material, sand, debris; minimum size 2 inches in diameter, maximum size 3 inches in diameter.

B. Type C - Sand: Natural river or bank sand; washed, free of silt, clay, loam, friable or soluble materials, or organic matter; graded in accordance with ANSI/ASTM C136, within the following limits:

Sieve Size	% Passing
No. 4	100
No. 14	10 to 100
No. 50	5 to 90
No. 100	4 to 30

Sieve Size	% Passing
No. 200	0 to 1

C. Subsoil: Reused, graded, free of lumps larger than 6 inches, rocks larger than 3 inches, and debris.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify fill materials to be reused are acceptable.

3.02 PREPARATION

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with Type C fill and compact to density equal to or greater than requirements for subsequent backfill material.

C. Prior to placement of controlled fill at building areas and base course material at paved areas, compact subsoil to 95% of its maximum dry density in accordance with ANSI/ASTM D698.

3.03 BACKFILLING

A. Backfill areas to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not back-fill over porous, wet, frozen or spongy subgrade surfaces.

C. Granular Fill: Place and compact materials in continuous layers not exceeding 6 inches compacted depth.

D. Subsoil Fill: Place and compact material in continuous layers not exceeding 6 inches compacted depth.

E. Controlled Backfill: Place and compact material in continuous layers, not exceeding 6 inches compacted depth. Contractor shall not proceed with subsequent layer of backfill until compacted layer is tested and backfill is found to be compacted to 95% of its maximum dry density in accordance with ANSI/ASTM D698.

F. Employ a placement method that does not disturb or damage foundation water-proofing and protective cover, and utilities in trenches.

G. Maintain optimum moisture content of backfill materials to attain required com-paction density.

H. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.

I. Slope grade away from building minimum 1” inch in 10 feet, unless noted other-wise.

J. Make grade changes gradual. Blend slope into level areas.

K. Remove surplus backfill materials from site.

L. Leave fill material stockpile areas completely free of excess fill materials.

3.04 TOLERANCES

A. Top Surface of Backfilling Under Paved Areas: ± 1 inch from required elevations.

3.05 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 014500.

B. Tests and analysis of fill material will be performed in accordance with ANSI/ASTM D698.

C. Compaction testing will be performed in accordance with ANSI/ASTM D1556 or D1557.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished work from damage due to continuing construction activity.

B. Recompact fills subjected to vehicular traffic.

3.07 SCHEDULE

A. Fill Under Seed/Sod Areas:
   1. Subsoil fill, to 4 inches below finish grade, compacted to 95%.

B. Fill Under Landscaped Areas:
   1. Subsoil fill, to 12 inches below finish grade, compacted to 95%.

C. Fill Under Asphalt and Concrete Paving:
   1. Subsoil fill, to 5-1/2 inches below finish asphalt paving elevation, to 4 inches below concrete sidewalk finish elevation and to 6 inches below concrete drive-way apron finish elevation, as shown on plans, compacted to 95%.

D. Fill to Correct Over-excavation:
   1. Type C fill, to proposed subgrade, compacted to 95%.

END OF SECTION 312317

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Site structure backfilling to sub-grade elevations.

B. Site filling and backfilling.

C. Consolidation and compaction.

D. Fill for over-excavation.

1.02 RELATED SECTIONS

A. Section 014500 - Quality Control

B. Section 312316.12 - Excavation.

C. Section 312316.13 - Trenching.

1.03 REFERENCES

A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.

C. ANSI/ASTM D1557 - Standard Test Methods for Laboratory Compaction Charac-teristics of Soil Using Modified Effort.

D. ANSI/ASTM D1556 - Standard Test Methods for Density and Unit Weight of Soil in Place by the Sand Cone Method.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

A. Type A - Coarse Stone, Gravel: Angular, washed natural stone; free of shale, clay, friable material, sand, debris; minimum size 2 inches in diameter, maximum size 3 inches in diameter.

B. Type C - Sand: Natural river or bank sand; washed, free of silt, clay, loam, friable or soluble materials, or organic matter; graded in accordance with ANSI/ASTM C136, within the following limits:

Sieve Size	% Passing
No. 4	100
No. 14	10 to 100
No. 50	5 to 90
No. 100	4 to 30
No. 200	0 to 1

C. Subsoil: Reused, graded, free of lumps larger than 6 inches, rocks larger than 3 inches, and debris.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions and substrate.

B. Verify fill materials to be reused are acceptable.

C. Verify items to be buried during backfilling process have been inspected prior to backfilling.

3.02 PREPARATION

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with Type C fill and compact to density equal to or greater than requirements for subsequent backfill material.

C. Prior to placement of controlled fill at building areas and base course material at paved areas, compact subsoil to 95% of its maximum dry density in accordance with ANSI/ASTM D698.

3.03 BACKFILLING

A. Backfill areas to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not back-fill over porous, wet, frozen or spongy subgrade surfaces.

C. Granular Fill: Place and compact materials in continuous layers not exceeding 6 inches compacted depth.

D. Subsoil Fill: Place and compact material in continuous layers not exceeding 6 inches compacted depth.

E. Controlled Backfill: Place and compact material in continuous layers, not exceeding 6 inches compacted depth. Contractor shall not proceed with subsequent layer of backfill until compacted layer is tested and backfill is found to be compacted to 95% of its maximum dry density in accordance with ANSI/ASTM D698.

F. Employ a placement method that does not disturb or damage foundation water-proofing and protective cover, and utilities in trenches.

G. Maintain optimum moisture content of backfill materials to attain required com-paction density.

H. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.

I. Slope grade a minimum of 2% positive pitch away from building and site structures, unless noted other-wise.

J. Make grade changes gradual. Blend slope into level areas.

K. Remove surplus backfill materials from site.

L. Leave fill material stockpile areas completely free of excess fill materials.

3.04 TOLERANCES

A. Maximum Variation From Top Surface of Backfilling Under Paved Areas: 1/4 inch.

B. B. Maximum Variation From Top Surface of General Backfilling: 1 inch.

3.05 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 014500.

B. Tests and analysis of fill material will be performed in accordance with ANSI/ASTM D698.

C. Compaction testing will be performed in accordance with ANSI/ASTM D1556 or D1557.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished work from damage due to continuing construction activity.

B. Recompact fills subjected to vehicular traffic.

END OF SECTION 312317

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Excavate trenches for piping and utilities outside building.

B. Compacted bedding and backfill around and over piping and utilities to subgrade elevations.

C. Backfilling and compaction.

1.02 RELATED SECTIONS

A. Section 260533 - Raceways and Boxes for Electrical Systems.

1.03 REFERENCES

A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 kg) Rammer and 18-inch (457 mm) Drop.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Test Reports: Submit a sieve analysis for bedding to be used.

1.05 QUALITY ASSURANCE

A. Do not excavate wet or frozen materials without written approval from the Engineer.

B. Do not backfill over or with wet or frozen materials.

C. Provide safety barricades around open excavations.

1.06 FIELD MEASUREMENTS

A. Verify that survey benchmark and intended elevations for the work are as shown on plans.

1.07 COORDINATION

A. Coordinate trenching with installation of pipe or conduit.

B. Coordinate trenching with installation and removal of sheeting.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Bedding: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, or organic matter; graded in accordance with ANSI/ASTM C136; within the following limits:

Sieve Size	Percent Passing
No. 4 (4.75 mm)	100
No. 16 (1.18 mm)	10 - 100

Sieve Size	Percent Passing
No. 50 (0.30 mm)	5 - 90
No. 100 (0.15 mm)	4 - 30
No. 200 (0.075 mm)	0 - 1

B. Subsoil: Reused, excavated material, free of lumps, rocks larger than 3 inches (75 mm) in size, debris and contaminants.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify fill materials to be reused are acceptable.

B. Verify items to be buried during backfilling process have been inspected prior to backfilling.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Maintain and protect existing utilities remaining which pass through work area.

C. Protect plant life, lawns, rock outcropping and other features remaining as a portion of final landscaping.

D. Protect bench marks, existing structures, fences, sidewalks, paving and curbs from excavation equipment and vehicular traffic. Any item damaged by the contractor shall be promptly repaired at the contractor's expense.

E. Protect above and below-grade utilities which are to remain.

F. Cut out soft areas of subgrade not capable of insitu compaction. Backfill with subsoil fill and compact to density equal to or greater than requirements for subsequent backfill material.

3.03 EXCAVATION

A. Excavate subsoil required for piping.

B. Cut trenches to the dimensions shown on the plans.

C. Excavation shall not interfere with normal 45 degree bearing splay of foundations.

D. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

E. Remove lumped subsoil, boulders, and rock.

F. For trenches made in solid rock, excavate to a depth of 1 foot (300 mm) below the proposed pipe invert.

G. Correct unauthorized excavation at no cost to Owner in accordance with Section 312317.

H. Stockpile excavated material in area designated on site and remove excess material not being used from site. Remove excavated material from site.

I. All trenches deeper than 5 ft (1.5 m) shall require sheeting.

3.04 INSTALLATION - BEDDING

A. Support pipe and conduit during placement and compaction of bedding fill.

B. For trenches made in solid rock, place an additional 1 foot (300 mm) of bedding under pipe or conduit.

C. Place bedding to the dimensions and limits as shown on the plans.

D. Place bedding material against and to 1 foot (300 mm) over the top of the pipe or conduit in 6 inch (150 mm) compacted layers.

E. All bedding material shall be compacted to 95 percent maximum dry density in accordance with ANSI/ASTM D1557. Maintain optimum moisture content to attain required density.

F. Place bedding simultaneously on both sides of the pipe or conduit.

3.05 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen materials.

B. Backfill to the dimensions and limits shown on the plans with reused subsoil.

C. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

D. Place and compact material in continuous layers not exceeding 6 inches (150 mm) compacted depth.

E. Employ a placement method that does not disturb or damage conduit or pipe.

F. All backfilled materials shall be compacted to 95 percent of maximum dry density in accordance with ANSI/ASTM D1557. Maintain optimum moisture content to attain required density.

G. Remove temporary sheeting as backfilling progresses.

3.06 TOLERANCES

A. Maximum Variation From Top Surface of Backfilling Under Paved Areas: 1/4 inch (13 mm).

B. Maximum Variation From Top Surface of General Backfilling: 1 inch (25 mm).

3.07 FIELD QUALITY CONTROL

A. Field testing is to be performed under provisions of Section 014500.

B. Tests and analysis of fill material are to be performed in accordance with ANSI/ASTM D1557.

C. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

D. Unless additional testing is required by the Engineer, compaction tests shall be taken every 100 feet (30 m), at the springline of the pipe and every 2 vertical feet (610 mm) of backfill.

3.08 CLEANING

A. Remove surplus backfill materials from site.

B. Leave fill material stockpile areas completely free of excess fill materials.

3.09 PROTECTION

A. Recompact fills subjected to vehicular traffic.

END OF SECTION 312318

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Recycled concrete aggregate base course.

1.02 RELATED SECTIONS

A. Section 312213 - Rough Grading: Preparation of site for base course.

B. Section 312323.13 - Backfilling.

C. Section 312333 - Trenching.

1.03 REFERENCES

A. ANSI/ASTM C88 - Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

B. ANSI/ASTM C136 - Sieve Analysis of Fine and Coarse Aggregates.

C. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and 18-inch Drop.

D. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Test Reports: Submit a sieve analysis for the aggregate base course used.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle products to the site under provisions of Section 016500.

B. Do not handle aggregate in any manner which will cause segregation of large or fine particles.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aggregate Base Course: At least 95% by weight, of angular, crushed, recycled concrete; free of organic matter and deleterious material; graded in accordance with ANSI/ASTM C136 within the following limits:

	Sieve Size	Percent Passing
1.	2 inches	90-100
2.	1/4 inch	30-65
3.	No. 40	5-40
4.	No. 200	0-10

B. The material may contain up to 5% by weight of asphalt and/or brick.

C. Material retained on the 1/2 inch sieve is coarse aggregate.

D. Coarse aggregate shall not have more than 10 percent by weight of flat or elongated pieces. A flat or elongated piece is defined as being three times greater in the largest dimension as compared to its least dimension.

E. The portion of the aggregate base course which passes the No. 40 screen shall have a plasticity index of one as tested in accordance with ASTM D4318.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions and substrate.

B. Verify elevations of subgrade are as indicated on the plans.

C. Verify that subgrade is properly compacted and ready to receive work of this section.

D. Beginning work of this section means acceptance of existing conditions.

3.02 PREPARATION

A. Fine grade and compact subgrade to 95 percent maximum dry density in accordance with ANSI/ASTM D1557.

3.03 AGGREGATE PLACEMENT

A. Spread course aggregate over prepared subgrade to a total compacted thickness as indicated on the plans.

B. Place aggregate in 3 inch layers and compact by roller.

C. Level and contour surfaces to elevations and gradients indicated.

D. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

E. Compact placed aggregate materials to achieve 95% maximum dry density in accordance with ANSI/ASTM D1557. Maintain optimum moisture content to attain required density.

F. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

G. Use mechanical vibrating tamping in areas inaccessible to compaction equipment.

H. New pavement must be placed on the properly compacted aggregate base course within 24 hours of final compaction. If aggregate base course is left open for more than 24 hours, re-compact and retest in accordance with ANSI/ASTM D1557.

3.04 TOLERANCES

A. Maximum Variation From Flatness: 1/4 inch measured with 10 foot straight edge.

B. Maximum Variation From Scheduled Compacted Thickness: 1/4 inch.

C. Maximum Variation from True Elevation: 1/4 inch.

3.05 FIELD QUALITY CONTROL

A. Perform field inspection and testing under provisions of Section 014500.

B. Perform compaction testing in accordance with ANSI/ASTM D1557.

C. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

D. Frequency of Tests: One test per 500 sq ft. immediately prior to paving.

END OF SECTION 321123

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Asphaltic concrete paving; wearing, binder or base course.

1.02 RELATED SECTIONS

A. Section 321123 - Recycled Concrete Aggregate Base Course.

1.03 REFERENCES

A. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot Mix Types.

B. AI MS-8 - Asphalt Paving Manual.

C. ASTM D242 - Mineral Filler for Bituminous Paving Mixtures.

D. ASTM D546 - Test Method for Sieve Analysis of Mineral Filler for Road and Paving Materials.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Supplier: Submit name of asphalt supplier to be used on the project prior to placement of any asphalt on the project.

C. Design Data: Submit asphalt mix design for each asphalt type to be used.

D. Testing Firm: Submit name of testing firm to be performing tests on asphalt pavement.

1.05 QUALITY ASSURANCE

A. Obtain materials from the same supplier throughout the duration of the project.

B. Do not alter from mix design requirements.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle products to the site under provisions of Section 016500.

B. Deliver asphalt in sealed, metal containers covered with suitable material to protect the asphalt from the elements.

C. Lightly lubricate the inside surface of the container with a thin oil or soap solution before loading asphalt.

D. All containers must be cleaned of all foreign materials prior to loading.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt when base surface temperature is less than 40 degrees F, or if surface is wet or frozen.

B. Do not place asphalt when precipitation is occurring.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asphalt Cement: AC-20; homogeneous, and shall not foam when heated to 347 degrees F.

B. Fine Aggregate: Material passing the 1/8 inch sieve; natural sand of hard, strong, durable particles which are free from coatings or injurious amounts of clay, loam or other deleterious substances.

C. Coarse Aggregate: Material retained on the 1/8 inch sieve; crushed stone or gravel; clean, durable, sharp angled fragments of rock of uniform quality.

D. Mineral Filler: ASTM D242, finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter; 100 percent shall pass the No. 30 sieve; a minimum of 85 percent shall pass the No. 80 sieve; and a minimum of 65 percent shall pass the No. 200 sieve as measured in accordance with ASTM D546.

2.02 EQUIPMENT

A. Rollers: Minimum weight of 10 tons; equipped with lubricating devices for the roller wheels.

B. Pavers: Equipped with a vibratory device.

2.03 ACCESSORIES

A. Tack Coat: Homogeneous, medium curing, liquid asphalt.

B. Wheel Lubricant: Oil-water mixture containing maximum 10 percent lubricating oil.

2.04 MIXES

A. Use dry material to avoid foaming. Mix uniformly.

B. Base Course: NYSDOT Type 1; 4.0 to 6.0 percent of asphalt cement by weight in mixture in accordance with the following gradation:

SIEVE SIZE	PERCENT PASSING
2 INCHES	100
1 ½ INCHES	90-100
1 INCH	78-95
½ INCH	57-84
¼ INCH	40-72
1/8 INCH	26-57
NO. 20	12-36
NO. 40	8-25
NO. 80	4-16
NO. 200	2-8

A. Binder Course: NYSDOT Type 3; 4.5 to 6.5 percent of asphalt cement by weight in mixture in accordance with the following gradation:

Sieve Size	Percent Passing
1-1/2 inches	100
1 inch	95-100
1/2 inch	70-90
1/4 inch	48-74
1/8 inch	32-62
No. 20	15-39
No. 40	8-27
No. 80	4-16
No. 200	2-8

B. Wearing Course: NYSDOT Type 6; 5.8 to 7.0 percent of asphalt cement by weight in mixture in accordance with the following gradation:

Sieve Size	Percent Passing
1 inch	100
1/2 inch	95-100
1/4 inch	65-85
1/8 inch	36-65
No. 20	15-39
No. 40	8-27
No. 80	4-16
No. 200	3-6

2.05 SOURCE QUALITY CONTROL

A. Obtain asphalt materials from same source throughout the project.

B. Provide asphalt in accordance with the approved mix design for each type of asphalt.

C. Test samples in accordance with AI MS-2.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions and substrate.

B. Verify that compacted subbase is dry and ready to receive work of this section.

C. Verify gradients and elevations of base are correct.

D. Verify that all castings are properly installed and are at the correct elevations.

E. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

A. Apply tack coat at uniform rate of 0.03 to 0.07 gal/sq. yd. to contact surfaces of castings, curbs, gutters and any asphalt or concrete material.

B. Do not apply tack coat to wet or frozen surfaces.

C. Coat top surfaces of castings with oil to prevent bond with asphalt pavement.

3.03 INSTALLATION

A. Install work in accordance with AI MS-8.

B. Maintain asphalt temperature between 250 and 325 degrees F during placement.

C. Place asphalt within 24 hours of applying tack coat.

D. Place asphalt to compacted thicknesses as identified on plans. If a multiple course pavement is to be used, place top course within 24 hours of placing bottom course. If more than 24 hours elapse, a tack coat will be required to be placed over the entire surface of the bottom course prior to any additional paving.

E. Utilize the vibratory device on the paver at all times.

F. Compact pavement by rolling. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

G. Compact pavement to a minimum of 94% maximum density.

H. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.

I. Seal all joints between new pavement and existing pavement with asphalt cement.

3.04 TOLERANCES

A. Maximum Variation From Flatness: 1/8 inch measured with 10 foot straight edge.

B. Maximum Variation From Scheduled Compacted Thickness: 1/8 inch.

C. Maximum Variation from True Elevation: 1/4 inch.

3.05 FIELD QUALITY CONTROL

A. Perform field inspection and testing under provisions of Section 014500.

B. Take samples and perform tests in accordance with AI MS-2.

C. Test are to include percent compaction, gradation and asphalt content.

D. Provide an asphalt thermometer for determining the asphalt temperature during paving operations.

E. Frequency of Tests: One test for every 1,000 square feet of each pavement course.

3.06 PROTECTION

A. Protect finished work under provisions of Section 015000.

B. Immediately after placement, protect pavement from mechanical injury until project is accepted by the Owner.

END OF SECTION 321216

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Concrete parking areas and roads.

B. Formwork.

1.02 RELATED SECTIONS

A. Section 312213 - Rough Grading: Preparation of subgrade for paving and subbase.

B. Section 321123 - Recycled Concrete Aggregate Base Course.

1.03 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

C. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.

D. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.

E. ASTM C33 - Concrete Aggregates.

F. ASTM C94 - Ready Mix Concrete.

G. ASTM C150 - Portland Cement

H. ASTM C260 - Air-Entraining Admixtures for Concrete.

I. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

J. ASTM C494 - Chemical Admixtures for Concrete.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide data on joint filler, admixtures and curing compounds.

C. Supplier: Submit name of concrete supplier prior to the placement of any concrete on the project.

D. Design Data: Provide a design mix for each type of concrete used on the project.

E. Certificates: Submit receipts of all concrete deliveries indicating source, date, contractor, amount of concrete, concrete strength, truck number and time load was batched.

1.05 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 017839.

B. Accurately record locations of each day's concrete pour.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

B. Obtain concrete only from approved suppliers and maintain same source throughout duration of the project.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle products to the site under provisions of Section 016500.

B. Deliver concrete in accordance with ASTM C94, Alternative No. 2.

C. Place all concrete within 90 minutes of time load was batched.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not place concrete when base surface temperature is less than 40 degrees F, or if surface is wet or frozen.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement: ASTM C150 Air Entraining - Type IA Portland type, gray color.

B. Aggregates: ASTM C33.

C. Water: Potable, not detrimental to concrete.

D. Reinforcing Bars: ASTM A615; 60 ksi yield grade; deformed billet steel bars; uncoated finish.

E. Dowels: ASTM A615; 60 ksi yield grade, plain steel, uncoated finish.

F. Welded Steel Wire Fabric: Plain type, ANSI/ASTM A185; in flat sheets; uncoated finish.

2.02 ACCESSORIES

A. Steel Forms: Minimum 16 gauge thick, stiffened to support weight of concrete with a minimum deflection.

B. Plywood Forms: Douglas Fir species; solid one side grade; sound, undamaged sheets.

C. Joint Filler: ANSI/ASTM D1751; 1/2 inch thick.

D. Air Entrainment Admixture: ASTM C260.

E. Chemical Admixture: ASTM C494, type as required.

F. Curing Compound: ASTM C309, Type 2, Class A.

G. Form Release Agent: Colorless material which will not stain concrete or absorb moisture.

H. Joint Sealant: ASTM C920, Type M, Grade P; SL-2 by Sonneborn or equal.

2.03 MIXES

A. Concrete shall be mixed and prepared in accordance with the approved mix design and ASTM C94, Alternative No. 2.

B. The mix design shall be such that the concrete shall attain the following characteristics:
   1. Compressive Strength (28 days): 4,000 psi.
   2. Slump: 2-1/2 to 3-1/2 inches.
   3. Air Entrainment: 6%±1%.

C. Use chemical admixtures only when approved by Engineer. Use of admixtures will not relax placement requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions and substrate.

B. Verify compacted granular subbase has been properly placed and is ready to receive work of this section.

C. Verify gradients and elevations of base are correct.

D. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

A. Moisten base to a minimum depth of 1/2 inch to minimize absorption of water from fresh concrete.

B. Coat surfaces of manhole and catch basin frames with oil to prevent bond with concrete pavement.

C. Notify Engineer minimum 24 hours prior to commencement of concreting operations.

D. Place and secure forms to correct location, dimension, and profile.

E. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

3.03 INSTALLATION

A. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

B. Place dowels to achieve pavement and curb alignment as detailed on the plans.

C. Place reinforcement as indicated on the plans. Interrupt reinforcement at expansion joints.

D. Provide doweled joints with one end of dowel greased or set in capped sleeve to allow longitudinal movement.

E. Place concrete in accordance with ACI 301.

F. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.

G. Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

H. Vibrate concrete adjacent to forms.

I. Place concrete to pattern indicated on the plans.

J. Place expansion and contraction joints as indicated on the plans.

K. Place joint filler between paving components and building or other appurtenances.

L. Provide keyed joints as indicated.

M. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing at the locations shown on the plans. Cut 1/3 into depth of slab.

N. Apply a light broom finish perpendicular to vehicular traffic.

O. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing under provisions of Section 014500.

B. Take six concrete test cylinders for every 50 cu. yds. or fraction thereof of each class of concrete placed each day.

C. Cure test cylinders on site under same conditions as concrete they represent.

D. Take one slump test for each set of test cylinders taken. Concrete not meeting slump requirements will be rejected.

E. Concrete represented by cylinders that do not meet required strength will be removed and replaced at no additional cost to the Owner.

3.05 PROTECTION

A. Protect finished work under provisions of Section 015000.

B. Immediately after placement, protect pavement from premature drying, excessive temperatures and mechanical injury.

C. Protect pavement from damage until project is accepted by the Owner.

END OF SECTION 321313

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Galvanized fence framework, fabric and accessories.

B. Excavation for post bases; concrete foundation for posts and center drop for gates.

1.02 RELATED SECTIONS

A. Section 312316 - Excavation: Excavation for fence posts.

1.03 REFERENCES

A. ANSI/ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

B. ANSI/ASTM F567 - Installation of Chain Link Fence.

C. ASTM A121 - Zinc-Coated (Galvanized) Steel Barbed Wire.

D. ASTM A392 - Zinc-Coated Steel Chain Link Fence Fabric.

E. ASTM C150 - Portland Cement.

F. ASTM F1043 - Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.

1.04 SYSTEM DESCRIPTION

A. Fence Height: As indicated on plans.

B. Line Post Spacing: As indicated on plans. If not indicated, intervals shall not exceed 10 feet.

1.05 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

C. Manufacturer's Installation Instructions: Indicate installation requirements and post foundation anchor bolt templates.

1.06 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 017839.

B. Accurately record actual locations of property perimeter posts relative to property lines and easements.

1.07 QUALITY ASSURANCE

A. Perform work in accordance with ANSI/ASTM F567.

B. Maintain one copy of document on site.

1.08 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum 3 years documented experience.

1.09 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on the plans.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. ANCHOR FENCE, INC.

B. AMERICAN FENCE CORPORATION.

C. Substitutions shall be permitted only after receiving written approval from the Engineer.

2.02 MATERIALS

A. Fence Framing: ASTM A1043; SS40 steel pipe, standard weight, one piece without joints.

B. Fabric Wire: ASTM A392; Zinc-coated No. 6 steel wire fabric with 2 inch squares, top and bottom selvage knuckle end closed.

C. Barbed Wire: ASTM A121; Galvanized steel, 12 gage thick wire, 3 strands, 4 points at 5 inches on center.

D. Concrete: ASTM C150, Type 1; minimum 4,000 psi strength at 28 days; 3 inch slump; 5 to 7 percent air entrainment.

E. Tension Wire: 7 gauge thick steel, single strand.

F. Tie Wire: Aluminum alloy steel wire.

2.03 ACCESSORIES

A. Caps: Cast steel galvanized or malleable iron galvanized; sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; galvanized steel.

C. Extension Arms: Cast steel galvanized to accommodate 3 strands of barbed wire, single arm, sloped to 45 degrees.

D. Diagonal Truss Rod with Turnbuckle: ASTM A153 galvanized steel.

E. Grounding Rod: ANSI/ASTM A123 steel rod.

2.04 FINISHES

A. Components and Fabric: Galvanized to ANSI/ASTM A123; 1.8 oz/sq ft coating.

B. Fabric: Galvanized to ANSI/ASTM A123; 0.3 oz/sq ft coating.

C. Fitting and Accessories: Galvanized to 1.2 oz/sq ft coating.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ANSI/ASTM F567 and manufacturer's instructions.

B. Set all posts plumb in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.

C. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail, one bay from end and gate posts.

D. Install diagonal truss rod from the center of the gate or corner post to the bottom of the adjacent line post.

E. Provide top rail through line post tops and splice with 6 inch long rail sleeves.

F. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.

G. Position bottom of fabric 2 inches above finished grade.

H. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

I. Attach fabric to end, corner and gate posts with tension bars and tension bar clips.

J. Install bottom tension wire stretched taut between terminal posts.

K. Install concrete center drop to footing depth and drop rod retainers at center of double gate openings.

L. Install 8 foot grounding rod to fence post.

3.02 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Position: 1 inch.

C. Components shall not infringe adjacent property lines.

END OF SECTION 323113

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Disinfection of potable water piping, valves, pumping and treatment units.

1.02 REFERENCES

A. ANSI/AWWA B300 - Standard for Hypochlorites

B. ANSI/AWWA B301 - Standard for Liquid Chlorine

C. ANSI/AWWA C651 - Standard for Disinfection of Water Mains

D. ANSI/AWWA C652 - Standard for Disinfection of Water Storage Facilities

E. ANSI/AWWA C653 - Standard for Disinfection of Water Treatment Plants

1.03 SUBMITTALS

A. Submit proposed method for introducing disinfectant into the treatment unit. If media must be disinfected, obtain method for disinfecting from supplier.

B. Test Reports: Indicate results comparative to specified requirements.

C. Certificate: Certify that cleanliness of filter tanks, towers and clearwell meets or exceeds specified requirements.

1.04 PROJECT RECORD DOCUMENTS

A. Prepare and submit a disinfection report containing the following:
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant injection start and time of completion.
   3. Test and injection locations.
   4. Initial and 24-hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfectant residual after flushing in ppm for each outlet tested.

B. Prepare and submit complete water analysis results with the following information:
   1. Date issued, project name and testing laboratory name, address and telephone number.
   2. Time and date of water sample collection.
   3. Name of person collecting samples.
   4. Test locations.
   5. Initial and 24-hour disinfectant residuals in ppm.
   6. Coliform bacteria and chemical test results.
   7. Certification that water conforms or fails to conform to New York State Drinking Water Standards.
   8. Laboratory Director's signature and authority.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with ANSI/AWWA C651, ANSI/AWWA C652 and ANSI/AWWA C653.

1.06 QUALIFICATIONS

A. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum three (3) years experience.

B. Testing Firm: Laboratory specializing in testing potable water systems, approved by the New York State Department of Health.

1.07 REGULATORY REQUIREMENTS

A. Conform to Recommended Standards for Water Works and applicable codes or regulations for performing the work of this Section.

B. Water quality to conform to New York State Drinking Water Standards after completion of disinfection.

C. The Suffolk County Department of Health Services will be notified of the date of water quality testing to allow sampling by the Health Department. Provide Engineer three (3) days advanced notification of proposed sampling date.

PART 2 - MATERIALS

2.01 DISINFECTION CHEMICALS

A. ANSI/AWWA B300, Hypochlorite

B. ANSI/AWWA B301, Liquid Chlorine

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that all piping systems and treatment units have been cleaned, inspected and pressure tested.

3.02 EXECUTION

A. Provide required equipment to perform the work of this Section. The Owner will provide the water required for the initial disinfection and filling of the piping, and valves, etc. The Contractor shall pay for the water required for any subsequent filling of these systems based on the Owner's retail water rate.

B. Disinfect system in accordance with Section 4.1 or Section 4.3 of AWWA C651.

C. Collect samples from sampling point 48 hours after flushing disinfectant and refilling with potable water. Samples shall not be collected if chlorine residual is greater than 0.1 mg/L, or greater than distribution system residual, if chlorinated system water is used for testing.
   1. Collect samples from booster sample taps and plant discharge sample tap at 0, 2, 5, 10, and 30 minutes and analyze for microbiological content (MIC).

D. Collect sample from booster sample taps and plant discharge sample tap at 30 minutes and have analyzed for Inorganic Chemicals (IOCs), physical characteristics, and Principal Organic Contaminants (POCs) as listed in Tables 9A and 9D of Part 5, Subpart 5-1 Public Water Systems of the New York State Department of Health Water Quality Monitoring

E. Chemical tests shall include bacteriological, inorganic chemicals, volatile halogenated organics, non-volatile organics, heavy metals and any other tests required by the Suffolk County Department of Health Services.

F. If water quality in system does not meet the bacteriological requirements of the Suffolk County Department of Health Services for potable water, the Contractor, at no additional cost to the owner, shall re-chlorinate or take other steps necessary to provide acceptable water quality. Samples shall be collected and analyzed after each attempt. All costs associated with subsequent sampling shall be borne directly by the Contractor.

G. Neutralize residual chlorine to less than 1 mg/l with a suitable quantity of sodium bisulfite, sodium sulfide or sodium thiosulfate prior to disposal.

H. For this project, a minimum of two (2) sets of bacteriological samples for plant/site distribution water main will be required. Take samples at the appropriate time intervals as required by the Suffolk County Department of Health Services. Verify sampling location with the Engineer.

3.03 QUALITY CONTROL

A. Provide analysis and testing of treated water in towers and clearwell.

B. Test samples in accordance with ANSI/AWWA C652 and C653 and Suffolk County Department of Helath Services.

END OF SECTION 331140

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Disinfection of water piping

1.02 REFERENCES

A. ANSI/AWWA B300 - Standard for Hypochlorites.

B. ANSI/AWWA B301 - Standard for Liquid Chlorine.

C. ANSI/AWWA C651 - Disinfecting Water Mains.

1.03 SUBMITTALS

A. Submit proposed method for introducing disinfectant into water piping.

B. Test Reports: Indicate results comparative to specified requirements.

1.04 PROJECT RECORD DOCUMENTS

A. Disinfection Report: Record:
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant injection start and time of completion.
   3. Test and injection locations.
   4. Initial and 24-hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfectant residual after flushing in ppm for each outlet tested.

B. Bacteriological, Chemical and Organic Chemical Report: Record:
   1. Date issued, project name and testing laboratory name, address and telephone number.
   2. Time and date of water sample collection.
   3. Name of person collecting samples.
   4. Test locations.
   5. 24-hour and 48-hour disinfectant residuals in ppm.
   6. Coliform bacteria and chemical test results.
   7. Certification that water conforms or fails to conform to New York State drinking water standards.
   8. Laboratory Director's signature and authority.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with ANSI/AWWA C651.

1.06 QUALIFICATIONS

A. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum three (3) years experience.

B. Testing Firm: Laboratory specializing in testing potable water systems, approved by the New York State Department of Health.

1.07 REGULATORY REQUIREMENTS

A. Conform to Recommended Standards for Water Works and applicable codes or regulations for performing the work of this Section.

B. Water quality to conform to New York State drinking water standards after completion of disinfection.

PART 2 - MATERIALS

2.01 DISINFECTION CHEMICALS

A. ANSI/AWWA B300, Hypochlorite.

B. ANSI/AWWA B301, Liquid Chlorine.

PART 3 - DISINFECTION & TESTING

3.01 EXAMINATION

A. Verify that all piping systems have been cleaned, inspected and pressure tested.

3.02 EXECUTION

A. Provide required equipment to perform the work of this Section. The Owner will provide the water required for the initial disinfection and filling of the piping, and valves, etc.

B. The preferred method of chlorinating is the continuous feed method using calcium hypochlorite granules in accordance with Section 4.4.3 of AWWA C651-05. Granules shall be placed at a minimum in accordance with Table 1 of the applicable Section. The slug method of chlorination is also acceptable and shall be performed in accordance with Section 4.4.4 of AWWA C651-05. The use of tablets for disinfection is prohibited.

C. The use of calcium hypochlorite granules specifically intended for swimming pool use is prohibited. The contractor shall utilize only those chemicals which are NSF 60/AWWA approved for disinfection.

D. The newly installed pipe shall be properly chlorinated to at least 200 ppm (mg/l) for a minimum of 24 hours, to ensure the chlorine residual at the pipe extremities and at other representative points after the retention period, is at least 200 ppm (mg/l). Treated water shall be retained in the pipe long enough to destroy all non-spore-forming bacteria.

E. After completion of retention period, new mains shall be flushed in order to eliminate residual chlorine with a suitable quantity of sodium bisulfite, sodium sulfide or sodium thiosulfate prior to disposal. Bacteria samples may not be collected until a chlorine residual representative of the existing distribution system is achieved. New mains shall be flushed at a velocity of no less than 2.5 ft/sec.

F. Collect samples 24 & 48-hours after flushing disinfectant and refilling with potable water. Samples shall not be collected if a chlorine residual inconsistent with that of the existing distribution system is present. Any portion of the sample set which tests positive for total coliform and/or e-coli bacteria constitutes failure of the entire set with no exceptions.

G. Field chlorine residual checks shall be performed for each sample and shall be recorded on the laboratory sampling form for inclusion in the sampling results report.

H. Two (2) consecutive sets of bacteriological samples, taken 24 hours apart, must be collected from every 1,000 ft of new main, the end of the line and from each branch. Samples should be collected after final flushing and when the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the distribution system (ANSI/AWWA C651 Standard).

I. Sample tap locations shall be as directed by the Engineer. Taps shall be installed to sample at a frequency as described above.

J. If water quality in system does not meet the requirements of the Department of Health for potable water, the Contractor shall re-chlorinate or take other steps necessary to provide acceptable water quality. Samples shall be collected and analyzed after each attempt.

3.03 QUALITY CONTROL

A. Test samples in accordance with ANSI/AWWA C651 and Department of Health requirements.

END OF SECTION 331300

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Water Utility Pipe

B. Special Castings; Mechanical Joint Fittings

C. Buried Valves & Valve Boxes

1.02 RELATED SECTIONS

A. Section 312316.13 - Trenching

B. Section 312317 - Backfilling

C. Section 331300 - Disinfection of Water Utility Distribution

1.03 REFERENCES

A. ANSI/AWWA C104 - Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water.

B. ANSI/AWWA C110 - Ductile Iron and Grey Iron Fittings.

C. ANSI/AWWA C111- Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.

D. ANSI/AWWA C150 - Thickness Design of Ductile Iron Pipes

E. ANSI/AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast for Water Service.

F. ANSI/AWWA C153 - Ductile-Iron Compact Fittings for Water Service.

G. ANSI/AWWA C600 - Installation of Ductile Iron Water Mains and Their Appurtenances.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide data on pipe materials and accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of water mains, connections, and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 QUALITY ASSURANCE

A. The tone-out, mark-out, locating and verification of existing utilities on private property are the responsibility of the contractor. All known utilities and facilities shall be verified by test holes or other means prior to commencing water main installation. No compensation will be paid to the contractor for lost time due to improper or inadequate utility investigation.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to ensure they are kept free from damage.

B. Store piping to ensure that their interiors are kept free of debris, organics or animals.

PART 2 - PRODUCTS

2.01 WATER UTILITY PIPING

A. Cement-Lined Ductile Iron Pipe
   1. Approved Manufacturers:
      a. US PIPE
      b. McWANE DUCTILE
      c. American Pipe
   2. Cement-Lined Ductile Iron Pipe meeting AWWA C150/C151 :
      a. Special Class 52 for all pipe 14 inches and smaller.
      b. Special Class 51 for all pipe 16 inches and larger.
   3. Interior lining shall be double-thick cement with a minimum thickness of 1/8" (125 mils) in accordance with AWWA C104.
   4. Exterior of pipe shall have an exterior bituminous coating measuring 1 mil in thickness and be marked with the manufacturer name, date of casting and pressure class.

B. Pipe Accessories:
   1. Joints: ANSI/AWWA C111, vulcanized rubber gaskets for push-on pipe; mechanical joint with rods and retainer glands for fittings.
   2. Field lock gaskets by US Pipe Model 350 or equal shall be utilized on the last push-on joint of all dead-end mains, where a bell falls within 10 feet of a mechanical joint connection or as indicated on the plans or as directed by the Engineer.
   3. Gaskets shall be free from porous areas, foreign materials and visible defects. No reclaimed rubber shall be used
   4. Lubricant for Joints: Nontoxic, NSF-61 certified, shall not support the growth of bacteria, and shall have no deteriorating effects on the gasket or pipe material.
   5. Wedges: Bronze, installed at each push-on joint. (CLDIP only)

2.02 SPECIAL CASTINGS

A. Manufacturers:
   1. US PIPE
   2. SIGMA CORP.
   3. TYLER UNION
   4. APPROVED EQUAL

B. Material:
   1. Fittings shall be in accordance with ANSI/AWWA C153 (compact).
   2. Fittings shall be ductile iron.
   3. Ductile iron fittings shall have a pressure rating of 350 psi.
   4. Fittings shall be cement lined.

C. All fittings shall be manufactured domestically with the United States.

D. Mechanical Joint fittings shall be used with "push-on" joint pipe with the joint conforming to AWWA Specifications.

E. Rubber gaskets shall be used at each pipe connection. Rubber gaskets shall be vulcanized rubber that is free of porous areas, foreign materials and visible defects. No reclaimed rubber shall be used. The size, mold number, gasket manufacturer's mark, the letters "MJ" and the year of manufacture shall be molded in the rubber.

F. Wedge type restraining glands shall be required at all mechanical joints.
   1. Manufacturer:
      a. EBAA IRON WORKS
      b. FORD METER BOX CO.
      c. SIGMA CORPORATION
      d. TYLER UNION
      e. US PIPE
      f. Approved equal
   2. Wedge type restraining glands shall be secured to fittings using alloy steel T-head bolts and hex-head nuts.

2.03 BURIED VALVES

A. Resilient Wedge Gate Valves (up to 12”)
   1. Acceptable Manufacturers:
      a. MUELLER COMPANY; A-2380-21
      b. CLOW VALVE COMPANY
      c. KENNEDY VALVE CO.
   2. All vertical gate valves up to and including 12-inch diameter shall conform to AWWA Specification C509 or latest revision, and shall be specified as follows:
      a. Material: Iron body, bronze mounted.
      b. Pressure: 250 psi minimum working pressure.
      c. Wedge: Cast iron wedge with urethane rubber coating (encapsulated). The rubber/metal bond shall be tested to meet ASTM D429.
      d. Stem: Forged bronze, non-rising stem with two "O" ring seals.
      e. Wrench Nut: Two-inch square (at base) wrench nut opening to the left or counterclockwise.
      f. Mechanical Joint Ends: Mechanical joint ends complete with all joint accessories including rubber gaskets.
      g. Painting: The body and bonnet shall be coated with a fusion coating both interior and exterior to meet AWWA Standard C550.
      h. Markings: Markings shall be cast on the bonnet or body of each valve, and shall show the manufacturer's name or mark, the year the valve casting was made, the size of the valve, and the designation of working water pressure for 4 to 12-inch valves.
      i. Affidavit of Compliance: The Contractor shall have the manufacturer provide an affidavit directly to the Engineer that all valves supplied on this project comply with all applicable provisions of AWWA Specification C509, and that each valve was subjected to and passed the 500 psi hydrostatic test without leakage. No final payment for valves will be made until this Affidavit of Compliance is received by the Engineer.

B. Butterfly Valves (14” and larger):
   1. Acceptable Manufacturers:
      a. CLOW VALVE COMPANY; Model 4500
      b. MUELLER COMPANY Lineseal XP II
      c. Approved equal
   2. All butterfly valves shall conform to AWWA Specification C504-06 or latest revision, and shall be specified as follows:

a. Select from below as required:
b. Material: Iron body, bronze mounted.
c. Pressure: 200 psi minimum working pressure.
d. Shaft: The valve shaft shall be a one-piece unit extending through the valve bearings into the valve disc. The shaft shall be 18-8 stainless steel, Type 302, 303, 304, 316, or if carbon steel, with 18-8 stainless steel journals.
e. The disc movement shall be 90 degrees open to shut. Discs shall be of cast iron conforming to ASTM A48, Class 40, or if alloy cast iron, conforming to ASTM A436, Type 1 or 2. Disc edge shall have Type 316 stainless steel seating surface.
f. Valve seats shall provide tight shutoff 200 psi upstream, zero psi downstream pressure differential. Rubber seats mounted on the disc and shall be retained without metal hardware. Rubber seats mounted on valve bodies shall be cemented and clamped, bonded or vulcanized into the valve body. Rubber seats shall be of new natural or synthetic rubber.
g. Valves shall be fitted with sleeve type bearings contained in the hubs of the valve body. A bearing shall be provided on the shaft outboard of the shaft seal or in the operator housing to protect the shaft seal from thrust forces developed in the operating mechanisms. Each valve shall be equipped with either one or two thrust bearings set to hold the valve disc securely in the center of the valve seat. Sleeve and other bearings fitted into the valve body proper shall be of self-lubricating materials and shall have a coefficient of friction not higher than 0.25.
h. Where shafts project through the valve body for operator connection, a shaft seal shall be provided. Seals shall be split "V" type or "O" ring type. "O" ring type shall be contained in a removable, corrosion-resistant recess. Seals shall be of a design allowing replacement without removing the valve shaft.
i. Manual operation shall be provided with totally enclosed gearing, with stop-limiting devices for the open and closed positions. Actuators shall be totally enclosed and shall produce full output torque requirements throughout the entire travel with an input torque no greater than 150 foot pounds.

C. Valve Boxes
1. Manufacturer:
a. BINGHAM & TAYLOR
b. SIGMA CORPORATION
c. TYLER UNION
2. Valve boxes shall be three piece, sliding type with 8" x 5-1/4" cast iron flanged bottom section, 9" x 6-1/8" ductile iron top section and 7" ductile iron drop lid with "WATER" cast on cover.

PART 3 - EXECUTION

3.01 INSTALLATION - PIPE

A. Remove scale and dirt, on inside and outside, before assembly.

B. Bevel plain ends of cut pipe at push-on joints.

C. Excavate pipe trench in accordance with Section 312316.13 for work of this section. Hand trim excavation for accurate placement of pipe to elevations indicated.

D. Place bedding material at trench bottom; level fill materials in one continuous layer not less than 6 inches compacted depth; compact to 95 percent maximum dry density.

E. Maintain optimum moisture content of bedding material to attain required compaction density.

F. Contract G shall be responsible for verifying the location of the existing water mains and other utilities along the entire route of the project.

G. The Contractor must have experienced personnel in his employ to perform the cut-ins and connections to the existing water mains and have available equipment necessary for cutting ductile iron, cast iron, asbestos cement and miscellaneous piping in the existing distribution system.

H. Suitable facilities shall be available for proper dewatering, drainage and disposal of water removed from dewatered lines and excavations, without damage to adjacent properties. Exposed ends of the water main shall never be submerged either partially or fully.

I. Maintain a 10 foot horizontal and 18 inch vertical separation of water main from all storm and sanitary sewer facilities. The Contractor shall install the water main with the minimum cover indicated in the Contract Documents. The Contractor shall verify the depth of any existing service laterals to the structures prior to crossing of same.

J. Pipe trenches shall be of minimum width and allow six (6) inches on each side of the bell with sufficient width to allow straight alignment of pipe and provide sufficient room for joint-ing as required and to allow the backfill to be placed as specified.

K. Only new full-lengths of pipe shall be delivered to and utilized on this project. Field cut pieces with bell ends shall be a minimum of 5 feet in length. Smaller pieces shall not be permitted for use and shall be removed from site.

L. Pipe shall be laid with the bell end facing in the direction of laying. Where pipe is laid on a grade of 10% or greater, the laying shall start at the bottom and shall proceed upward with the bell ends of the pipe up gradient.

M. Install pipe to indicated elevation to within tolerance of 1/2 inch.

N. Clean bell end of pipe prior to placing gasket. Apply lubricant to both gasket and plain end of pipe.

O. Do not field cut pipe within 24 inches of bell or 8 inches of spigot end. Verify the pipe diameter of cut end.

P. Route pipe in straight line where possible. Joint deflections are permitted as outlined in ANSI/AWWA C600.

Q. Install and test ductile iron piping and fittings to ANSI/AWWA C600.

R. Establish elevations of buried piping to ensure not less than 4 feet of cover unless otherwise indicated on plans or specifically approved by Engineer or Owner in field.

S. Trench widths shall not exceed the following authorized widths prior to cut-back:
   1. Less than 12-inches diameter mains: 30 inches
   2. 12-inch, 16-inch, and 20-inch diameter mains: 36 inches

T. Backfill trench in accordance with Section 312317. Backfill around sides and to top of pipe with fill, tamped in place and compacted to 95 percent maximum dry density.

U. The contractor shall restore, replace and/or reposition all decorative lawn ornaments, and miscellaneous items disturbed during water main installation including but not limited to the following: stones, brick driveway pavers, fences, signs, sprinklers, shrubs and trees.

3.02 DISINFECTION AND BACTERIA SAMPLING OF WATER UTILITIES

A. Flush and disinfect system in accordance with Section 331300.

3.03 PRESSURE TESTING

A. Perform hydrostatic pressure testing after disinfection, but prior to bacteria sampling.

B. Expel all air from piping system, including pipe, valves and appurtenances. All new water mains shall be pressure tested to a minimum of 150 psi or 1.5 times line pressure, whichever is greater. The pressure test shall be held for a minimum of two hours with no leakage.

C. Remove and replace any defective pipe, fittings, valves, and appurtenances. Repeat pressure test until satisfactory to Engineer.

3.04 INSTALLATION - SPECIAL CASTINGS

A. Tighten glands in accordance with manufacturers direction.

B. Ensure that fittings are free of dirt and debris prior to installation.

C. Support fitting with solid blocking in areas of over excavation. Wood wedges, blocking and supports are prohibited.

D. The contractor shall install a minimum of two ¾-inch steel tie rods on mechanical joint fittings. Additional tie-rods may be requested on vertical pipe or by Engineer in areas of high pressure.

E. Steel tie rods shall be secured to fittings using 3/4" steel eye-bolts, washers and nuts. The use of ductile iron "Duc-Lugs" is prohibited. Steel tie rods shall be secured to pipe using half-moon pipe clamps, restraints, washers and nuts.

F. Bell ends of pipe shall not be installed within 5 feet of a mechanical joint assembly without being further restrained by locking gaskets and tie rods.

G. Concrete blocking shall be applied on all pipe lines 4-inch in diameter and larger at all hydrants, tees, plugs, caps, and at bends deflecting 22-1/2 degrees or more. Blocking shall be placed between solid ground and the fitting to be anchored. The blocking shall be so placed that the pipe and fitting joints will be accessible for repair. Size of blocking and minimum bearing area shall be in accordance with the Bearing Area Table within this specification section.

H. Form and place concrete for thrust blocks at each elbow or change of direction of pipe.

BEARING AREA TABLE

Pipe Size	Dead End of Tee	90 Degree Bend	45 Degree Bend	22½ Degree Bend
4 in	1 ft2	1 ft2	3/4 ft2	½ ft2
6 in	2 ft2	3 ft2	2 ft2	1 ft2
8 in	4 ft2	5½ ft2	3 ft2	1½ ft2
10 in	6 ft2	8½ ft2	4½ ft2	2½ ft2
12 in	9 ft2	12 ft2	6½ ft2	3½ ft2
>16 in	15 ft2	22 ft2	12 ft2	6 ft2

I. Concrete for Thrust Blocks: Portland Cement Concrete; 2,000 psi minimum strength at 28 days. Solid precast concrete blocking meeting the compressive strength requirement shall also

be acceptable for use. When solid blocking is utilized, the contractor shall fill all annular spaces with cement or mortar. The use of wood wedges or blocking is not permitted.

3.05 INSTALLATION - VALVES

A. Set valves on solid bearing.

B. Contractor is responsible for ensuring that all valve boxes are plumb and centered over the operating nut until after final asphalt restoration is complete.

C. Contractor shall adjust boxes prior to final restoration. The use of "Rite-Hite" type adapters is not permitted on new construction.

3.06 INSTALLATION - TAPPING SLEEVES

A. Clean existing pipe thoroughly to remove dirt and scale prior to installation of gasket.

B. Ensure gasket is free from tears and debris.

C. Tighten hardware in accordance with manufacturer's recommendations.

D. Tapping valve shall be installed level to grade to ensure access with valve box. Support valve during tapping operations and afterwards with solid concrete blocking.

3.07 NOTIFICATIONS

A. The Engineer and owner shall be notified at least 24 hours in advance and immediately prior to any of the following:
   1. Commencing work or starting again after more than a 72-hour shutdown.
   2. Admitting water to a new section.
   3. Flushing or blowing off piping.
   4. Chlorination of piping.

3.08 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed in accordance with Owner requirements.

B. Leakage testing shall be in accordance with ANSI/AWWA C600.

C. Compaction testing shall be in accordance with ANSI/ASTM D1557.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

END OF SECTION 331411

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Corrugated polyethylene pipe.

B. Fittings and accessories.

1.02 RELATED SECTIONS

A. Section 312333 - Trenching.

1.03 REFERENCES

A. ASTM D2321 - Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications.

B. ASTM F405 - Corrugated Polyethylene (PE) Tubing and Fittings.

C. ASTM F667 - Large Diameter Corrugated Polyethylene Tubing and Fittings.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide data on pipe, fittings and accessories.

C. Manufacturer's Instructions: Indicate special procedures and conditions required to install products specified.

1.05 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of pipe runs, connections and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable codes for materials and installation of the work of this section.

B. Install pipe in accordance with ASTM D2321.

1.07 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on the plans and as required by the manufacturer.

1.08 COORDINATION

A. Coordinate pipe installation with the trenching.

PART 2 - PRODUCTS

2.01 COMPONENTS

A. Corrugated Polyethylene Pipe: ASTM F405 or ASTM F667 corrugated polyethylene; N-12 manufactured by ADVANCED DRAINAGE SYSTEMS, INC. or specifically approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions and substrate.

B. Verify that trench cut is ready to receive work and excavations, dimensions and elevations are as indicated on the plans.

3.02 PREPARATION

A. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

B. Excavate under provisions of Section 312316.

3.03 INSTALLATION

A. Install pipe and accessories in accordance with manufacturer's instructions and approved shop drawings.

B. Lift or roll pipe into position. Do not drop or drag pipe over prepared bedding.

C. Shore pipe to required position; retain in place until after compaction of adjacent fills. Ensure pipe remains in correct position and to required slope.

D. Lay pipe to slope gradients noted on the plans, with maximum variation from true slope of 1/8 inch in 10 feet.

E. Backfill under provisions of Section 312323.13.

3.04 TOLERANCES

A. Maximum Variation from Intended Invert Elevation: 1/2 inch.

B. Maximum Offset of Pipe from True Alignment: 1 inch.

3.05 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 014500.

B. Request inspection prior to and immediately after placing aggregate cover over pipe.

3.06 PROTECTION

A. Protect pipe from damage or displacement until backfilling operation is in progress.

END OF SECTION 334116

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Precast solid and leaching rings.

B. Top section.

C. Castings.

1.02 RELATED SECTIONS

A. Section 312316 - Excavation.

B. Section 312323.13 - Backfilling.

1.03 REFERENCES

A. ASTM A48 - Gray Iron Castings.

B. ASTM A185 - Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.

C. ASTM A615 - Deformed and Plain Billet - Steel Bars for Concrete Reinforcement.

D. ASTM C55 - Concrete Building Brick.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Shop Drawings: Indicate dimensions and details for solid rings, leaching rings, top sections and castings.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle products under provisions of Section 016500.

B. Store products on firm, level ground.

C. Handle products in a manner which will not induce unnecessary stresses, cause cracks to occur or damage the product in any way.

D. Any cracked or otherwise defective materials will be rejected.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not mix or place mortar if ambient temperature is below 40 degrees F.

1.07 COORDINATION

A. Coordinate with installation of piping and all other work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. OLDCASTLE PRECAST, INC.

B. LONG ISLAND PRECAST

C. COASTAL PIPELINE PRODUCTS CORP.

D. Substitutions shall be permitted only after receiving written approval from the Engineer.

2.02 COMPONENTS

A. Rings and Tops: Reinforced precast concrete of the following materials:
   1. Concrete: ASTM C150 normal Portland cement Type I; minimum 4,000 psi strength at 28 days.
   2. Reinforcement: ASTM A615 reinforcing bars and ASTM A185 welded wire fabric.

B. Castings: ASTM A48, Class 30B, cast iron construction, machined flat bearing surface; non-rocking, removable grate, capable of supporting the AASHTO HS-20-44 highway loading; free from blowholes, shrinkage, distortion, cracks or other defects; smooth and of uniform quality; size and pattern as indicated on the plans; manufactured by CAMPBELL FOUNDRY COMPANY or specifically approved equal.

2.03 ACCESSORIES

A. Mortar: A 1:1:5 ratio of Portland cement, masonry cement and sand, respectively. Add water as required to create a workable consistency.

B. Filter Fabric: Non-woven, needle-punched geotextile; 140N manufactured by MIRAFI or equal.

2.04 FABRICATION

A. Fabricate and reinforce all sections to the dimensions as indicated on the plans.

B. Pipe Entry: Provide openings as required.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing site conditions.

B. Verify existing grades are as indicated on the plans.

C. Verify items provided by other sections of work are properly sized and located.

D. Verify that rough openings for piping are as required.

3.02 INSTALLATION

A. Form bottom of excavation clean and smooth to correct elevation. Compact bottom of the excavation to a minimum of 95 percent of maximum dry density.

B. Place structure on firm, level gravel surface.

C. Place rings and top piece concentrically over footing. Utilize a placement method which will not damage or crack the structure. Wrap leaching rings for drainage structures with filter fabric.

D. Place sections plumb and level, trim to the correct elevations.

E. Cut and fit for pipe. Seal openings in wall around pipe with brick and mortar. Establish elevations and pipe inverts for inlets and outlets as indicated on the plans. Trowel surfaces smooth.

F. Mount casting in a 1 inch mortar bed over access opening in slab or dome top. Install firm, level and to the required elevation.

G. If required to achieve proper elevation of casting, adjust with brick and mortar. A height of 6-12 inches is permitted between the slab or dome top and the base of the casting. Maximum distance between brick surfaces is to be 1 inch.

H. Backfill in annulus surrounding the leaching pool with drywell collar material. Refer to Section 312323.13.

3.03 TOLERANCES

A. Maximum Lateral Variation From Proposed Location: 1/2 inch.

B. Maximum Variation From Proposed Rim Elevation: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 014500.

B. Request inspection prior to backfilling around structure and prior to surface restoration.

3.05 PROTECTION

A. Protect structure from damage and displacement until project is accepted by the Owner.

END OF SECTION 334923

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Reduced pressure zone device (RPZ)

1.02 RELATED SECTIONS

A. Section 221113 - Facility Piping

1.03 REFERENCES

A. ANSI/ASSE 1013 - Backflow Preventers, Reduced Pressure Principle

B. ANSI/ASSE 1015 - Backflow Preventers, Double Check Principle

C. AWWA C506 - Backflow Prevention Devices - Reduced Pressure Principle and Double Check Valve Types

D. ANSI/AWWA C511 - Standard for Reduced-Pressure Principle Backflow-Prevention Assembly

1.04 QUALITY ASSURANCE

A. All devices shall meet the requirements of ASSE Standard 1013 and 1015, AWWA Standard C506, AWWA Standard C511 and University of Southern California Foundation for Cross Connection Control and Hydraulic Research, Sixth Edition (or latest revision), and New York State Approved Backflow Prevention Assemblies.

1.05 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Within thirty (30) days of installation, the contractor shall employ a New York State certified backflow prevention tester to test each backflow device and submit results on New York State Department of Health Form DOH 1013.

PART 2 - PRODUCTS

2.01 BACKFLOW PREVENTION DEVICE

A. RPZ Manufacturer:
   1. FEBCO Model LF825Y, 1/2" through 2"
   2. FEBCO Model LF860, 1/2" through 2"
   3. or other New York State Department of Health approved device

B. The Contractor shall furnish and install approved reduced pressure zone (RPZ), as shown on the contract drawings.

C. The RPZ device shall consist of two (2) brass, internally spring-loaded check valves, strainer, two (2) ball valves of same manufacturer as device and four (4) test cocks.

D. The RPZ device shall consist of two (2) independently operating, spring loaded, "Y" pattern check valves, one (1) hydraulically dependent differential relief valve, strainer, two (2) ball valves of same manufacturer as device and four (4) test cocks.

E. Each backflow prevention device shall include threaded inlet and outlet, full port shut-off valves and test cocks. Shut-off valves must be ball type, low lead (less than 0.25 percent lead by weight) bronze, and be by the same manufacturer as the RPZ device.

F. Each backflow prevention device shall have a strainer with the following specifications. Body and cover shall be of ASTM B-63 bronze, screen shall consist of ASTM A478, Type 304 stainless steel. Strainer includes body, cap, gasket and plug. Working pressure shall be 150 psi. Strainers shall have self-cleaning blow-off plug with NPT threads. Stainless steel screens shall be standard 20 mesh. Strainers shall be by the same manufacturer as the RPZ/DCV device.

G. All piping and branches not protected by the backflow prevention device shall be stenciled or otherwise marked with "DO NOT TAP TO THIS LINE". Piping shall be marked with wrap around pipe markers at five foot intervals.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The Contractor shall install the backflow device in the location indicated on the contract drawings. The installation shall conform to all clearances as required by the County Department of Health.

B. The Contractor shall install a drain funnel and drain line as indicated on the contract drawings. Installation shall conform to latest County Department of Health requirements.

END OF SECTION 400567

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Large interior piping systems.

1.02 RELATED SECTIONS

A. Section 331140 - Disinfection of Water Facilities

1.03 REFERENCES

A. ANSI/AWWA C104 - Cement-Mortar Lining for Ductile Iron Pipe and Fittings

B. ANSI/AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids

C. ANSI/AWWA - C115/A21.15 - American National Standard for Flanged Ductile Iron Pipe with Threaded Flanges

D. ANSI/AWWA C150/A21.50 - American National Standard for Thickness Design of Ductile Iron Pipe

E. ANSI/AWWA C600 - Installation of Ductile Iron Water Mains and Appurtenances

F. ANSI B18.2.1 - Square and Hex Bolts and Screws Inch Series Including Hex Cap Screws and Lag Screws

G. ANSI B18.2.2 - Square and Hex Nuts (Inch Series)

H. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength

1.04 SUBMITTALS

A. All products shall be made in the United States of America.

B. Submit product data under provisions of Section 013300.

C. Product Data: Provide data on pipe material, pipe fittings, and accessories. Provide manufacturer's catalog information.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE AND FITTINGS

A. ANSI/AWWA C151/A21.51; double thickness cement lining minimum 3/16" in accordance with ANSI/AWWA C104/A21.04, bituminous coating inside; and epoxy primer outside; flanged joint for exposed pipe, thickness Class 52 minimum for all pipe diameters.
   1. Fittings: ANSI/AWWA C110, Ductile iron, standard thickness.
   2. Flanged Joints: ANSI B16.1, Class 125 with full face, 1/8" thick rubber gaskets.
   3. Bolts: ANSI B18.2.1 and ASTM A307 Grade B.
   4. Nuts: ANSI B18.2.2 and ASTM A307 Grade B.
   5. Lubricant for Joints: Nontoxic; shall not support growth of bacteria; shall have no deteriorating effects on gasket or pipe material.
   6. Manufacturer: TYLER UNION, SIGMA, U.S. PIPE & FOUNDRY CO., GRIFFIN PIPE PRODUCTS or specifically approved equal.

B. Flanged Adapters: Dresser Industries, Inc., Style 127 for plain end steel or cast iron pipe with all bolts, rings, gaskets and accessories.

C. Restrained Flange Adapters: EBAA Iron Inc., Style 2100 Megaflange.

D. Couplings: Dresser Industries, Inc., Style 38 for plain end steel or cast iron pipe with all bolts, rings, gaskets and accessories.

E. Piping extending outside buildings shall be mechanical joint.

2.02 PIPE ACCESSORIES

A. Joint Restrainers: Joint restrainers shall be Style 442 with tiebolts for flanged piping as manufactured by STAR NATIONAL PRODUCTS.

B. Pipe Supports: Pipe supports shall be manufactured by MATERIAL RESOURCES:
   1. Pipe Saddle Support: Standon Model S92. Minimum Quantity: Two (2)/10'
   2. Pipe Flange Support: Standon Model S89. Minimum Quantity: Two (2)/10'

PART 3 - EXECUTION

3.01 INSTALLATION

A. Clean inside of pipe before installation. Keep installed piping clean and protect ends from foreign matter by capping or plugging.

B. Install pipe so that it does not interfere with opening of doors or apparatus, access to equipment or any portion of electrical equipment. Group piping whenever practical at common elevations.

C. Run pipes in straight lines and square with building. Install rise plumb. Make offsets only where indicated and where necessary.

D. Install pipes so that expansion and contraction will not cause undue stress or strain to pipes or equipment. Provide loops, offsets and expansion joints as shown on drawings. If, in contractor's opinion, inadequate loops or offsets are shown, contact Engineer for instructions.

E. Provide flanges and unions throughout the pipe systems to make installation and removal of piping and equipment convenient. Make provisions for servicing and removal of equipment without dismantling piping.

F. Label piping after testing.

G. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

H. Install valves with stems upright or horizontal, not inverted.

I. Core drill through existing walls and floors to provide clearance around pipe to be installed and install link seals.

J. Install ductile iron piping and fittings to ANSI/AWWA C600.

K. Install flanged adapters and couplings in accordance with manufacturer's installation instructions. Drawings show minimum required adapters and couplings. Contractor shall

install additional coupling and adapters as required for installation and disassembly of the piping systems.

L. Install pipe saddle supports and pipe flange supports to brace piping systems in locations shown on contract plan or as directed by Engineer. Installation shall be in accordance with manufacturer's installation instructions.

3.02 PIPE JOINTING

A. Preparing pipe ends: Cut pipe ends square with pipe cutters only. Do not use hacksaws or torch. Ream pipe ends, after cutting, to full diameter. Where pipe is to be threaded, die-cut right hand, pipe stand, clean cut full depth, taper threads. Make threaded joints so that they will be leak proof without caulking. Apply a thin coat of approved pipe lubricant to make threads only.

B. Bracing joints: Provide braces and bridle rods as required to reinforce joints. Where large pipes underground are subject to shock because of sudden changes in liquid flow rate, provide concrete "kicker" blocks at joints, fittings and changes of pipe direction.

C. Flanged ductile iron pipe joints: Clean face of flange of all sand, grease, grit or other foreign matter. Center gasket before assembling joints. After alignment has been completed insert bolts and hand tighten nuts. Keep gap between flanges approximately uniform while tightening. Tighten bolts to required torque in several steps, alternating from one side to the other.

3.03 RECHECKING AND REPAIRING

A. Before piping is concealed, recheck it for leaks.

B. Rework or replace defective and leaking joints, and joints which are otherwise unsatisfactory. Peening, caulking and doping are not permitted.

END OF SECTION 402323

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Butterfly Valves & Actuators

B. Check Valves

C. Hydraulic Control Valves

1.02 RELATED SECTIONS

A. Section 099744 - Mechanical Piping Coating Systems

B. Section 402323 - Potable Water Process Piping

1.03 REFERENCES

A. ASME/ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings

B. ASME/ANSI B16.34 - 2004 Valves Flanged, Threaded and Welding End

C. ASTM A536 - Ductile Iron Castings

D. AWWA C504 - Standard for Rubber Seated Butterfly Valves

E. AWWA C508 - Swing Check Valves for Waterworks Service, 2 inches (50 mm) through 24 inches (600 mm) NPS

F. AWWA C509 - Resilient Seated Gate Valves for Water Supply Service

G. AWWA C540 - Power Actuating Devices for Valves and Slide Gates

H. AWWA C542 - Electric Motor Actuators for Valves and Slide Gates

I. AWWA C550 - Protective Epoxy Interior Coatings for Valves and Hydrants

J. AWWA C800 - Swing - Check Valves for Waterworks Service, 2 inches (50 mm) through 24 inches (600 mm) NPS

K. ANSI/NSF Standard 61, Drinking Water System Components

L. AWWA C530 - Pilot Operated Control Valves

1.04 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Submit the following:
   1. Technical descriptive data for the valves showing model number, size, capacity, weight, materials, accessories and other similar information. Catalog cuts are acceptable if they contain the necessary information.
   2. Storage, handling and installation instructions for the valves.
   3. Warranty Certificate prepared in accordance with paragraph 1.03 herein.

D. Operations and Maintenance Manuals prepared in accordance with the requirements contained in Section 017823 - Operating and Maintenance Data shall be provided.

1.05 PROJECT RECORD DOCUMENTS

A. Submit product data under provisions of Section 017839.

B. Accurately record actual locations of valves, connections, and invert elevations.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with the local water utility company requirements.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

C. All brass valves and fittings installed on a potable water supply line shall be made of "low-lead" materials and have a maximum lead content of 0.25 percent by weight. All low lead brass fittings shall be stamped or embossed with a mark indicating that the product is manufactured from low-lead alloys.

D. Consideration will only be given to suppliers who can demonstrate that their valve complies with these specifications having had successful and documented experience of the size, quality, performance and reliability to that specified, and who can successfully demonstrate this criteria to the Engineer.

E. Each manufacturer shall have at least ten (10) years of experience in the design and manufacture of the specified valve.

1.07 WARRANTY

A. Provide a Warranty Certificate typed on company letterhead and signed by an authorized officer of the manufacturer.

B. The instrument manufacturer shall guarantee all components to be furnished under this section to be free from defects in design, materials and workmanship for a period of twenty-four (24) months commencing on the date the instrument was placed in permanent and consistent operation.

C. During the guarantee period, if any part or equipment component is defective or fails to perform when operating at design conditions and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by the manufacturer; the manufacturer shall repair or exchange at the discretion of the Owner such defective part(s) free of any and all charges. The cost of labor and all other expenses resulting from the repair or replacement of the defective part(s) and from installation of part(s) furnished by this Warranty shall be borne solely by the manufacturer.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Sections 016100 and 016500.

B. Deliver and store valves in shipping containers with labeling in place.

1.09 FIELD SERVICES

A. Supply and credit to the Owner field services as specified in Section 014500 - Quality Control.

B. Provide the following field services:
   1. One (1) day totaling eight (8) hours for the pressure relief - pressure sustaining valve manufacturer. During these visits, the representative shall check the installation, make all necessary adjustments, and otherwise place the specified valve into permanent operation as specified in Section 017500 - Starting and Adjusting. As part of startup activities, the representative shall check the terminal connections and the specific work of the Contractor. Before substantial completion, provide operation and maintenance instruction to the Owner. A complete review of the Operations and Maintenance Manual for the pressure relief - pressure sustaining valve shall be presented at this time.

1.10 SERVICE CONDITIONS

A. All components of the control instruments shall be designed for continuous duty.

B. Provisions shall be made for adjustments or replacements of all parts.

PART 2 - PRODUCTS

2.01 BUTTERFLY VALVES (FLANGED TYPE)

A. Manufacturers:
   1. PRATT, Model 2FII
   2. Mueller, Lineseal III
   3. GA Industries, Series 800
   4. Approved equal.

B. Flanged end butterfly valves shall be of the rubber-seated, tight closing type, with cast body and disc. Valves shall conform to the requirements specified in the governing Standard for Rubber-Seated Butterfly Valves, AWWA C504.

C. Valve body shall be cast iron per ASTM A-126, Class B, with integrally cast hubs for shaft bearing housing, and 125 class flanged ends faced and drilled in accordance with ANSI B16.1, Standard for Cast Iron Flanges. Rated for 150 psig working pressure.

D. Valve disc shall be symmetrical about the shaft axis with no external ribs, cast of alloy cast iron per Military Specification MIL 6-858a, Class I. Valve shaft shall be of a solid one-piece design of centerless ground 18-8 stainless steel or high strength steel (70,000 psi) completely isolated from line fluid.

E. Taper pins, lock washers and nuts shall be 18-8 stainless steel. Valve seat shall be of molded natural rubber, recess mounted, bonded and mechanically secured to the valve body or disc. Sleeve type bearings of self-lubricating material shall be installed in the hubs of the valve body, designed for maximum load of 2,500 psi or one-fifth the compressive strength of the material, whichever is highest.

F. A shaft seal shall be provided in the valve body hub where the shaft extends through same. The one-piece cast gland follower studs and nuts shall be bronze. Packing shall be self-adjusting split "V" type, or triple "O" ring.

G. Manual Valve Operators

1. Manual operators shall be of the worm and gear type and shall be self-locking. The gear operators shall be permanently lubricated, totally enclosed, with adjustable stops for the open and closed position, and valve disc position indicator. The operator shall be designed so that a pull of not more than 80 pounds will produce an output torque sufficient to operate the valve under actual line pressures and velocities.
2. Valves shall be equipped with hand wheels and position indicators.
3. Provide manual valve operator wheel.

H. Electric Valve Actuators
1. Manufacturers: AUMA motor operator, Model SG.05-SG12.1 Auma Matic for 3” valves and larger.
2. Electric Valve Actuator operator shall conform to AWWA C504 and AWWA C540. Valve shall be electric motor actuated. The electric motor operator shall be designed to move the valve from fully open position to fully closed when electrical power is applied, and hold the valve in any intermediate position between full open and fully closed without creeping or fluttering. Valve, reducer, electric motor operator and accessories shall be furnished complete, ready for installation, from a single manufacturer. Electric motor enclosure shall meet NEMA 4 construction.
3. Electrical control housing shall be heavy cast aluminum and fully gasketed to meet NEMA 4, watertight construction.
4. Heavy duty motor shall operate from 120 VAC (nominal) single phase input source. Thermal cut-out switches shall be provided in case of motor overload. Internal heaters shall be provided to prevent damage from condensation within housing.
5. Gears and gear shafts shall be alloy steel and heat treated for hardness. All shafts shall mount in friction reducing bearings. Gear box housing shall be grease filled and sealed. No lubrication shall be required for the life of the unit.
6. Two (2) internal limit switches shall be preset at the factory and furnished for each extremity of valve disc travel. Adjustment of each limit switch within one-half degree of disc travel shall be possible. Two (2) additional external limit switches shall be furnished for signal or auxiliary control for both open and closed valve positions. Manual operation shall be available and shall be accomplished by means of a shaft, equipped with a flat wrench that extends through a sealed opening in the housing. A hand wheel for manual operation shall be supplied.
7. For each motorized butterfly valve, provide automatic and local valve controls which will include an open-close-automatic remote selector switch and timer that will open the valve and then close the valve as directed. Two (2) indicator lights shall be provided to indicate the OPEN (green) and CLOSED (red) positions.
8. Provide position indication by means of an indicator dial in full step at all items with valve travel during both powered and manual operation.
9. Provide manual valve operator wheel.

2.02 CHECK VALVES

A. Horizontal Swing Arm with limit switch
1. Manufacturers:
   a. GOLDEN ANDERSON, Figure 350
   b. CLOW, Model 206
2. Quiet closing, outside lever and weight with adjustable air cushion chamber, ASTM A126 C1.B cast iron body and valve disc, stainless steel shaft, bronze seal and gate rings, watertight on closing, horizontal, resilient seat ring. AWWA C508, full flow area not less than the area of a circle with a diameter equal to the nominal pipe size, flanged ends, Class 125, working pressure of 250 psi.
3. Valve shall be provided with a mounted plunger actuated limit switch.
4. SCADA compatible, Nema-4 heavy duty limit switch with DPDT contacts shall be provided.

2.03 HYDRAULIC CONTROL VALVES

A. Flow Control Valves
   1. The flow control valve shall be the 133 Series - reduced internal port, as Manufactured by CLA-VAL. Model 133-93: Electronic interface and pressure sustaining valve
   2. Each valve shall have the following attributes and accessories:
      a. Operating system pressure as follows:
         1) Inlet pressure range = 60-80 psi
         2) Outlet pressure range = 5 psi
      b. Required Flow Rate
         1) a. Minimum Flow = 0 MGD
         2) b. Maximum Flow = 2.8 MGD (2,000 GPM)
      c. Required Valve Size = 12” reduced port
      d. Required Options for Main Valve and Pilot System:
         1) ASTM A536 Ductile Iron Body and Cover
         2) NSF61 Fusion Bonded Epoxy Coating - Internal and External c. Stainless Steel Fasteners
         3) Stainless Steel tubing and fittings for pilot system
         4) Integral pilot system strainer
         5) 316 Stainless Steel Cavitation Trim Seat
         6) Valve Position Transmitter (4-20 mA)
         7) Stainless Steel Bodied Solenoids (24vDC) with manual bypass system
         8) Independent Closing Speed Control
         9) Independent Opening Speed Control
         10) Integral Valve Metering Capability.
      e. Valve Controller Requirements :
         1) Controller to provide SCADA interface to existing Riverhead system
         2) Modbus capable
         3) Color touch screen
         4) Selectable program for position control or flow control
         5) Provide six 4-20 mA analog inputs
         6) Provide six 4-20 mA analog outputs
         7) Provide six digital inputs
         8) Provide six digital outputs
         9) IP 68 Rated

PART 3 - EXECUTION

3.01 GENERAL

A. Install control valves and components in accordance with the written and/or verbal instructions provided by the manufacturer.

B. All components shall be fully tested and verified for service by the manufacturer. Each manufacturer shall provide a MSR as specified in Section 017500 - Starting and Adjusting.

3.02 INSTALLATION

A. All valves, valve accessories shall be installed by workers thoroughly experienced in such work and all valve work shall be properly supported and aligned and present a neat and workmanlike appearance. All other required temporary or permanent supports for the valves shall be included in this contract to the approval of the Engineer.

B. Secure all floor stands to support members using stainless steel hardware. Field touchup floor stands after installation.

C. Plug valves shall be installed with the pressure side correctly placed.

D. Set valves in a plumb or level position, as applicable.

E. Install check valves for proper direction of flow. Adjust cushion chamber check valve to prevent water hammer at service conditions.

F. Assemble flanged joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly with a torque wrench.

G. All flanged valves shall be furnished and installed with a Style 127 flange adapter by Dresser Industries, Inc. or equal.

H. Paint all installed valves and piping in accordance with Section 099744.

I. Before each valve is installed, pipe lines should be flushed of all chips, scale, and foreign matter.

J. Properly use dielectric fittings and gaskets with dissimilar metals to insure that galvanic and/or electrolytic action does not take place.

K. Coordinate with Electrical Contractor for wiring of solenoid valves and transmitters.

3.03 INSPECTION, HANDLING AND STORAGE

A. Inspection - All valves and accessories are subject to inspection by the Engineer at the point of delivery for manufacturer, direction of opening, freedom of operation, tightness of pressure-containing bolt, cleanliness of valve ports and especially seating surfaces, handling damage, cracks and any other damage.

B. Valves found to be either defective or damaged shall be rejected and immediately removed from the job site.

C. Handling - All valves shall be loaded and unloaded by lifting with hoists or skidding under control with ropes in order to avoid shock or damage. Under no circumstances shall valves and boxes be dropped.

D. Storage - Valves, joint accessories and other appurtenances, if stored, shall be kept safe from damage. The interior of the valve and the joint accessories shall be kept free from dirt or foreign matter at all times.

E. Perform operating tests on valves as per the manufacturers recommendations as required to determine they are in satisfactory operating condition and do not leak. All valves upon completion of the work shall be checked to determine they are in an open position, unless otherwise indicated.
   1. Electronic controller shall be installed and wired by Contractor E. Contract G shall provide manufacturer's representative to provide field start-up services for programming and calibrating the electronic control which shall receive a remote 4-20mA set point (desired flow) as an input to the electronic controller.

END OF SECTION 402324

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pipe penetration seals.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Thunderline Corp

B. PSI Products

C. Approved equal

2.02 MATERIALS

A. Seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut.

B. After the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide a watertight seal between the pipe and wall opening under 40 feet of head. Seal shall be suitable for a temperature range of -40°F to 250°F and submergence in groundwater.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Determine the required inside diameter of each individual wall opening or sleeve. The inside diameter of each wall opening shall be sized as recommended by the manufacturer to fit the pipe and pipe penetration seal to assure a watertight joint. Sizing for correct pipe penetration seal model and number of links per seal may be obtained through manufacturer's catalog. If pipe outer diameter is nonstandard due to coating or insulation, consult manufacturer for engineering assistance and recommendation before proceeding with wall opening detail.

3.02 INSTALLATION

A. Install and tighten seal to provide a watertight pipe penetration in accordance with manufacturer's instructions.

END OF SECTION 402325

PART 1 - GENERAL

1.01 REFERENCES

A. NFPA 70 - National Electric Code.

1.02 SYSTEM DESCRIPTION

A. Flow monitoring, water level monitoring and system control devices for potable water.

1.03 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Provide catalog cuts indicating materials, ratings and descriptive data and accessories.

C. Provide installation instructions and calibration data.

1.04 OWNERS INSTRUCTIONS

A. Provide the services of a manufacturers trained representative on operation and maintenance of equipment

PART 2 - PRODUCTS

2.01 PRESSURE SWITCHES

A. Manufacturers:
   1. Mercoid DA Series

B. Bourdon Tube Material: Brass

C. Stem Mounted

D. Snubbers

E. Adjustable Operating Range:
   1. 5-150 PSIG - Booster A
   2. 5-150 PSIG - Booster B
   3. 5-150 PSIG - Booster C

F. Snap-action Switch - SPDT, 15A, 120V; one normally closed and one normally open.

G. Set points shall be adjustable without removing switch cover or shutting down process.

H. Switch shall have visible on/off indication

I. Switch shall have calibrated dial and two pointers indicating set and reset points.

2.02 PRESSURE TRANSMITTER/LEVEL TRANSMITTER

A. Manufacturers:
   1. Foxboro, Model No. IGP20 Gauge Pressure Transmitter.

B. Transmitter Housing: NEMA 4X.

C. Pressure Cell Module: Type 316 Stainless Steel.

D. Silicone Sensor Fill Fluid.

E. Universal wall/pipe mounting bracket.

F. Digital Indicator: LCD display, integrally mounted.

G. Accuracy: ±0.10% of full span.

H. Lightning and surge protection.

I. Span Limits: 0 and 300 psi.

2.03 GROUND STORAGE TANK LEVEL TRANSMITTER

A. Manufacturers: Endress+Hauser

B. Type: Ultrasonic Level Transmitter.

C. Model: FMU43

D. Housing: IP 68, NEMA 6P

E. Output Signal: 4-20mA HART

F. Max Range: 15m

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment in accordance with manufacturer’s installation instructions.

B. Calibrate flow, level and pressure transmitters based on flow, level and pressure levels.

C. Provide all taps, pressure sensing lines, valves and miscellaneous equipment as indicated on drawings.

D. Mount pressure switches and transmitters in vertical position.

E. Install copper Type K piping from pressure taps to switches and transmitters.

F. Provide vent and drain valves in accordance with meter manufacturer's installation instructions.

G. Calibrate booster flow for low and high flow using two (2) wide range transmitters.

H. Contractor shall provide a portable clamp on flow meter and differential pressure gauge to calibrate new and existing flow transmitters.

3.02 FIELD QUALITY CONTROL

A. Verify tubing installation is leak free.

B. Demonstrate performance and operation of installed equipment.

C. Calibrate all transmitters and pressure switches.

END OF SECTION 409000

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Electromagnetic flow meter

1.02 RELATED SECTIONS

A. Section 221113 - Facility Piping

B. Section 260519 - Low Voltage Electrical Power Conduit and Cables.

C. Section 402323 - Potable Water Process Piping.

D. Section 409000 - Instrumentation and Control for Process Systems

1.03 REFERENCES

A. NFPA 70 - National Electric Code

1.04 SYSTEM DESCRIPTION

A. Flow monitoring devices for potable water.

1.05 SUBMITTALS

A. Submit product data under provisions of Section 013300.

B. Provide catalog cuts indicating materials, ratings and descriptive data and accessories.

C. Provide installation instructions and calibration data.

1.06 OWNERS INSTRUCTIONS

A. Provide the services of a manufacturers trained representative on operation and maintenance of equipment

1.07 WARRANTY

A. Provide manufacturer's standard 2-year warranty.

PART 2 - PRODUCTS

2.01 ELECTROMAGNETIC FLOWMETER

A. Manufacturer:
   1. ABB Group Model: F,V,W Series
   2. Specifically approved equal

B. Tube material: lined 304 Stainless Steel.

C. Calibrated Bore Size: As required on the Plans.

D. End Connections: ANSI B16.5 Class 150 carbon steel flanges.

E. Lining Material: Elastomer (chlorobutyl rubber), NSF 61 approved.

F. Electrodes: 316 Stainless Steel

G. Grounding rings: 316 Stainless Steel

H. Calibration: Standard 3-point, no pressure test.

I. Glanding: Conduit entry: 0.5” NPT - cable fitted and potted.

J. Meter shall be submersible - waterproof.

K. Flow Converter Type: Sensor built for Remote MagMaster converter (mount in location as noted on the Plans)
   1. Glanding: Conduit entry: 0.5 in NPT
   2. Power Supply: 120V AC
   3. Display: 2 line local display
   4. Outputs:
      a. 4 digital (forward and reverse pulse, alarm 1, and alarm 2)
      b. 2 analog
   5. Communication Options: HART Communications
   6. Transmitter Build Standard: General Purpose
   7. Display Orientation: Standard
   8. Accessory: mounting bracket to be mounted on wall, remote from flow tube.
   9. A 4-20mA output proportional to flow shall be provided.

L. Provide two-year manufacturer's warranty.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment in accordance with manufacturer's installation instructions.

B. Calibrate flow sensor/controller/meter based on flow level.

C. Mount transmitters in vertical position.

D. Contractor shall provide a portable clamp on flow meter and differential pressure gauge to calibrate new flow transmitters and to verify calibrations.

3.02 WORK INCLUDED UNDER OTHER CONTRACTS

A. Furnishing and installation of flow meter by Contract G.

B. Coordinate with Contract E for installation of switches, transmitters and wiring.

3.03 FIELD QUALITY CONTROL

A. Verify installation is leak free.

B. Demonstrate performance and operation of installed equipment.

C. Calibrate all sensors and control equipment, and transmitters.

END OF SECTION 409123

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Electronic indicating recorder.

1.02 RELATED SECTIONS

1.03 REFERENCES

A. NEMA - National Electrical Manufacturers Association.

1.04 DESIGN REQUIREMENTS

A. Accept 4-20 mA current input from pressure and flow transmitters.

B. Electronic actuation.

C. Circular chart recorder.

D. Operating temperature range: 32°F to 125°F.

E. NEMA 4X enclosure.

F. Zero, span and gain adjustments.

1.05 PERFORMANCE REQUIREMENTS

A. Indicator recorder accuracy ±0.5 percent of span.

B. Totalizer accuracy ±0.1 percent of span.

1.06 SUBMITTALS

A. Submit under provisions of Section 013300.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. FOXBORO, Model 740 R Digital Circular Chart Recorder.

B. No equals will be accepted.

2.02 MANUFACTURED UNITS

A. Booster Building tank level chart recorder and flow chart recorder shall each be one (1) pen for one (1) process variable. Pen for each chart recorder shall be red.

B. Admin Building tank level chart recorder shall be three (3) pen for three (3) process variables, i.e. Tank Nos. 10, 15, and 58. Coordinate pen colors with Owner.

C. Weekly chart.

D. 7-digit Digital Display of Flow and pressure.

E. Integral totalizers for flow and remote totalizer output.

F. 120V, 60Hz.

G. 4-20 mA isolated input.

H. 4-20 mA Isolated Retransmitted Output.

I. Eight (8) Adjustable alarm Output Relays.

J. Enclosure: Glass Door, NEMA 4X, case color grey.

K. 28V DC power supply.

L. Recorder Schedule:

Chart Recorder	**Input Quantity**	**Location**
Plant 15 Flow	1	Plant 15
Plant 15 Tank Level	1	Plant 15
Plants 10,15,58 Tank Level	3	Administration Building

2.03 ACCESSORIES

A. Spare Parts: Provide 12 felt tip pens per indicator recorder.

B. Provide 100 detailed charts per indicator recorder.

C. Spare fuse.

2.04 CHART DETAIL

A. All weekly Well flow charts shall have a range of 0-1500 gpm.

B. All weekly pressure charts shall have a range of 0-150 PSI.

C. The Well Nos. 10 and 15 Flow chart shall have a range of 0-3,000 gpm.

D. All weekly pH/Chlorine shall be custom made charts, which shall have a dual scale, which shall read 0-14 for pH and 0-2 ppm for Chlorine.

2.05 SIGNAL CONDITIONER

A. The converter input or output shall be a 4-20 ma dc signal input to the PLC for tank level.

B. The input or output signal shall be a 0-15 second adjustable time duration impulse signal into a 0-1000 ohm load and be proportional to the input or output.

C. The converter shall be operated on 120 VAC 60 Hz with a power requirement of 100 ma.

D. The accuracy shall be ± 0.5% of full scale over a range of 10% to 100% of full scale for a 0-10% suppressed or live zero input signal. The accuracy shall be ± 1.0% of full scale over a range of 10% to 100% of full scale for a 10-50% suppressed or live zero input signal.

E. The maximum error due to an ambient temperature variation from the calibrated nominal shall not exceed 0.05% of full scale.

F. Line voltage variation of ± 10% from nominal 117 VAC 50/60 Hz shall not cause an error greater than ± 0.1% of full scale.

G. The converter shall be manufactured by AGM or approved equal product.

H. Provide additional signal conditioners and power and control circuits as required to interface existing signals at administration building.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Run power supply, signal cable (shielded twisted pair) and alarm output Control Circuits in separate, dedicated conduits.

B. Chart Recorder shall be mounted on the chemical analyzer station as indicated on drawings.

C. Wire device in accordance with manufacturer's wiring schematic.

D. Adjust zero, span and gain settings.

E. Calibrate Recorder/Controller for flow, level, and pressure.

F. Provide two (2) on/off toggle switches in each recorder to switch on/off the current alarm contact closures.

G. Provide one (1) day of manufacturers field start-up services for Operations and Maintenance procedures for District personnel.

END OF SECTION 409323

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Chlorine residual monitoring components.

B. Control relays to activate chemical feed equipment.

C. pH monitoring equipment for ptable water.

1.02 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Provide catalog information, parts list and wiring diagram, and operation and maintenance instructions.

1.03 OWNERS INSTRUCTIONS

A. Provide the services of a manufacturers trained engineer for one day to check each system installation, calibrate equipment and to instruct Owner on operation and maintenance.

1.04 EXTRA MATERIALS

A. Spare Probe

PART 2 - PRODUCTS

2.01 CHLORINE RESIDUAL MONITORING COMPONENTS

A. Manufacturers: HACH COMPANY, Model No. 5440001 CL17. Free residual chlorine analyzer, three digit LED display, surface mount or approved equal.

B. Analyzer Measurement Ranges:
   1. Free Residual Chlorine - 0.00 to 20.00 ppm (within a 7.2 to 8.5 pH range)
   2. Temperature - 0.00 to 45.0 degrees C

C. Sampling Assembly Inlet Pressure: 0.5 bar - 5.2 bar.

D. Sampling Cycle Time: 150 seconds.

E. Relay Setpoints:
   1. Relay A: 0.00-20.00 ppm free residual chlorine (for low alarm - in response to decreasing value)
   2. Relay B: 0.00-20.00 ppm free residual chlorine (for control - in response to decreasing value). Provide additional relay to provide control response to increasing value.

F. Alarms - SPDT relay with contacts for 5A resistance.
   1. Analyzer system warning.
   2. Analyzer system shutdown.

G. Indicators - LED lights when respective relay transfers.

H. Outputs - Two 4-20 mA. Digital network connection. Output span shall be programmable over any portion of the 0-20 mg/l range.

I. Controller shall have the following communication:
   1. MODBUS RS-232.
   2. MODBUS RS-485.
   3. Profibus DP.

J. All user settings of the controller are retained for 10 years in a flash memory.

K. Power Requirements - 100-230 VAC, 50 or 60 Hz.

L. Analyzer Performance (Electrical, Analog Outputs):
   1. Resolution - 0.1 mg/l.
   2. Accuracy - 5% of reading or ?0.05 mg/l whichever is more accurate.
   3. Minimum Detection - 0.5 mg/l.
   4. Automatic color/ turbidity compensation.

M. Enclosure: Analyzer - NEMA 4x, rated IP66.

2.02 PH MONITORING UNIT

A. Manufacturer: HACH COMPANY, Model SC200 with LCD readout.

B. Analyzer Measurement Range: pH -2.00 to 14.00, automatic temperature compensation 0 to 100X.

C. Analyzer Ambient Conditions: -20 to +60 degrees C, 0 to 100% relative humidity.

D. Relay Control Setpoints: Continueously adjusting, 0-100% full scale.

E. Relay Control Deadbands: Continueouslt adjustable, 0-15% full scale.

F. Dual Alarm Feature: Individually adjustable high and low alarm points, 0-100% full scale, each with 2% fixed dead band.

G. Power Requirements: 98-132 VAC, 50 or 60 Hz, less than 5VA.

H. Analog output: isolated 4-20 mA.

I. Communication: provide optional Modbus communication module.

J. Enclosure: NEMA 4X, surface mounted with stainless steel tagging of model number, serial number and date manufacturered.

K. Analyzer Performance:
   1. Sensitivity: 0.1% span
   2. Stability: 0.05% of span per 24 hours, non cumulative.
   3. Non-linearity: 0.05% of span.
   4. Repeatability: 0.1% of span.
   5. Temperature drift: zero: 0.03% of span/degree C; span: 0.3% of span/degree C.
   6. Reponse Time: 3 seconds to 90% of value upon step change.

L. pH Probe:
   1. Ryton Convertible body, glass electrode, Product Number DPD1R1.
   2. Aluminum junction box.
   3. Sensor cable.

M. The pH sensor shall be automatically temperature compensated and shall utilize differential techniques (Dual Electrodes) to compare the process to a stable internal reference buffer solution. Electrode shall have non flowing, and fouling resistant characteristics, and shall utilize totally encapsulated close coupled electronics for low impedance, long distance (up to 3,000 ft.) transmission. Sensor shall not polarize when removed from the process while energized and shall include ground electrodes to bypass ground loop currents thereby precluding them from causing disturbances to the measurement system.

N. The front panel controls shall have span, calibration, a run/test switch, set point controls and backlit LCD readout. Menu screens shall guide setup, calibration, operation and test/maintenance functions.

O. The electronics shall be contained on printed circuit cards inserted and removable as a plug in module to facilitate servicing. Two (2) relay contacts shall be rated at 5 amps and the switches shall allow for high and low contact actuation. The built in control relays shall operate on increase and decrease reading, switch selectable. The unit shall provide a current analog output to actuate the pH recorder.

P. The analyzer module shall include alarm lights for a high and low pH condition, an adjustable timer, relay and manual reset. The timer shall be a digital 0-15 minute on delay. Output contacts shall be two (2) form c, rated 115 VAC, 5 amperes.

Q. Either a high or low pH condition shall start the timer to time out. If the high or low pH condition is corrected before the timer times out, it shall reset automatically. When the timer times out, it shall transfer the output contacts.

R. The output contacts shall stay in this alarm state until manually reset with the reset button. The contacts from the control relay shall be wired to a terminal board in the module. Connection of remote equipment shall be made from this terminal board.

S. The sample line shall include a flow meter on the discharge side of the probe assembly. Meter shall have a range of 0-5 G.P.M.

2.03 ENCLOSURE

A. The pH/ Chlorine analyzer module top section and base cabinet shall be fabricated from textured fire retardant PVC alloy plastic sheet 30” wide x 23” deep x 78.5” high. All corners and seams shall be machined, heat formed and back welded using the hot gas welding technique, with weld filler rod of the same materials to ensure maximum strength without visible seams.

B. Counter top shall be fabricated from ANSI special quality industrial stain resistant solid surfacing material with integrally bonded 6”L x 3”W x 7”D sink unit of same material. Material shall be laminated, sanded and polished to produce an edge thickness of 1¼”. Bonding agent shall be of same material in its liquid form to produce seams that are unnoticeable in the finished product.

2.04 ACCESSORIES

A. Flow Cell, product #LZX866.

B. Cup Sink: 6 inch x 3 inch oval, 1-1/2 inch outlet, black, polypropylene, integral strainer.

C. Filter Cartridge Housing: Celcon plastic, transparent, meet NSF Standard 42, AQUA-PURE brand AP 101T, internally actuated pressure relief valve.

D. Filter Cartridge: Cellulose fiber, AQUA-PURE brand AP110 H/C, 6 GPM flow rating, collect particles as small as 5 micron, 210F maximum temperature.

2.05 CHEMICAL TREATMENT SAFETY CONTROL

A. Manufacturer: Eagle Control Corp., Yaphank, NY; or approved equal.

B. NEMA rated 1 horsepower, 120/240 volt, single phase power relays with weld resistant contacts to energize treatment receptacles upon satisfaction of all associated chemical safeties.

C. Refer to drawings for required chemical safeties to be integrated with chemical pump treatment receptacle control circuits.

D. All components shall be installed within CP-1

E. All press-to-test pilot lights and switches shall be flush mounted on door. All pilot lights shall be LED.

F. Monitor shall be factory wired to numbered terminal strips and tested prior to shipment.

G. Provide and install labels to identify each indicator lights and switches.

H. The chemical safety panel shall have a four-position selector switch to permit "off", 'normal", "weld", and "device" operation. When positioned "off", chemical feeers shall be prevented from operating. In the "normal" position, the closure of all chemical safety devcies will allow chemical feeder pumps to operate. Whaen a safety device activates, a pilot light shall indicate it operation. Similarly, when a chemical feeder pump is energized, a pilot light shall indicate its operation. If a chemical feed pump becomes powered in the "normal" mode and any one or all of the safety devices are not closed, an alarm bell shall sound for an ajdustable time period, all power to chemical feeder pumps shall be interrupted, a pilot light shall indicate failure, and an auxiliary relay contact shall close. Chemical safety panel shall require operator to manually depress a reset button to repower the chemical feeder pumps and reset the alarms.

I. The "weld" position shall allow test of the power contactors for weld. During this test, individual push-buttons for each safety device are depressed. Should a power contactor contain a welded contact, pilot lights shall pinpoint the specific location. The procedure dor electrically testing all pilot lights shall be performed by the weld test.

J. The "device" position shall permit the operator to test the safety devices. By manually operating the device, the panel alarm bell shall double function as an audible continuity tester to indicate dlosed and open states. Visual verification shall be provided through panel pilot lights. All instructions for performing the above test procedures shall be silk screened on the panel face.

K. All wiring shall be numbered, tagged, and terminated at 30 ampere heavy duty labeled terminal strips.

L. All associated logic control and monitoring circuitry shall be configured utilizing control relays and timers of the octal base (or 11 pin base) plug in type. Each relay and timer shall be equipped with an LED status indicator (visible with enclosure door open), and manual operators to facilitate testing and troubleshooting by Owner. Contact ratings shall be minimum 10 ampere, 24 volt.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install pH/Cl Analyzers in location indicated on drawings.

B. Install all analyzer equipment as shown on drawings.

C. Run power supply and interconnect cable in separate conduit.

D. Run interconnect cable without splices from sensor junction box to analyzer.

E. Install isolated 4-20 mA DC chlorine residual process variable instrument circuits in dedicated conduits.

F. Deliver remaining Extra Materials to site designated by Owner.

G. Provide initial supply of chemicals for analyzers.

3.02 ADJUSTING

A. Calibrate analyzer with installed probe using two point buffer method.

B. Set low and high alarm set points as requested by Engineer.

3.03 DEMONSTRATION

A. Demonstrate performance of system to operate monitoring systems and to operate chemical feed pump when alarm relay is energized.

B. Demonstrate operation and maintenance of system to Owner.

END OF SECTION 409513

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. New water lubricated, multi-stage vertical turbine pumping units and accessories for potable water.

B. Testing, adjusting, and balancing.

C. Demonstration.

1.02 RELATED SECTIONS

A. Section 099744 - Mechanical Piping Coating Systems

B. Section 432268.01 - Vertical Hollow Shaft Electric Motor

1.03 REFERENCES

A. ANSI B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

B. AWWA E101 Vertical Turbine Pumps - Line Shaft and Submersible Types.

C. ANSI/NSF Standard 61 - Drinking Water System Components.

D. ASTM A48 - Gray Iron Castings.

E. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc-Coated, Welded and Seamless.

F. ASTM A108 - Steel Bars, Carbon, Cold Finished, Standard Quality.

G. ASTM A283 - Low and Intermediate Tensile Strength Carbon Steel Plates.

H. ASTM B42 - Seamless Copper Pipe, Standard Sizes.

I. ASTM B584 - Copper Alloy Sand Castings for General Applications.

J. AWWA E103 - Horizontal and Vertical Line-Shaft Pumps.

K. AWWA C205 - Cement-Mortar protective lining and coating for steel water pipe.

L. NEMA - National Electrical Manufacturers Association.

1.04 PERFORMANCE REQUIREMENTS

A. The installed pumps shall be premium efficiency, multi-stage, water lubricated, vertical turbine pumps for potable water with the following characteristics:

REQUIREMENT	**BOOSTER PUMP**
Capacity (GPM)	1000
Total Dynamic Head (ft)	185
Minimum Pump Efficiency	85 percent
Full Load Speed (RPM)	1780

REQUIREMENT	BOOSTER PUMP
Capacity (GPM)	750
Total Dynamic Head (ft)	185
Minimum Pump Efficiency	85 percent
Full Load Speed (RPM)	1780

B. The pumping unit shall be designed and furnished in accordance with the latest Hydraulic Institute and AWWA standards for lineshaft turbine pumps.

C. Pump curves must not be excessively shallow at any point throughout the range of operating pressures. The pump must meet a HI14.6-1U acceptance grade at the design point. If not, the pump will need to be reworked and retested at the manufacturer's expense.

D. Manufacturer shall submit certified pump curves stamped by a registered Professional Engineer before shipping unit.

E. All pump equipment shall be supplied by a single manufacturer. A certified bill of materials shall be provided.

F. All pump components and accessories in contact with water shall be in compliance with the “Lead in Drinking Water Act” effective January 4, 2014.

1.05 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Indicate technical information and dimensions for the pumps and electric motors, including non-witnessed certified performance test pump curves and upthrust and downthrust ratings.

C. Shop Drawings: Indicate mounting details, dimensions, configuration, construction details and parts list.

D. Certified Pump Curves: Indicate operating characteristics at design points as well as throughout the operating range of the pump.

E. Manufacturer's Instructions: Indicate procedures and conditions required for proper installation.

F. Written report on results of initial and final pump tests.

G. Operation and maintenance data.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 017823.

B. Operation Data: Indicate procedures and methods required for proper operation of all equipment.

C. Maintenance Data: Indicate maintenance schedule, type and frequency of lubrication, spare parts manual and local parts supplier.

1.07 WARRANTY

A. The manufacturer shall provide a warranty certificate typed on company letterhead and signed by an officer of the manufacturer. The certificate shall be witnessed by a notary public in the state in which the company headquarters is located.

B. The manufacturer shall guarantee all components of the equipment specified to be furnished under this Section to be free from defects in design, materials and workmanship for a period of one (1) year commencing on the date the contractor posts the maintenance bond.

C. During the guarantee period, if any part or equipment component is defective or fails to perform when operating at design conditions and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by the manufacturer, the manufacturer shall repair or exchange at the discretion of the Owner such defective part(s) free of any and all charges. The cost of labor and all other expenses resulting from the repair or replacement of the defective part(s) and from installation of part(s) furnished by this Warranty shall be borne solely by the manufacturer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. GOULDS PUMPS INC.

B. LAYNE CHRISTENSEN, CO.

C. AMERICAN MARSH

D. Or approved equal.

2.02 MATERIALS

A. Pumping Unit (Vertical Turbine Pump): AWWA E101, high efficiency, multi-stage water lubricated, turbine pump; discharge diameter pump column; of the following materials and components:
   1. Bowl Assembly: ASTM A48, Class 30 (250 PSI), flanged, cast iron, high tensile strength; free from blowholes, sand holes and other faults; porcelain enamel coated water passages; fitted with diffuser vanes; replaceable bronze wear rings; rubber or bronze sand collar; bronze alloy C89835 sleeve bearings; bowl shaft and collets. Bowl exterior to be uncoated. Bowl assembly stages fastened with ASTM A276 type 316 stainless steel hardware.
   2. Impeller: ASTM A743, , Type 304 stainless steel, fastened to the bowl shaft with ASTM A582 type 416 stainless steel taper collets; enclosed type with solid plates; statically and dynamically balanced; adjustable. Impellers shall be balanced to grade G6.3 of ISO 1940 as minimum. Impeller trim shall be typical of each individual impeller.
   3. Suction: The suction bowl shall be provided with a non-soluble grease packed bronze bearing. A bronze sand collar shall be provided to protect bearing from abrasives in water and shall have sufficient opening at bottom for easy removal of bearing. Suction bowl shall have a bell bottom.
   4. Impeller Shaft: ASTM A582 type 416 stainless steel, polished to better than 40 RMS surface finish, minimum 12% chromium content; diameter equal to that of line shaft; connected to line shaft with solid type 416 stainless steel coupling; supported by bearings above and below each impeller.

B. Column Assembly - Water Lubricated: AWWA E101, discharge diameter pump column of the following materials and components:
   1. Line Shaft: ASTM A582 type 416 stainless steel; polished to better than 40 RMS surface finish, balanced; faced both ends, left hand threaded with a tendency to tighten during normal operation; maximum 10 foot lengths; ASTM A582 type 416 heavy duty stainless steel couplings, rubber line shaft bearings in bronze bearing retainers; water lubricated during pump's operation; secured at each coupling or flange. Line shaft shall be rated for minimum of 150% of maximum rated torque/HP requirement. The lineshaft shall be provided with ASTM A743 type 304 stainless steel sleeve to act as a journal at each bearing location. The sleeve shall be placed on a full size shaft without undercutting and secured in position by a suitable adhesive.
   2. Discharge Column Assembly: ASTM A53, Schedule 40, Grade B, steel pipe, threaded; maximum 5 foot lengths; screw coupled with 8 threads per inch with 3/16” taper per foot thread and faced parallel to butt against centering spider to form accurate shaft alignment. Uncoated.
   3. Bearing: Bearing shall be fluted rubber retained in the centering spider by a shoulder on each end of the bearing.
   4. Centering Spiders: 416 stainless steel.

C. Discharge Head Assembly - Water Lubricated:
   1. ASTM A48, Class 30 cast iron, high profile type to allow shaft coupled above stuffing box and provided for mounting the motor and support the column and bowl assemblies. Vertical suction to horizontal discharge, 125 ANSI drilling discharge flange.
   2. Stuffing Box: Provide ASTM A48, Class 30 cast iron stuffing box with a minimum of five (5) packing rings. The packing gland shall be a 316 stainless steel split type secured in place with 316 stainless steel hardware and with a rubber slinger installed on the shaft. The bearing shall be C89835 bronze.
   3. Headshaft: ASTM 582 type 416 stainless steel, polished to better than 40 RMS surface finish, minimum 12% chromium content; diameter equal to that of line shaft; connected to line shaft with solid type 416 stainless steel coupling;
   4. Discharge head shall be provided with
      a. NPT fittings for rim drain connection
      b. NPT water pre-lube connection
   5. Provide removable discharge head opening guards to protect from inadvertent contact with rotating shaft.
   6. Baseplate: Provide ASTM A283 steel or ASTM A48, Class 30 cast iron base plate to mount discharge head. Baseplate shall be bolted to pump casing as shown on the drawings.

2.03 ACCESSORIES

A. Protective Coating: See Section 099744 (Head only).

B. Bolts and Hardware: Stainless Steel; ASTM A582, Type 316.

2.04 PUMP BASE SEALANT

A. Manufacturer: Pecora Corp, Synthacalk GC2+, or approved equal.

B. NSF 61 approved polysulfide rubber sealant.

C. Conforms to ASTM C920 (color change) and ASTM C1247 (continuous immersion in liquids). Tested in conformance with ASTM D70, ASTM C1250, ASTM C661, ASTM C679, and ASTM D412.

D. UV, ozone, aging, shrinkage, rain, and snow resistant; non-sag sealant.

E. Apply Synthacalk P53+ primer (and allow to dry) prior to GC2+.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing site conditions and work required to install pump.

B. Verify that the piping and substrate are ready to receive vertical turbine pumps of this section.

3.02 INSTALLATION

A. Prior to the installation of any equipment, the equipment shall be thoroughly cleaned and disinfected.

B. Contractor shall utilize a minimum of 2,000 psi pressure washer to thoroughly clean the interior and exterior of all pump equipment. Prevent any dirt, debris or other foreign matter from contaminating the washed equipment.

C. Disinfect all pump equipment by applying a minimum of 1 percent hypochlorite solution to all exterior and interior surfaces. Rinse solution off of materials which are not compatible with hypochlorite to prevent corrosion.

D. Install new pumping unit and discharge head in accordance with manufacturer's instructions and approved shop drawings.

E. Install pumps plumb and level. Securely mount pumping unit to concrete base.

F. Position suction pipe, column assemblies and bowl assemblies in center of clearwell penetration. Pump setting is to be as noted on plans.

G. Securely mount pumping unit. Form Health Department approved sanitary seal. Material used to form Sanitary Seal shall be NSF-61 approved.

H. Install new electric motors, shafts and couplings in alignment with existing and or new equipment.

I. Following manufacturer recommendation and instruction for application of sealant.

3.03 FINAL TESTS

A. Conduct: After a minimum 12 hours of operation, conduct final test on new pump for five different points along the pump curve for each pump, including the design point, and shutoff head. Record and submit the following data for EACH point:

B. Tank water level

C. Flow in gpm

D. Discharge pressure

E. Voltage and amperage.

F. Power factor.

G. Bowl Efficiency.

H. Total Dynamic head

I. RPM

J. Motor vibrations.

K. Provide all valves, gauges and, piping, hoses, flow measuring devices and instruments required to conduct all tests. Owner's equipment shall not be used.

3.04 PROTECTION

A. Protect pump and accessories from damage and contamination during removal and installation and until project is accepted by the Owner.

B. Protect finished work under provisions of Section 016500.

C. Protect all nearby equipment from damage during installation.

D. Protect pumps and accessories from damage and contamination during installation, and until project is accepted by the Owner.

3.05 ADJUSTING

A. Adjust under provisions of Section 017500.

B. Adjust operation of pump to ensure proper installation and operation consistent with the submitted pump curves.

3.06 DEMONSTRATION

A. Demonstrate under provisions of Section 017900.

B. Demonstrate operation and maintenance of pump to Owner's personnel.

3.07 PAINTING

A. Includes new motor, discharge head, fittings, base plate and other exterior pump surfaces.

B. Apply paint as per specification Section 099744.

C. Submit paint color and type to Engineer for review and approval.

D. Clean up all paint splatter, spills, chips, etc., to the satisfaction of the Engineer.

END OF SECTION 432150

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Premium efficiency vertical electric motors.

B. Testing.

1.02 RELATED SECTIONS

A. Section 432155.01 - Water Lubricated Vertical Turbine Well Pump

1.03 REFERENCES

A. All equipment shall be fabricated, assembled and tested in accordance with the most current applicable standards as defined by the following institutions:
   1. Institute of Electrical and Electronic Engineers (IEEE).
   2. National Electrical Manufacturers' Association (NEMA).
   3. Anti-Friction Bearing Manufacturers' Association (AFBMA).
   4. American National Standards Institute (ANSI).
   5. National Electrical Code (NEC).
   6. Underwriter's Laboratories (UL).

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.
   1. Preliminary Dimension Print and Frame Size.
   2. Approximate Motor Weight.
   3. Complete Motor Nameplate Information.
   4. Motor Performance Data, including the following:
      a. Efficiencies at 100%, 75% and 50% of full load
      b. Power factor at 100%, 75% and 50% of full load
      c. Locked Rotor Current
      d. Full Load Current
      e. Starting Torque
      f. Full Load Torque
      g. Breakdown Torque
   5. Complete Description of Testing Facilities.
   6. Job site Storage Requirements.
   7. Certified Dimension Prints.
   8. Recommended Spare Parts List with current pricing.
   9. Required with motor upon shipment:
      a. Operation and Maintenance Manuals
      b. Connection Diagrams
      c. Test Reports as Specified

1.05 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 017823.

B. Operation Data: Indicate procedures and methods required for proper operation of all equipment.

C. Maintenance Data: Indicate maintenance schedule, type and frequency of lubrication, spare parts manual and local parts supplier.

1.06 COORDINATION

A. Coordinate work under provisions of Section 013100.

B. Coordinate work of this section with installation of new well pump, including all adjacent mechanical and electrical work.

1.07 WARRANTY

A. Provide under provisions of Section 017800.

B. Provide minimum 3 year warranty on all parts, labor and equipment, effective the date of final acceptance of the project.

C. Provide 3 year guarantee that motor will meet or exceed specified requirements.

PART 2 - MATERIALS

2.01 VERTICAL HOLLOW SHAFT ELECTRIC MOTOR

A. Conditions of Service
1. Motor shall be suitable for operation under the following conditions of service unless otherwise specified:

BOOSTER PUMP	HORSE POWER	SPEED (RPM)
A	50	1,780
B	75	1,780
C	75	1,780

2. Continuous operation on a three-phase 60 hertz system rated 460 volts.
3. Motors shall have a service factor of 1.15.
4. Motors shall be designed to operate at rated load in a maximum ambient temperature of 40° C at a maximum altitude of 300 feet.
5. The location of the installation will be indoor unless otherwise specified.

B. Design Requirements
1. Motors shall be capable of withstanding all normal forces which may be imposed upon them during the course of normal operation, including starting and normal stops.
2. Motors shall be suitable for across the line starting and shall be able to start and accelerate the connected load speed with 90% of rated voltage at the motor terminals.
3. Motors shall be capable of continuous operation at full load and rated frequency with a voltage variation of +10%.
4. Motors shall be capable of continuous operation at full load and rated voltage with a frequency variation of +5%.
5. Motors shall be capable of continuous operation with a combined voltage and frequency variation of no greater than 10% with the frequency variation no greater than 5%.
6. Motor installation locations will be subject to dust, moisture and/or corrosive atmospheric conditions and shall have all parts given protective treatment such as Emerson’s “CORRO-DUTY®” or equal.

C. Enclosure
1. Motors shall be furnished with a Weather Protected, Type I (WPI) guarded enclosure.

2. Openings on enclosures shall be covered with metal guard screens having a mesh size no larger than 5/8” square.
3. Enclosure shall be of cast iron construction in accordance with the manufacturer
4. S standard design. Canopy caps shall be of plastic, aluminum, cast iron or sheet metal and shall be easily removable for maintenance purposes.

D. Stator Construction
1. Stator laminations shall be of fully processed steel. Each lamination surface shall be given necessary treatment so as to have core plate type C-5 insulation.
2. Insulation system shall be Class F or better.

E. Rotor Construction
1. Rotors shall be of cast or fabricated aluminum in accordance with manufacturer’s standard design practices.

F. Bearings
1. Bearing supplied shall be of type and size sufficient to satisfy thrust loading requirements for each motor in accordance with the manufacturer’s standard design.
2. Bearings shall be rated for an in-service L-10 life of 8,800 hours.

G. Thrust bearings
1. Thrust bearings shall be deep-groove ball, angular contact ball or spherical roller type. Bearings mounted back-to-back or in tandem are acceptable and may be furnished when required according to manufacturer’s standard design.
2. Motors shall be of high thrust design and shall be supplied with angular contact ball bearings whenever possible and in accordance with manufacturer’s standard design.
3. Where thrust requirements restrict the use of angular contact bearings, spherical roller bearings shall be furnished. Spherical roller bearings shall be spring loaded to keep the lower bearing race in contact and prevent bearing damage during starting and momentary upthrust conditions.

H. Guide Bearings
1. Guide bearings shall be deep-grove ball type.
2. Guide bearings may be stacked when necessary according to manufacturer’s standard design to accommodate specific upthrust conditions.
3. Guide bearings or bearing assemblies shall be provided with sufficient means for preventing the leakage of lubricant or entrance of foreign matter along the shaft.

I. Lubrication
1. Grease lubricated bearings shall be furnished with provisions for in-service positive lubrication. A drain shall be provided to guard against over lubrication.

J. Noise Level
1. Sound pressure levels shall be measured according to NEMA MG1 / ANSI 12.51-2002 and shall not exceed 90 decibels as measured on the A-Weighted Scale at a distance of five (5) feet from any motor surface under no load, free field conditions.

K. Nameplates
1. Motor nameplates shall be of stainless steel and shall be securely fastened to the motor frame with pins of like material.
2. The following information shall be contained on the motor nameplate as a minimum:
   a. Rated Horsepower
   b. Full Load Speed
   c. Frequency
   d. NEMA KVA Code and Design (when applicable)

e. Rated Voltage
f. Manufacturer's Serial Number
g. Service Factor
h. Insulation Class
i. Maximum Ambient
j. Full Load Current at Nameplate Voltage
k. Frame Size Designation

L. Terminal Boxes
1. Terminal boxes shall be of aluminum, stamped steel, fabricated steel or cast iron construction to be compatible with the motor enclosure specified and when possible, shall be diagonally split and capable of rotation in 90° increments. Boxes not suitable for rotation shall be capable of top entry.
2. The area in which the main terminal box is connected with the motor frame shall be fully gasketed in order to prevent entrance of foreign matter into the motor and to provide support for the stator leads where they pass through the motor frame.
3. A properly sized grounding terminal shall be mounted in the main terminal box.

M. Accessories
1. Non-Reverse Ratchet
a. Motors shall be furnished with a non-reverse ratchet.
2. Space Heaters
a. Motors shall be furnished with space heaters to provide sufficient wattage to maintain the internal temperature of the motor at a level approximately 10°C above the ambient temperature while the motor is not in operation.
b. Space heaters shall be of the silicone rubber strip type attached directly to the stator end turns. The leads shall be brought out to an auxiliary terminal box.
c. The space heaters shall be rated for operation on a single phase, 60 hertz, 120 volt system.

PART 3 - EXECUTION

3.01 TESTING

A. Prior to shipment, one (1) motor of each horsepower and voltage rating shall be given a complete initial certified test in accordance with IEEE 112 method B and shall include the following items:
1. Current Balance
2. High Potential Test
3. Winding Resistance
4. Locked Rotor Current
5. No Load Running Current
6. Full Load Heat Run
7. Full Load Percent Slip
8. Efficiency at 100%, 75% and 50% Load
9. Power Factor at 100%, 75% and 50% Load

B. Noise test shall be performed in accordance with NEMA MG1 / ANSI S12.51-2002.

C. Certified test reports shall be submitted to upon completion of all required tests.
1. After the motor has operated for a minimum of 12 hours under load, all motors shall be given a short commercial test in accordance with NEMA MG1-12.55.

D. VIBRATION TEST

1. After a minimum of 12 hours or motor operation under load, a vibration test shall be conducted.
2. Perform a vibration test on the installed motors.
3. Contractor to provide the equipment necessary to perform the test.
4. Instruments for vibration test must be approved by the Engineer.
5. Record displacement, velocity, and spike energy for each point as defined below.
6. Perform vibration test for each point in the pump test as outlined in Section 11209.

DESCRIPTION	MEAS. LOC.	DISPLACE. (MILS)	VELOCITY	SPIKE ENERGY
Top of Motor Bonnet - Horizontal		Y	Y	N
Upper Motor Bearing - Horizontal	90 & 180 degrees	Y	Y	Y
Lower Motor Bearing - Horizontal	90 & 180 degrees	Y	Y	Y
Discharge Head Coupling - Horizontal	90 degrees	Y	Y	N
Discharge Head Packing Gland - Horizontal		Y	Y	N
Discharge Head Base - Horizontal	90 & 180 degrees	Y	Y	N

Y - Required as part of vibration testing.
N - Not required as part of vibration testing.
90° - 90 degrees from discharge head discharge.
90 & 180° - 90 and 180 degrees from discharge head discharge.

7. Displacement readings greater than 2.0 mils or spike energy readings greater than 0.3 shall be cause for the Contractor to take measures to reduce the vibrations. This shall be done at no additional cost to the Owner.

3.02 INSTALLATION

A. Prior to installation, verify motor horsepower, voltage and RPM.

B. Furnish and install new motor. Adjust/modify pump column shaft after motor installation.

C. Install motor in accordance with manufacturer’s recommendations.

D. Perform vibration test as outlined in this specification section.

3.03 ADJUSTING

A. Adjust under provisions of Section 017500.

3.04 DEMONSTRATION

A. Demonstrate operation and maintenance of motor to Owner’s personnel.

3.05 PROTECTION

A. Protect finished work.

B. Protect motor and accessories from damage and contamination until project is accepted by the Owner.

END OF SECTION 432268.01

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Calcium hypochlorite tablet chlorinator.

B. Calcium hypochlorite pump and accessories.

C. Spill containment pallet.

1.02 RELATED SECTIONS

A. Section 220529 - Hangers and Support for Piping.

B. Section 221113 - Facility Piping.

1.03 COORDINATION

A. Coordinate work under provisions of Section 013100.

B. Coordinate the inspection of the system by the manufacturer with the complete installation of the system.

C. Coordinate with all other adjacent electrical and mechanical work.

1.04 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Indicate information on solution tank, chemical feed pump, mixer, controls, including capacities, hypochlorite treatment unit, recirculation pump, secondary containment basin, capacities, performance, and accessories.

C. Shop Drawings: Indicate plan layout of equipment, pertinent dimensions, mounting details, construction details, required clearances, power requirements and wiring diagrams.

D. Manufacturer’s Installation Instructions: Indicate special procedures and conditions required for proper installation.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 017823.

B. Operation Data: Indicate proper operating instructions and procedures.

C. Maintenance Data: Indicate types and methods of lubrication, cleaning, schedules, spare parts list and local parts supplier.

1.06 SPARE PARTS

A. The following spare parts shall be provided for each chlorinator unit:
   1. One (1) calcium hypochlorite pump.
   2. One (1) set of diaphragms, poppets, and seals for each chemical metering pump and standard manufacturer’s preventative maintenance kit for each pump supplied.
   3. One (1) complete length of 3/4” diameter discharge tubing.
   4. One (1) quart of pump lubricant, S.A.E. 40.

5. Four (4) 50 lb. pails of calcium hypochlorite briquettes, NSF Standard 60, 7 gram briquette size with anti-scale inhibitor. Provide hand scoop constructed of corrosion resistant material for transferring tablets to hopper.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle products to the site under provisions of Section 016500.

B. Do not remove manufacturer's packaging until product is ready to be installed.

C. Do not store product directly on the ground.

D. Store product on a firm, level surface.

1.08 WARRANTY

A. Provide manufacturer's standard warranty.

B. Warranty to include coverage for materials.

PART 2 - PRODUCTS

2.01 GENERAL

A. Contractor shall furnish and install one (1) new dry tablet chlorinator with new calcium hypochlorite pump in location indicated on the Plans.

B. System must be supplied to achieve a chlorine solution strength of 0.8 to 0.99 percent at all times.

2.02 CALCIUM HYPOCHLORITE TABLET CHLORINATOR

A. Manufacturers:
   1. Constant Chlor Plus, Model MC4-50 as manufactured by Arch Chemicals, Inc. of Atlanta, GA. The chlorinator shall be factory pre-wired and piped and require only connecting to a reliable water supply, connecting to the dosing pump suction and plugging into an 115V outlet.

B. Description:
   1. Equipment:
      a. Calcium hypochlorite tablet chlorinator shall consist of a feed hopper; feed hopper cover, chemical support grid, a spray water system, solution storage tank and fully integrated control panel with PLC, to provide independent system operation and alarms.
   2. Chemical:
      a. Chlorinator shall be designed to operate with Constant Chlor Plus TM briquettes. Briquettes shall be 66 percent calcium hypochlorite by weight with a size and form to prevent bridging and clogging of the hopper screen.
      b. Briquettes shall contain a scale inhibitor, 0.5 percent by weight, to prevent excessive scaling of the wetted components.
      c. Chemicals shall comply with: EPA No. 1258-1179, NSF Standard 60, and AWWA B300.

C. Operation:
   1. Pressure Range: 40 to 150 psig
   2. Dry chemical Capacity: 62 lbs

3. Solution Tank Volume: 25 gallons
4. Available Working Solution: 13 gallons
5. Water Inlet Size: 1/2 inch FNPT
6. Solution Outlet Size: 1/2 inch MNPT
7. Solution Strength: <1.0 percent
8. Operating Temperature: 40 degrees to 105 degrees F
9. Electrical: 115V, 60Hz, 15A, 1Phase

D. Controls and Alarms:
   1. 4 Normally Open Contacts for Remote Interface. 1 Dry Contact for Remote Start of Dosing Pump.
   2. 24VDC Control Power.
   3. PLC with 14 inputs/10 outputs
      a. 6 Inputs and 2 Outputs Available for Systems Integration 8 Buttons / Indicators:
         1) OFF/ON Indicator: Push-Button to turn the unit ON or OFF
         2) LID OPEN: Prevents the unit from operating if lid is open
         3) TANK LOW: Solution inside tank is low, alarm condition
         4) CIRCULATION PUMP: Circulation pump is interlocked with TANK LOW AND will not operate if TANK LOW alarm is activated. Lamp flashes is circulation pump pressure drops below 5 psi. Push- Button to turn ON or OFF
         5) DOSING PUMP: Chemical dosing pump is interlocked to the system. Will not pump if LOW CHLORINE SOLUTION alarm is activated. Remote or manual start capability. Push-Button to turn ON or OFF
         6) FILLING: Indicates that the solenoid is energized and the unit is making solution
         7) TANK FULL: The high float is engaged and the tank is full of concentrated solution
         8) E-STOP: Push-Button emergency stop for the unit. Turns off every function.

E. Materials:
   1. Hopper / Basket Assembly
      a. Hopper / Basket Assembly shall be constructed of molded polyethylene and provide a minimum slope of 60 degrees to properly feed the briquettes to the hopper screen.
      b. Hopper will be complete with a tightly sealed lid to retard condensation and casual water from binding the stored briquettes.
      c. Hopper screen
         1) Hopper screen shall be made from polyethylene and shall be molded into the hopper / basket assembly.
         2) Hopper/ Screen shall be field replaceable and not require any tools for removal or installation.
      d. Spray assembly
         1) Spray assembly shall be completely constructed of non-ferrous materials and shall be fitted with non clogging spray nozzles. Spray nozzles shall be designed to operate at 30-50 psi and shall provide spray patterns which completely covers the hopper grid area. Spray assembly shall be modified to produce a <1.0 percent solution.
      e. Solution tank
         1) Solution tank shall be constructed of molded polyethylene.
         2) Solution tank will be fitted with factory installed connections for recirculation pump inlet and discharge, water inlet, chemical feed pump suction and return, off-gassing/spare and drain with shut-off valve.
      f. Solution mixer
         1) A magnetically driven pump will be provided for recirculation mixing. The pump shall be sized to provide a minimum mixing capability to keep suspended solids in suspension in the calcium hypochlorite solution.

2) An eductor will be used to provide additional mix solution in the tank.

g. Inlet water assembly
   1) Inlet water assembly shall consist of an isolation valve, inlet Y-strainer with mesh screen, volumetric water meter (if required), pressure regulator, inlet water pressure gauge, pressure regulator, feeder inlet pressure gauge and a solenoid valve.
   2) Inlet assembly shall be 1/2” diameter piping (material as shown on drawings)

h. Level controls and alarms
   1) A total of three level sensors shall be provided. These sensors include:
      (a) A normally closed electronic low level control float.
      (b) A normally closed electronic high level control float.
      (c) A mechanical overflow float.
   2) The hopper shall include an option to provide a low level dry briquette alarm.
   3) The hopper lid shall include an “open lid” magnetic proximity switch and alarm.
   4) The solution tank shall include a low level alarm and a low level system shut off switch.

2.03 CALCIUM HYPOCHLORITE PUMP

A. Manufacturers:
   1. Jesco, Memdox DX
   2. Approved equal.

B. Description:
   1. Motor driven, heavy duty, oscillatory displacement, diaphragm pump
   2. Contractor shall furnish and install calcium hypochlorite pumps in the locations indicated on the Plans. Provide one (1) spare pump to the Owner.

C. Performance/Design Criteria:
   1. Single head pumps shall operate against a backpressure from 0 to 150 psi.
   2. Rated capacity to be adjustable with a maximum rate of 92 gallons per hour at 150 psi backpressure.

D. Operation:
   1. Pump motor shall be 230 volt, 50Hz, 1/6 HP, 1360 RPM, one-phase induction, UL listed, International Protection Rating IP 55.
   2. Feed rate adjustment shall be automatic stroke length control to allow a capacity adjustment of 1400:1, with a maximum speed of 32 strokes per minute with a micrometer to indicate setting. Device to be fitted with locknut to prevent feed rate change after setting

E. Materials:
   1. Materials of construction shall be compatible with up to 1.0 percent calcium hypochlorite solution.
   2. Clear PVC suction tubing, HDPE discharge tubing, foot valve with strainer, automatic air venting valve, and instruction book.

F. Accessories:
   1. Pump shall be equipped with 10-foot length of cord with NEMA 460 volt, 20 amp, three phase twist-lock plug for matching receptacle.
   2. Provide standard manufacturers pump discharge anti-siphon valve.
   3. Filter housing, as manufactured by Pentair Water or approved equal, for filtering calcium hypochlorite solution on the discharge line. Filter shall be constructed of durable polypropylene or a clear FDA-compliant Styrene-Acrylonitrile (SAN). Filter shall be

equipped with 3/4-inch NPT inlet and outlet ports and will also have two corresponding ball valves in order to remove filter for servicing.

4. Flexible Suction and Discharge Line: provide clear, lightweight ozone resistant PVC tubing, 1/2 and 3/4 inch ID, reinforced with spiraled polyester yarn to reduce elongation under pressure. Certified NSF-61 and rated for working pressure of 250 psig at 70 degrees F and burst pressure of 1000 psig at 70 degrees F.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate and conditions are ready to accept work of this section as required by the manufacturer.

B. Beginning of installation means installer accepts existing substrate and conditions.

3.02 INSTALLATION

A. Mount and install treatment system and accessories in accordance with manufacturer’s installation instructions and approved shop drawings.

B. Pumps and piping runs shall be braced, properly supported, neat and orderly in appearance and parallel to walls and floors where possible.

3.03 MANUFACTURER’S FIELD SERVICE

A. Provide manufacturer’s field services under provisions of Section 017500.

B. Manufacturer shall provide a trained service technician for one day per unit to verify proper installation, to start the system and to demonstrate operation of the unit to the Owner’s designated representatives.

C. Schedule demonstration with the Owner.

3.04 STARTUP

A. Provide manufacturer's representative for calibration and 4 hour startup of chemical feed systems. Submit written report from manufacturer’s representative covering inspection and startup of installed system.

B. Prime suction and discharge line.

C. Demonstrate system operation to Owner.

3.05 PROTECTION

A. Protect finished work under provisions of Section 016500.

B. Protect system and equipment from damage until project is accepted by the Owner.

END OF SECTION 444416

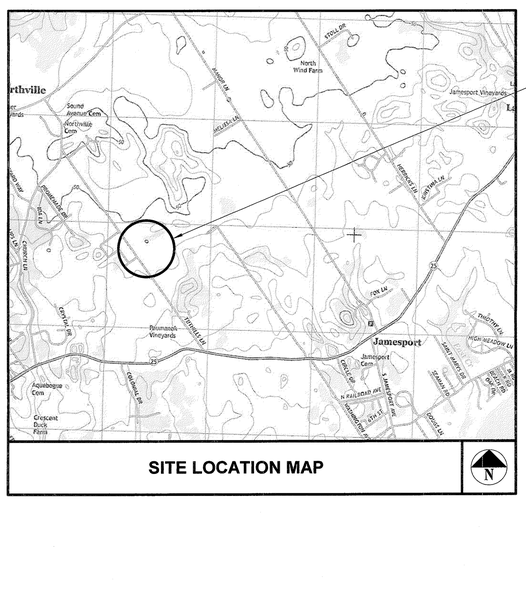
Riverhead Water District

Booster Pumping Station at Plant No. 15

RDWD 17-02

MARCH 2018

CONTRACT G - GENERAL CONSTRUCTION
CONTRACT E - ELECTRICAL CONSTRUCTION



TOWN SUPERVISOR
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TOWN COUNCIL
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STATE OF NEW YORK — JAMES M. ANDERSEN — No. 59891 — LICENSED PROFESSIONAL ENGINEER

DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
AMM/JMA	AMM/JMA		
PROJECT No: RDWD 17-02	DATE: MARCH 2018	SCALE: AS SHOWN	

CLIENT
Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

STATUS
FINAL BID DOCUMEMT

DRAWING No.
G0.0

SHEET No. 1 OF 51

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ALL CONTRACTS

SHEET NUMBER	DRAWING NUMBER	SHEET TITLE
1	G0.0	COVER SHEET
2	G1.0	GENERAL PROJECT NOTES
3	PD0.0	PROCESS DIAGRAM LEGEND
4	PD1.0	PROCESS DIAGRAM

CONTRACT G

SHEET NUMBER	DRAWING NUMBER	SHEET TITLE
5	C1.0	EXISTING SITE CONDITIONS AND SITE REMOVALS PLAN
6	C2.0	DIMENSIONAL SITE PLAN & GRADING AND DRAINAGE PLAN
7	C3.0	EROSION AND SEDIMENT CONTROL PLAN AND DETAILS
8	C4.0	SITE DETAILS
9	S1.0	FOUNDATION PLAN AND DESIGN LOADS
10	S2.0	SLAB PLAN
11	S3.0	ROOF FRAMING PLAN
12	S4.0	FOUNDATION DETAILS
13	A0.0	GENERAL NOTES, ABBREVIATIONS AND LEGENDS
14	A0.1	NEW YORK STATE CODE ANALYSIS
15	A0.2	EGRESS PLANS
16	A1.0	FIRST FLOOR PLAN, SCHEDULE AND NOTES
17	A1.1	FIRST FLOOR REFLECTED CEILING PLAN
18	A1.2	ROOF PLAN
19	A2.0	BUILDING ELEVATIONS
20	A3.0	BUILDING SECTIONS
21	A4.0	DETAILS
22	A5.0	DOOR SCHEDULE AND DETAILS
23	SP1.0	SITE PIPING PLAN
24	SP2.0	SITE PIPING DETAILS
25	M0.0	GENERAL MECHANICAL INFORMATION
26	M1.0	BOOSTER STATION LARGE PIPING PLAN
27	M1.1	BOOSTER STATION LARGE PIPING SECTIONS
28	M1.2	BOOSTER STATION SMALL PIPING PLAN
29	M2.0	CHEMICAL DETAILS
30	M2.1	MECHANICAL DETAILS
31	H0.0	HVAC LEGENDS, SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES
32	H1.0	HVAC FIRST FLOOR PLAN
33	H2.0	HVAC SCHEUDLES AND DETAILS

CONTRACT E

SHEET NUMBER	DRAWING NUMBER	SHEET TITLE
35	E0.0	ELECTRICAL LEGENDS
36	E1.0	ELECTRICAL SITE DEMOLITION PLAN
37	E1.1	ELECTRICAL SITE PLAN
38	E2.0	ELECTRICAL POWER PLAN
39	E3.0	ELECTRICAL LIGHTING PLAN
40	E4.0	ELECTRICAL HVAC POWER PLAN
41	E5.0	ELECTRICAL SECURITY PLAN
42	E6.0	ELECTRICAL SINGLE LINE DIAGRAM
43	E7.0	ELECTRICAL EQUIPMENT ELEVATIONS
44	E8.0	ELECTRICAL DETAILS
45	E9.0	ELECTRICAL GENERATOR PLAN
46	E9.1	ELECTRICAL GENERATOR DETAILS
47	E10.0	ELECTRICAL SCHEDULES
48	EI0.0	ELECTRICAL INSTRUMENTATION AND CONTROL LEGENDS
49	EI1.0	ELECTRICAL INSTRUMENTATION FLOOR PLAN
50	EI2.0	ELECTRICAL INSTRUMENTATION EQUIPMENT ELEVATIONS
51	EI3.0	ELECTRICAL INSTRUMENTATION DETAILS AND SCHEMATICS

SYMBOLS LEGEND

℄	CENTERLINE
1 / G1.0	DETAIL KEY
1 Drawing Title SCALE	DRAWING TITLE
Level Name	ELEVATION
N	NORTH
1 / G1.0	SECTION CUT

GENERAL CONSTRUCTION AND PROJECT NOTES:

1. CONTRACTOR SHALL INSPECT THE SITE PRIOR TO SUBMISSION OF BIDS AND MAKE NO ADDITIONAL CLAIMS REGARDING SITE CONDITIONS THEREAFTER.
2. CONTRACTOR SHALL NOTIFY THE OWNER AT LEAST 24 HOURS PRIOR TO THE COMMENCEMENT OF THE WORK. THE SAME NOTICE SHALL BE REQUIRED WHEN RESUMING WORK AFTER ANY STOPPAGE OR DELAY.
3. ALL DIMENSIONS SHOWN ARE APPROXIMATE AND SUBJECT TO THE APPROVAL OF THE OWNER AND THE ENGINEER.
4. CONSTRUCTION SHALL CONFORM TO ALL APPLICABLE STATE AND LOCAL CODE REQUIREMENTS, THE CONTRACT, AND SUBJECT TO THE APPROVAL OF THE OWNER AND THE ENGINEER.
5. CONTRACTOR SHALL SECURE CONSTRUCTION SITE IN ACCORDANCE WITH ALL APPLICABLE SAFETY STANDARDS AND SUBJECT TO THE APPROVAL OF THE OWNER AND THE ENGINEER.
6. CONTRACTOR SHALL COORDINATE ACTIVITIES WITH THE OWNER SO AS TO MINIMIZE INTERRUPTION TO THE WATER SUPPLY.
7. CONTRACTOR WILL BE REQUIRED TO PROTECT AND MAINTAIN ALL BENCHMARKS AND MONUMENTS. CONTRACTOR WILL BE RESPONSIBLE TO RESTORE ALL BENCHMARKS OR MONUMENTS DISTURBED BY THE CONTRACTOR'S WORK.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL LAYOUT, SURVEY, ETC. AS REQUIRED TO COMPLETE THE WORK.
9. THE DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY. THE PROJECT SPECIFICATIONS, SEPARATELY BOUND, CONTAIN THE CONDITIONS OF THE CONTRACT, PROCEDURES AND TECHNICAL SPECIFICATIONS.
10. DO NOT SCALE MEASURE ANY DRAWING. VERIFY THE FIGURES, DIMENSIONS AND DESIGN INTENTION SHOWN ON THE DRAWINGS BEFORE BEGINNING LAYOUT OF THE WORK.
11. REPORT ANY ERRORS, INACCURACIES, MISSING DIMENSIONAL REQUIREMENTS OR CONFLICTS TO THE ARCHITECT/ENGINEER IN WRITING BEFORE BEGINNING ANY WORK.
12. VERIFY EXACT LAYOUT CAPABILITY WITH ALL EXISTING CONDITIONS AND COORDINATE ALL WORK TO BE UNDERTAKEN PRIOR TO BEGINNING ANY WORK. NOTIFY THE ARCHITECT/ENGINEER IN WRITING BEFORE BEGINNING WORK IF ANY DISCREPANCIES ARE FOUND WITH CONDITIONS ENCOUNTERED, AS WELL AS ITEMS COVERED IN 8 AND 9. CONTRACTOR WILL BE RESPONSIBLE FOR ALL TEMPORARY MEASURES, TIME LOST, CHANGES TO THE WORK SCOPE WITHOUT ANY ADDITIONAL COMPENSATION IF CONTRACTOR FAILS TO PROVIDE AFOREMENTIONED VERIFICATIONS AND COORDINATION PRIOR TO COMMENCING WORK.
13. DISTURB ONLY THOSE AREAS OF THE SITE AFFECTED BY NEW CONSTRUCTION, UNLESS NOTED OTHERWISE. PROTECT ALL OTHER AREAS. CONTRACTOR SHALL COMPLETELY RESTORE ALL AREAS DISTURBED DURING CONSTRUCTION, INCLUDING, BUT NOT LIMITED TO GRASS AREA, LANDSCAPING, PAVEMENTS, SIDEWALKS, CURBING AND IN-GROUND SPRINKLER SYSTEMS.
14. PROTECT ADJOINING PROPERTIES WHEN CONDUCTING WORK.
15. ALL WORK SHALL COMPLY WITH ALL APPLICABLE CODES, LAWS, AGENCIES HAVING JURISDICTION, AND STATUS AS REQUIRED.
16. CONTRACTOR SHALL STRICTLY ADHERE TO MANUFACTURER'S PRINTED INSTRUCTIONS.
17. VERIFY ALL CHANGES TO WORK IN WRITING WITH THE ARCHITECT/ENGINEER AND OWNER BEFORE BEGINNING RELATED WORK.
18. IF APPLICABLE, ALL CONTRACTS MUST REVIEW ALL DRAWINGS CONTAINED IN THE SET (INCLUDING ALL IN G, PE, W, C, D, A, S, SP, PD, M, H, E, AND EI DRAWINGS) SO AS TO BECOME FAMILIAR WITH THE WORK REQUIRED UNDER THEIR SCOPE AND THE WORK OF ALL OTHER CONTRACTORS. ADDITIONALLY, ALL CONTRACTORS ARE RESPONSIBLE FOR THE COORDINATION OF THEIR WORK WITH ALL OTHER TRADES AND CONTRACTORS.
19. DIMENSIONS NOTED AS "EQUAL" OR "EQ" WITHIN A ROOM REFER TO A DISTANCE RELATIONSHIP CONTAINED ONLY IN THAT ROOM AT AN OPPOSING OR PARALLEL WALL UNLESS NOTED OTHERWISE.
20. VERIFY AND ADJUST APPROXIMATE DIMENSIONS (+/-) IN THE FIELD. VERIFY WITH ARCHITECT/ENGINEER PRIOR TO CONSTRUCTION.
21. CONTRACTOR SHALL LOCATE ALL PENETRATIONS REQUIRED TO ACCOMMODATE ALL WORK DETAILED OR SPECIFIED FOR THEIR SCOPE, AND COORDINATE THIS WORK WITH OTHERS.
22. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING WATER-TIGHT WEATHER PROTECTION THROUGHOUT ALL WORK AREA AND EXISTING AREAS IMMEDIATELY ADJACENT TO THOSE WORK AREAS, FOR THE DURATION OF THE ENTIRE PROJECT.
23. CONTRACTOR SHALL PROTECT ALL ADJACENT EXISTING CONSTRUCTION, ITEMS, FINISHES, ETC. AND SHALL PATCH, REPAIR AND/OR REPLACE, AND REFINISH AS REQUIRED TO RESTORE ANY AND ALL AREAS DAMAGED DURING CONSTRUCTION.
24. CONTRACTOR SHALL PROVIDE, AND COORDINATE THE INSTALLATION OF, ALL ACCESS PANELS THAT ARE NEEDED TO ACCESS OR SERVICE FOR ALL ITEMS INSTALLED AS PART OF THEIR SCOPE OF WORK.
25. PROVIDE TEMPORARY FENCING TO PROTECT ALL WORK AREAS.

H2M architects + engineers

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CONSULTANTS:

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DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
AMM/JMA	AMM/JMA		

PROJECT No:	DATE:	SCALE:
RDWD 17-02	MARCH 2018	AS SHOWN

CLIENT

Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT

ALL CONTRACTS

STATUS

FINAL BID DOCUMEMT

SHEET TITLE

GENERAL PROJECT NOTES

DRAWING No.

G1.0

SHEET No. 2 OF 51

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PROCESS EQUIPMENT AND VALVE SYMBOLS

VALVES AND PIPE ACCESSORIES

- ANTI-SIPHON
- AUTOMATIC AIR
- BALL
- BACK PRESSURE
- BUTTERFLY
- BUTTERFLY VALVE (NORMALLY
- CHECK
- CHECK VALVE W/ LIMIT
- DIAPHRAGM
- DIAPHRAGM VALVE W/ LIMIT
- DOUBLE CHECK
- GATE
- MOTORIZED BALL
- MOTORIZED BALL VALVE (NORMALLY CLOSED)
- MOTORIZED BUTTERFLY
- MOTORIZED BUTTERFLY VALVE (NORMALLY CLOSED)
- PLUG
- PRESSURE REDUCING
- PRESSURE RELIEF VALVE W/ LIMIT
- RPZ DEVICE
- SOLENOID
- WYE
- CHEMICAL INJECTION
- DIELECTRIC
- DUPLEX
- FILTER AND STRAINER
- PRESSURE GAUGE AND
- RUPTURE
- SAMPLE
- SIGHT
- STATIC

DUCT AND DUCT ACCESSORIES

- AIR
- AIRFLOW MONITORING
- DUCT
- DUCT
- DUCT
- FLEXIBLE DUCT
- MOTORIZED VOLUME
- MOTORIZED VOLUME DAMPER (NORMALLY
- VOLUME

PROCESS CONTROL SYMBOLS

- CHLORINE ANALYZER
- CONDUCTIVITY ANALYZER
- DIFFERENTIAL PRESSURE GAUGE
- DIFFERENTIAL PRESSURE SWITCH
- DIFFERENTIAL PRESSURE TRANSMITTER
- FLOAT SWITCH
- FLOW SWITCH
- FLOW TRANSMITTER
- FLUORIDE ANALYZER
- HYDROGEN PEROXIDE ANALYZER
- HUMIDITY AND TEMPERATURE TRANSMITTER
- LEVEL SWITCH
- LEVEL TRANSMITTER
- LIMIT SWITCH
- NITRATE ANALYZER
- pH ANALYZER
- PHOSPHATE ANALYZER
- PRESSURE SWITCH
- PRESSURE TRANSMITTER
- VOC ANALYZER

FLOW CONTROL

- ELECTROMAGNETIC FLOW METER
- ORIFICE PLATE
- TURBINE FLOW METER
- VENTURI FLOW METER

MECHANICAL EQUIPMENT

- AIR STRIPPING
- BLOWE
- CENTRIFUGAL
- CLEARWELL ACCESS
- LIQUID PHASE CARBON ADSORPTION
- ION EXCHANGE (PERCHLORATE)
- OXIDATION AND FILTRATION
- RECYCLE
- BRINE
- ION EXCHANGE (NITRATE)

- STRUCTURE

STRUCTURE NAME

- VAPOR PHASE CARBON ADSORPTION UNIT
- VERTICAL LINESHAFT PUMP
- VERTICAL LINESHAFT PUMP (PITLESS ADAPTER)
- SUBMERSIBLE PUMP
- CHEMICAL METERING PUMP
- DECHLORINATION UNIT
- GROUND STORAGE TANK
- VERTICAL CHEMICAL BULK STORAGE TANK
- HORIZONTAL CHEMICAL BULK STORAGE TANK

LARGE PIPING FITTINGS

- BLIND
- BLOW-OFF
- CONCENTRIC
- ECCENTRIC
- FLANGED CONNECTING PIPE
- FLEXIBLE
- PIPE PLUG
- QUICK CONNECTION
- VENT

SERVICE ABBREVIATIONS

BO	BLOW-OFF
BI	BACKWASH INFLUENT
EF	PROCESS EFFLUENT
FW	FINISHED WATER
HYDI	HYPOCHLORITE (DISINFECTION)
HYOX	HYPOCHLORITE (OXIDATION)
IN	PROCESS INFLUENT
NAOH	SODIUM HYDROXIDE
PR	PRESSURE RELIEF
PS	PRESSURE SENSING
RL	RECIRCULATION
SP	SAMPLING LINE
WD	WELL DISCHARGE
WT	WASTE WATER
WS	WATER SERVICE

NOMINAL SIZES

0.50	1/2"
01	1"
02	2"
04	4"
06	6"
08	8"
10	10"
12	12"
14	14"
16	16"
20	20"
24	24"
30	30"
32	32"
34	34"
36	36"
38	38"
40	40"

PROCESS AREA ABBREVIATIONS

01	WELL DISCHARGE
02	CALCIUM HYPOCHLORITE TREATMENT (DISINFECTION)
03	FINISHED WATER

PROCESS DIAGRAM ANNOTATION SYMBOLS

SERVICE ABBREVIATION
PROCESS
NOMINAL PIPE
06-01-BO
FLOW DIRECTION

SERVICE ABBREVIATION
PROCESS
NOMINAL DUCT
30-11-IN
FLOW DIRECTION (CIRCULAR DUCT)

SERVICE ABBREVIATION
PROCESS
DUCT HEIGHT x
20x20-11-EF
FLOW DIRECTION (RECTANGULAR DUCT)

MATCH

PD2.0
PD2.0
TIE-IN (CONTINUED ELSEWHERE ON OTHER SHEET)

TIE-IN (CONTINUED ELSEWHERE ON SAME SHEET)

UNCONNECTED PROCESS

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DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
AMM/JMA	JMA		

PROJECT No:	DATE:	SCALE:
RDWD 17-02	MARCH 2018	AS SHOWN

CLIENT

Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT

ALL CONTRACTS

STATUS

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SHEET TITLE

PROCESS DIAGRAM LEGEND

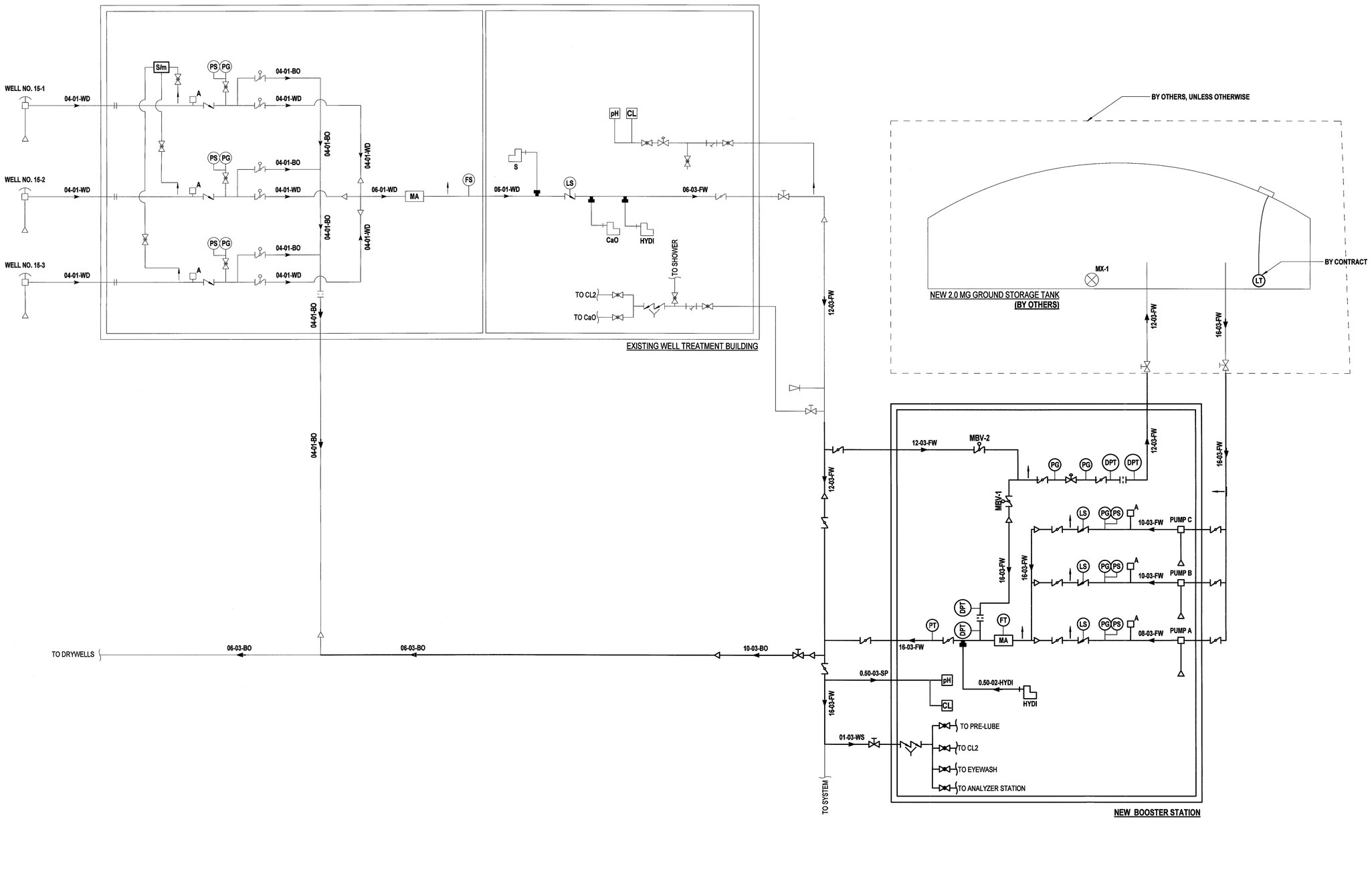
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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT

ALL CONTRACTS

STATUS

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SHEET TITLE

PROCESS DIAGRAM

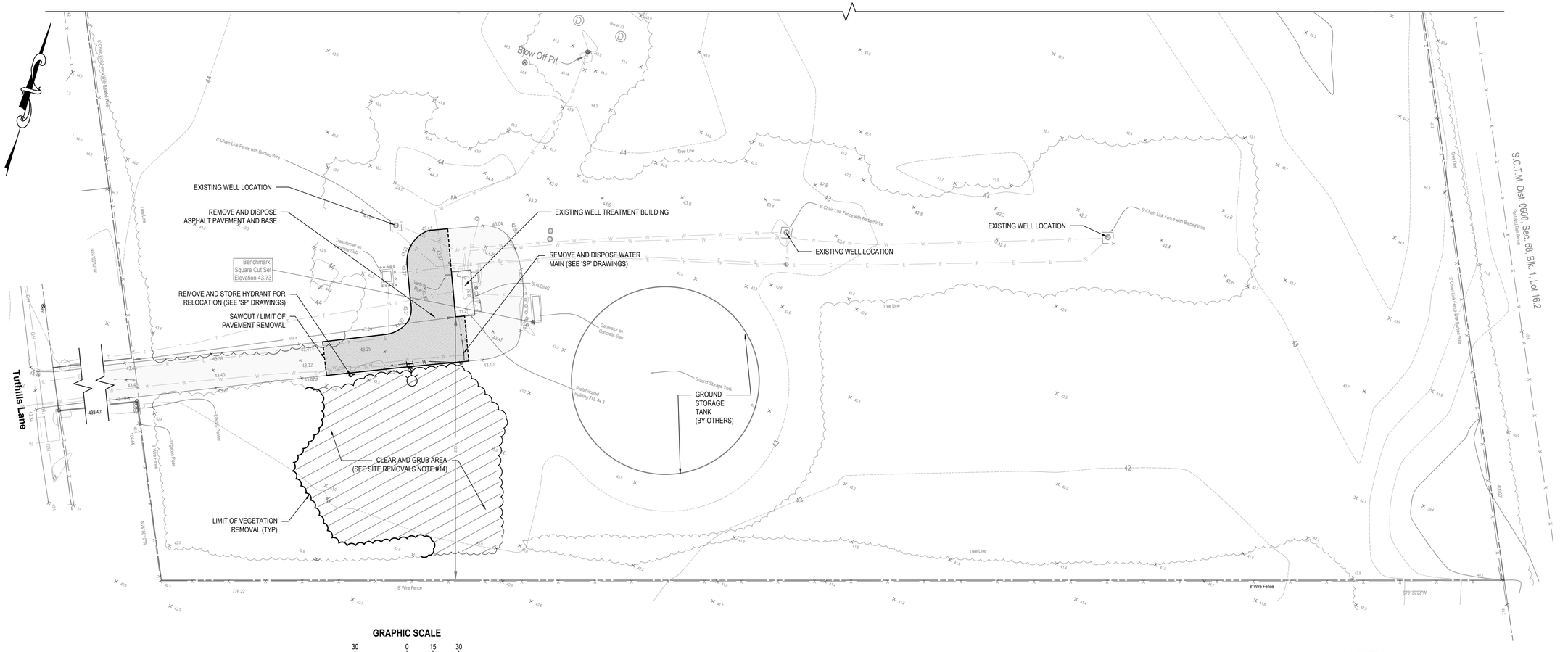
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GRAPHIC SCALE

30 0 15 30

(IN FEET)
1 inch = 30 ft.

EXISTING CONDITIONS NOTES:

1. EXISTING SURVEY PREPARED BY H2M ARCHITECTS + ENGINEERS, DATED 10/17/2017, AND SITE PLAN FOR TANK CONSTRUCTION PREPARED BY H2M, DATES NOVEMBER 2017.
2. MARKOUT OF UNDERGROUND UTILITIES COMPLETED BY SINGER UTILITY ENGINEERING PC. ON AUG. 2017.
3. BENCHMARK: SQUARE CUT SET LOCATED ON CONCRETE SLAB FOR GENERATOR AT ELEVATION 43.73 IN N.A.V.D. 1988 DATUM.
4. LOCATION OF UNDERGROUND UTILITIES AND STRUCTURES BOTH PUBLIC AND CUSTOMER OWNED, WERE OBTAINED FROM EITHER OLD MAPS, SURVEYS, DRAWINGS/RECORDS SUPPLIED BY OTHERS AND/OR UTILITY MARKOUT. THE OWNER AND ENGINEER DO NOT GUARANTEE OR ACCEPT RESPONSIBILITY FOR ANY DAMAGE TO SUCH FACILITIES DUE TO DISCREPANCIES IN LOCATION AND SIZE SHOWN ON THE PLANS OR THOSE UTILITIES AND STRUCTURES NOT SHOWN.

UTILITY NOTES:

SUBSURFACE UTILITY ENGINEERING (SUE) QUALITY LEVELS OF SERVICE (ACCURACY)
ALL MARKOUT IS QUALITY LEVEL B UNLESS OTHERWISE NOTED.

QL-A = QUALITY LEVEL A (TEST HOLES)
DATA TYPICALLY ACQUIRED AT ONE POINT ON AN UNDERGROUND UTILITY FEATURE EXPOSED BY AIR VACUUM EXCAVATION OR OTHER MEANS. THE HORIZONTAL AND VERTICAL LOCATION OF THIS REFERENCE POINT IS ACQUIRED AND REPORTED TO ACCEPTABLE SURVEY TOLERANCES. THE ACQUIRED DATA FULFILLS SECTION 5.4.5 ON PAGE 6 OF ASCE STANDARD 38-02.

QL-B = QUALITY LEVEL B (UTILITY DESIGNATION)
DEPICTION OF AN UNDERGROUND UTILITY LINE ESTABLISHED BY SENSING THE LOCATION WITH ELECTRONIC INSTRUMENTATION. LINEWORK AND UTILITY SURFACE FEATURES ARE ACQUIRED BY SURVEYING POINTS ALONG ALIGNMENT TO ACCEPTABLE SURVEY TOLERANCES.

QL-C = QUALITY LEVEL C (RECORDS PLOTTING)
UTILITY INFORMATION OBTAINED FROM RECORD INFORMATION AND PLOTTED TO CORRELATE WITH SURFACE UTILITY FEATURES WHICH HAVE BEEN SURVEY LOCATED AND ACCURATELY REDUCED ON TO DESIGN/CONSTRUCTION DOCUMENTS.

QL-D = QUALITY LEVEL D (RECORDS DRAFTING)
DEPICTION OF UNDERGROUND UTILITY LINES BY TRANSPOSITION FROM UTILITY RECORDS OR PLACED FROM VERBAL RECOLLECTIONS WITHOUT BENEFIT OF SURVEYED SURFACE FEATURES. ACCURACY OF INFORMATION IS QUESTIONABLE.

EOI
END OF INFORMATION PERTAINS TO THE LOSS OF SIGNAL THAT HAS BEEN APPLIED TO AN UNDERGROUND UTILITY AND THEN DETECTED TO ELECTRONICALLY LOCATE THE UTILITY. COMMONLY FOUND WHERE UTILITIES CHANGE TO NON-CONDUCTIVE MATERIALS, ARE CUT OR AT END OF UTILITY.

SITE REMOVALS NOTES:

1. REPORT ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THE PLANS TO THE ENGINEER IN WRITING IMMEDIATELY.
2. UNDERGROUND UTILITY INFORMATION SHOWN ON THESE PLANS WAS OBTAINED FOR DESIGN PURPOSES ONLY. PROVIDE FOR CONSTRUCTION MARKOUT AND LOCATE EXISTING UNDERGROUND UTILITIES. NO EXCAVATION CAN COMMENCE UNTIL UTILITY DOCUMENTATION HAS BEEN COMPLETED.
3. AFTER MARKOUT AND PRIOR TO DISTURBING THE SITE, UNCOVER ALL SUBSURFACE UTILITIES AND STRUCTURES WITHIN LIMITS OF DISTURBANCE TO CONFIRM THEIR LOCATION AND DEPTH.
4. NO COMPENSATION WILL BE MADE FOR ANY INCONVENIENCE CAUSED BY ENCOUNTERING UTILITIES AND STRUCTURES WHICH ARE NOT SHOWN, OR ARE INACCURATELY SHOWN ON THE PLANS.
5. REPAIR ANY DAMAGE TO EXISTING UTILITIES RESULTING FROM CONTRACTOR OPERATIONS IMMEDIATELY AT NO COST TO OWNER.
6. REPAIR ANY DAMAGE TO EXISTING SITE FEATURES SCHEDULED TO REMAIN RESULTING FROM CONTRACTOR OPERATIONS AT NO COST TO OWNER.
7. LOCATE ALL COMPONENTS OF ANY EXISTING IRRIGATION SYSTEMS PRIOR TO CONSTRUCTION AND PROTECT THROUGHOUT THE DURATION OF THE CONTRACT. REPAIR ALL DAMAGED COMPONENTS AT NO ADDITIONAL COST TO THE OWNER.
8. PROVIDE TEMPORARY FENCING TO PROTECT WORK AREAS.
9. INSTALL EROSION CONTROL MEASURES PRIOR TO ANY GROUND DISTURBANCE.
10. DELINEATE THE LIMITS OF CLEARING AND REVIEW WITH THE OWNER PRIOR TO COMMENCING WORK.
11. NOTIFY OWNER AND ENGINEER IMMEDIATELY IN WRITING WHEN UNKNOWN STRUCTURES OR SUSPECTED HAZARDOUS OR CONTAMINATED MATERIALS ARE ENCOUNTERED PRIOR TO REMOVAL OR DISTURBANCE.
12. TAKE APPROPRIATE MEASURES TO PROTECT PEDESTRIANS AND VEHICULAR TRAFFIC DURING REMOVAL ACTIVITIES, AND PROVIDE TEMPORARY MEASURES FOR THE PROTECTION AND SAFETY OF THE PUBLIC UNTIL FINAL ACCEPTANCE BY THE OWNER.
13. BACKFILL ALL VOIDS RESULTING FROM THE REMOVAL OF EXISTING SITE FEATURES. BACKFILL TO BE SOIL, FREE OF ORGANIC MATERIAL, DEBRIS, TRASH, CLAY AND STONES LARGER THAN 4 INCHES.
14. CONTRACTOR SHALL MINIMIZE REMOVAL OF EXISTING TREES. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE LAYOUT, TAGGING AND REMOVAL OF THE TREES REQUIRED TO COMPLETE ALL WORK, OWNER SHALL APPROVE TREES TO BE REMOVED PRIOR TO ACTUAL REMOVALS. REMOVALS SHALL INCLUDE REMOVAL OF COMPLETE STUMP AND ROOT SYSTEM. CONTRACTOR SHALL NOT BE PERMITTED TO GRIND STUMPS.

LEGEND

DESCRIPTION	SYMBOL
MONUMENT	⊡
BENCHMARK	◥
STAKE	△
DRAINAGE MANHOLE	Ⓓ
WELL	Ⓦ
HYDRANT	
WATER MANHOLE	Ⓦ
WATER METER	⊗WM
WATER VALVE	⊗
ELECTRIC MANHOLE	Ⓔ
UTILITY POLE/GUY POLE	
GUY WIRE	C
MONITORING WELL	
SIGN	
BOLLARD	◎
CURB	
STORM DRAIN	D D
WATER MAIN	W W
UNDERGROUND ELECTRIC	E E
UNDERGROUND TELEPHONE	T T
OVERHEAD WIRES	OH OH
FENCE	X X
EDGE OF PAVEMENT	
CONTOUR	100
SPOT ELEVATION	100.0
TOP/BOT CURB GRADE	tc 100.50 bc 100.00
ASPHALT PAVEMENT	
CONCRETE PAVEMENT	
SAWCUT PAVEMENT LINE	
REMOVE AND DISPOSE EXISTING ASPHALT PAVEMENT AND BASE	
REMOVE VEGETATION, CLEAR AND GRUB	
REMOVE AND DISPOSE OF EXISTING CHAIN LINK FENCE	X X
REMOVE AND DISPOSE OF EXISTING WATER LINE	W W

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631.756.8000 • www.h2m.com

CONSULTANTS:

MARK	DATE	DESCRIPTION

STATE OF NEW YORK
MATTHEW RONALD MOSER
LICENSED PROFESSIONAL ENGINEER
071569

DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
BJL/SK	BJL/SK	MRM	

PROJECT No.:	DATE:	SCALE:
RDWD 17-02	MARCH 2018	1" = 30'

CLIENT
Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

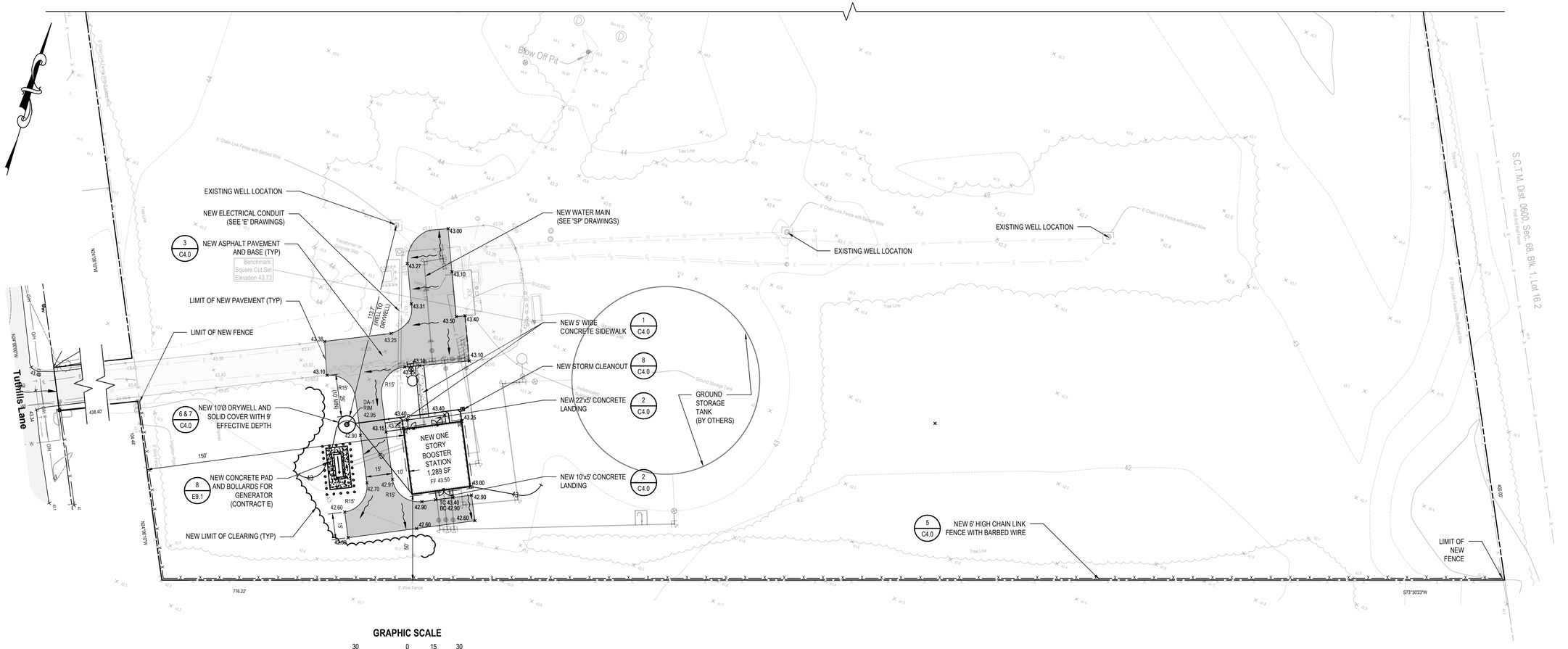
CONTRACT
CONTRACT G
GENERAL CONSTRUCTION

STATUS
FINAL BID DOCUMENT

SHEET TITLE
EXISTING SITE CONDITIONS AND SITE REMOVALS PLAN

DRAWING No.
C1.0

SHEET No.
5 OF 51



GRAPHIC SCALE

30 0 15 30

(IN FEET)
1 inch = 30 ft.

DRAINAGE STRUCTURE SCHEDULE

STRUCT. NUMBER	STRUCTURE TYPE	RIM/TC ELEVATION	TOP OF RING ELEVATION	BOTTOM OF RING ELEVATION	EFF. DEPTH	INVERT ELEVATIONS
DA-1	10' DIA DRYWELL	RIM 42.95	38.70	29.70	9.00	E 39.70 (6")

STORM DRAINAGE CALCULATIONS

PROVIDE STORAGE FOR RUNOFF FROM 3" RAINFALL

ROOF AREA
TRIBUTARY AREA (ROOF AREA) = 1,289 SF

VOLUME REQUIRED FOR ROOF AREA
1.0 x 1,289 x 3/12 = 322.25 CF

PROVIDE ADDITIONAL STORAGE FOR NUISANCE DRAIN AND PH ANALYZER

NUISANCE DRAIN
5 GALLONS PER MINUTE FOR ONE HOUR EACH DAY

VOLUME REQUIRED FOR NUISANCE DRAIN
(5 GPM x 60 MIN) = 300 gpd
DRYWELL DRAINAGE RATE = 10 gpd / SF WALL AREA
DRYWELL WALL AREA REQUIRED = 300 gpd / 10 gpd/SF = 30 SF
(31.4 SF/VF OF WALL FOR 10' Ø DRYWELL)
DRYWELL VERTICAL FEET REQUIRED = 30 SF / 31.4 SF/VF = 0.96 VF

TOTAL VOLUME REQUIRED FOR NUISANCE DRAIN:
NUISANCE: 0.96 VF (10'Ø) = 65.68 CF

ANALYZER DRAIN
0.5 GALLONS PER MINUTE (CONSTANT FLOW)

VOLUME REQUIRED FOR ANALYZER DRAIN
(0.5 GPM x 60 MIN x 24 HRS) = 720 gpd
DRYWELL DRAINAGE RATE = 10 gpd / SF WALL AREA
DRYWELL WALL AREA REQUIRED = 720 gpd / 10 gpd/SF = 72 SF
(31.4 SF/VF OF WALL FOR 10' Ø DRYWELL)
DRYWELL VERTICAL FEET REQUIRED = 72 SF / 31.4 SF/VF = 2.30 VF

TOTAL VOLUME REQUIRED FOR ANALYZER DRAIN:
ANALYZER: 2.39 VF (10'Ø) = 163.52 CF

TOTAL VOLUME REQUIRED: 322.25 CF + 65.68 CF + 163.52 = 551.45 CF

VOLUME PROVIDED:
USE ONE (1) 10' DIA. DRYWELL @ 9' EFFECTIVE DEPTH = 615.78 CF

VOLUME PROVIDED 615.78 CF > 551.45 CF (REQ.)

SITE PLAN NOTES:

1. INSPECT THE SITE PRIOR TO SUBMISSION OF BIDS AND MAKE NO ADDITIONAL CLAIMS REGARDING SITE CONDITIONS THEREAFTER.
2. NOTIFY THE OWNER AND H2M (TELEPHONE 631-756-8000) AT LEAST 48 HOURS PRIOR TO THE COMMENCEMENT OF THE WORK. THE SAME NOTICE SHALL BE REQUIRED WHEN RESUMING WORK AFTER ANY STOPPAGE OR DELAY.
3. COMPLETE ALL SURVEY AND STAKEOUT AS REQUIRED TO PROPERLY COMPLETE THE WORK.
4. PERFORM DAILY CLEANUP OPERATIONS INCLUDING REMOVAL OF DEBRIS AND EXCESS CONSTRUCTION MATERIAL, AND DRIVEWAY/STREET CLEANING TO THE SATISFACTION OF THE OWNER.
5. DURING ALL NON-WORKING HOURS, STORE ALL EQUIPMENT AND MATERIALS WITHIN AN AREA DESIGNATED BY THE OWNER AT THE PROJECT SITE.
6. ALL CONSTRUCTION TO CONFORM WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODE REQUIREMENTS.
7. COORDINATE CONSTRUCTION ACTIVITIES WITH OWNER TO MINIMIZE INTERRUPTION TO THE OWNER'S OPERATIONS.
8. RESTORE SURROUNDING AREAS DAMAGED OR DISTURBED DURING CONSTRUCTION. RESTORE TO NEW CONDITIONS AT NO ADDITIONAL COST TO THE OWNER.
9. RESTORE ALL DISTURBED GRASS AREAS AND ALL AREAS NOT SPECIFICALLY IDENTIFIED FOR OTHER IMPROVEMENTS WITH 4 INCHES OF TOPSOIL AND SEED.

GRADING AND DRAINAGE NOTES:

1. FOR NEW CONSTRUCTION THAT MEETS EXISTING CONDITIONS, ABUTTING SURFACES SHALL BE FLUSH AND ALIGNED.
2. THE CONTRACTOR SHALL CONFIRM INVERT ELEVATIONS OF ALL ROOF DRAINS AND SANITARY HOUSE CONNECTIONS PRIOR TO COMMENCING SITE DRAINAGE AND SANITARY CONSTRUCTION.
3. ADJUST ALL EXISTING CASTINGS AND VALVE COVERS TO MEET PROPOSED GRADE.
4. CONSTRUCTION DEBRIS AND EXCESS SOIL SHALL BE REMOVED AND LEGALLY DISPOSED OFF SITE.
5. UNSUITABLE SOILS ENCOUNTERED DURING CONSTRUCTION SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER IMMEDIATELY IN WRITING BEFORE REMOVAL OR DISTURBANCE.

PIPE MATERIAL SPECIFICATIONS:

- ROOF LEADER TO DRYWELL: 6'Ø SMOOTH INTERIOR HDPE
- ANALYZER TO ROOF LEADER: 4:Ø SMOOTH INTERIOR HDPE

LEGEND

DESCRIPTION	SYMBOL
ASPHALT PAVEMENT	
CONCRETE PAVEMENT	
CHAIN LINK FENCE	— X — X — X —
SPOT ELEVATION	+121.50
TOP AND BOTTOM CURB ELEVATION	TC140.00 BC139.50
MAJOR CONTOUR	240
MINOR CONTOUR	241
DRYWELL W/ SOLID COVER	
CLEAN OUT	
DRAINAGE LINE	D D
ROOF LEADER LINE	R R
ANALYZER (WATER) LINE	A A
FLOW ARROW	

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CONSULTANTS:

MARK	DATE	DESCRIPTION

STATE OF NEW YORK RONALD M. MARINO LICENSED PROFESSIONAL ENGINEER 071569

DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
BJL/SK	SK	MRM	

PROJECT No.:	DATE:	SCALE:
RDWD 17-02	MARCH 2018	1" = 30'

CLIENT
Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT
CONTRACT G
GENERAL CONSTRUCTION

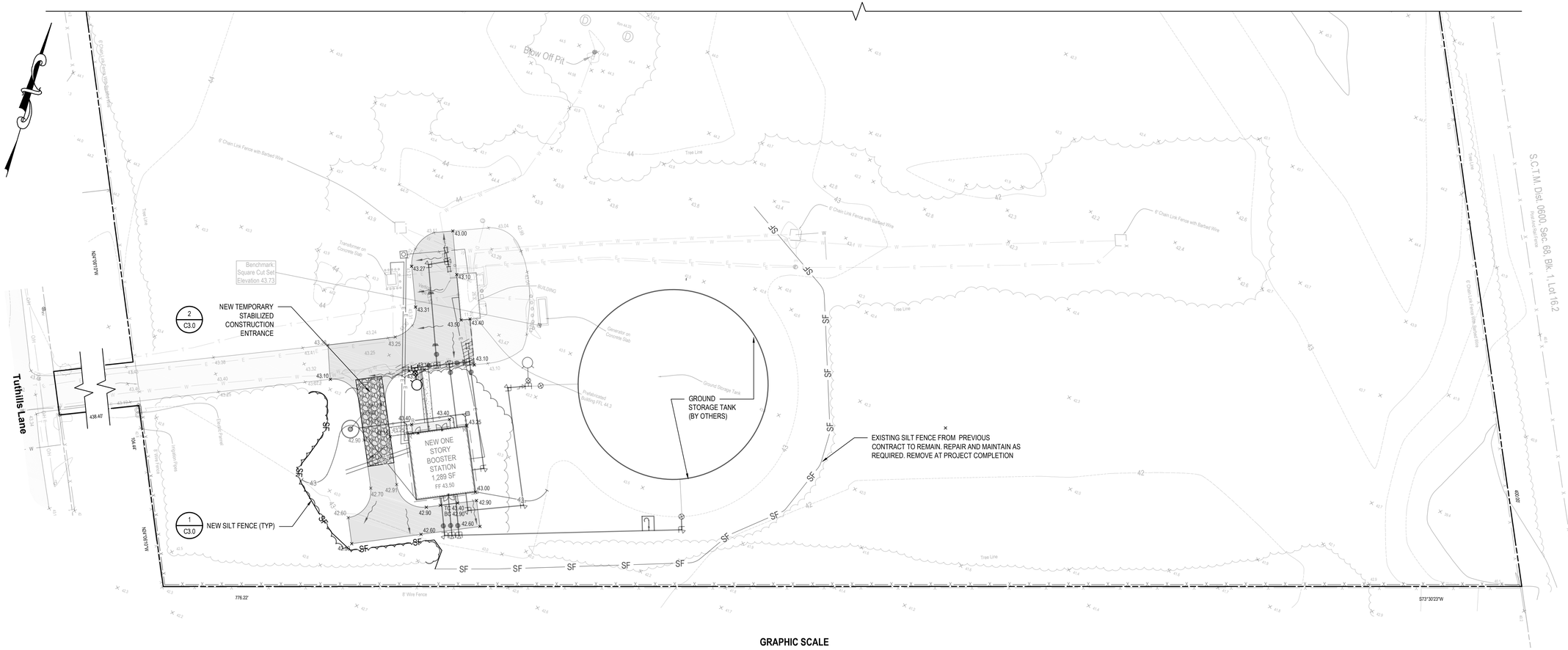
STATUS
FINAL BID DOCUMENT

SHEET TITLE
DIMENSIONAL SITE PLAN & GRADING AND DRAINAGE PLAN

DRAWING No. **C2.0**

SHEET No. 6 OF 51

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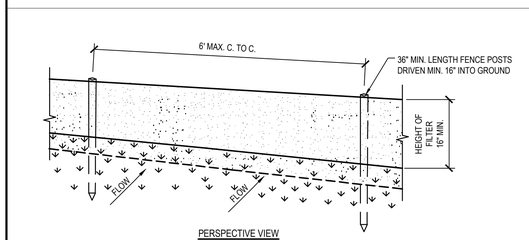


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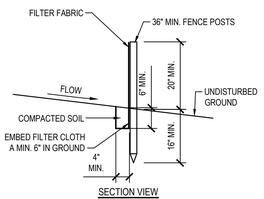
30 0 15 30

(IN FEET)

1 inch = 30 ft.



PERSPECTIVE VIEW



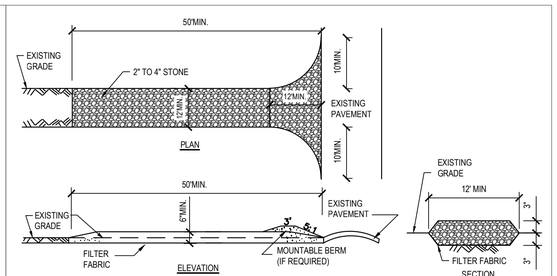
SECTION VIEW

NOTES

1. POSTS SHALL BE 2" X 2" HARDWOOD OR APPROVED EQUIVALENT.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO POSTS AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED AND SECURE AT POST. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND ACCUMULATED SEDIMENT REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.
5. REMOVE SILT FENCE UPON PERMANENT STABILIZATION OF UPLAND AREAS.

1 Silt Fence - Standard

NTS (312513.13NYDC1) - U



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE TO BE 2" TO 4".
2. LENGTH - NOT LESS THAN 50 FEET (UNLESS INDICATED OTHERWISE ON PLANS).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. PLACE FILTER FABRIC OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. FILTER FABRIC TO BE TREVIRA SPUNBOND, 1135 MIRAFI 600X OR EQUIVALENT.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

2 Stabilized Construction Entrance

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EROSION CONTROL NOTES:

1. DURING THE COURSE OF CONSTRUCTION, EROSION AND SEDIMENT CONTROL MEASURES ARE NECESSARY TO PREVENT THE TRANSPORT OF SEDIMENT TO UNDISTURBED AREAS, PONDS, WATER COURSES, DRAINAGE SYSTEMS, RECHARGE BASINS, AND ROADS. THE MINIMUM EROSION CONTROL MEASURES REQUIRED ARE INDICATED ON THIS PLAN. IN ADDITION, THE FOLLOWING GENERAL CONDITIONS SHALL BE OBSERVED:
   a. EXISTING VEGETATION SCHEDULED TO REMAIN SHALL BE PROTECTED AND REMAIN UNDISTURBED.
   b. INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES AS REQUIRED TO PREVENT THE INCIDENTAL DISCHARGE OF SEDIMENT FROM THE SITE.
2. SPECIFIC METHODS AND MATERIALS EMPLOYED IN THE INSTALLATION AND MAINTENANCE OF EROSION CONTROL MEASURES MUST CONFORM TO THE LATEST EDITION OF THE "NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL".
3. INSTALL PROPRIETARY EROSION AND SEDIMENT CONTROL PRODUCTS IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
4. ADJUST EROSION AND SEDIMENT CONTROL MEASURES TO ACCOMMODATE CONSTRUCTION PHASING TO MAINTAIN EFFECTIVENESS OF EROSION AND SEDIMENT CONTROL MEASURES.
5. PROTECT EXISTING DRAINAGE INLETS WITHIN THE PROJECT LIMITS AND NEW DRAINAGE INLETS INSTALLED AS PART OF THIS PROJECT FROM SEDIMENT INTRUSION.
6. PERFORM INSPECTION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES ON A WEEKLY BASIS AND AFTER HEAVY OR PROLONGED STORMS. MAINTENANCE MEASURES INCLUDE, BUT ARE NOT LIMITED TO, CLEANING AND REPAIR OF ALL EROSION AND SEDIMENT CONTROL MEASURES.
7. UTILIZE APPROPRIATE MEANS TO CONTROL DUST DURING CONSTRUCTION, INCLUDING BUT NOT LIMITED TO APPLYING WATER TO BARE SOIL SURFACES.
8. MAINTAIN THE STABILIZED CONSTRUCTION ENTRANCE TO PREVENT SOIL AND LOOSE DEBRIS FROM BEING TRACKED ONTO LOCAL ROADS. MAINTAIN THE CONSTRUCTION ENTRANCE WEEKLY UNTIL THE SITE IS PERMANENTLY STABILIZED.
9. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL REMAIN IN PLACE UNTIL DISTURBED AREAS ARE PERMANENTLY STABILIZED. AFTER PERMANENT STABILIZATION, REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES AND ALL ACCUMULATED SEDIMENT AND DEBRIS FROM THE SITE AND DRAINAGE STRUCTURES.

LEGEND

DESCRIPTION	SYMBOL
NEW SILT FENCE	SF SF
NEW STABILIZED CONSTRUCTION ENTRANCE	

H 2 M architects + engineers

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Melville, NY 11747
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CONSULTANTS:

MARK	DATE	DESCRIPTION

STATE OF NEW YORK
MATTHEW RONALD MORRIS
LICENSED PROFESSIONAL ENGINEER
071569

DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
BJL/SK	BJL/SK	MRM	

PROJECT No.:	DATE:	SCALE:
RDWD 17-02	MARCH 2018	1" = 30' / AS NOTED

CLIENT

Riverhead Water District

Booster Pumping Station at Plant No. 15

TOWN OF RIVERHEAD 1792 PUT YE PROSPERITIE FYE PROGRESSUM

Tuthills Lane, Jamesport

CONTRACT

CONTRACT G
GENERAL CONSTRUCTION

STATUS

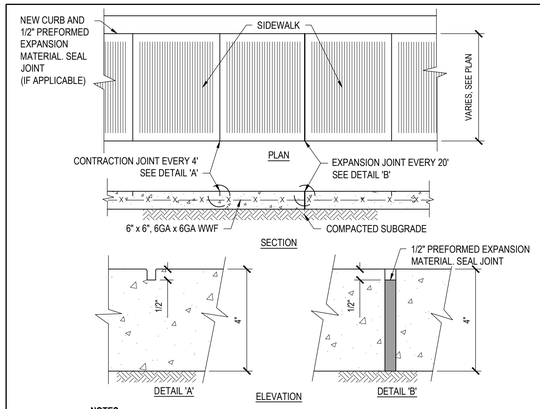
FINAL BID DOCUMENT

SHEET TITLE

EROSION AND SEDIMENT CONTROL PLAN AND DETAILS

DRAWING No. **C3.0**

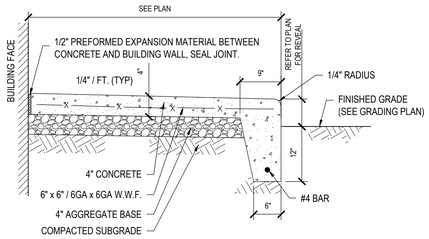
SHEET No. 7 OF 51



NOTES:

1. CONCRETE TO ACHIEVE 4000 PSI STRENGTH AT 28 DAYS
2. COMPACT SUBGRADE TO 92% MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D1557.
3. APPLY BROOM FINISH PERPENDICULAR TO DIRECTION OF TRAVEL.

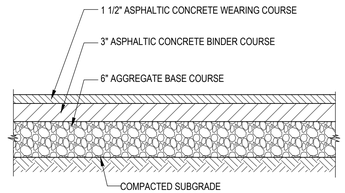
1 Concrete Sidewalk
NTS (321313.33 H2MX1) - U



NOTES:

1. WOOD FLOAT AND BRUSH FINISH ON ALL SURFACES ABOVE GRADE.
2. CONCRETE TO ACHIEVE 4,000 P.S.I. AT 28 DAYS.
3. COMPACT SUBGRADE TO 92% MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D1557.

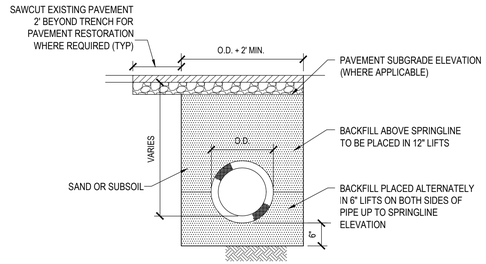
2 Concrete Landing
NTS (321315.00 H2MX1) - U



NOTE:

COMPACT SUBGRADE TO 92% MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D1557.

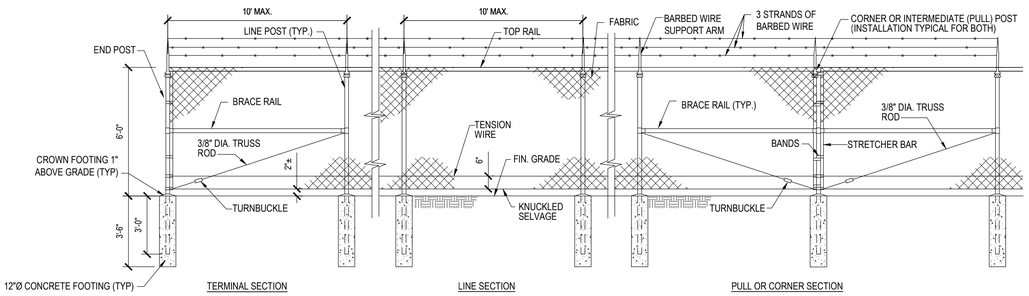
3 Asphalt Pavement - Heavy Duty
NTS (321216.13 H2MX2) - U



NOTES:

1. IF DEPTH OF TRENCH EXCEEDS 5', THE CONTRACTOR MUST PROVIDE SHEETING AND BRACING OR A SHEETING BOX IN ACCORDANCE WITH OSHA REGULATIONS. AS AN ALTERNATIVE, IF PERMITTED BY THE ENGINEER, THE TRENCH WALLS MAY BE CUT BACK TO A 1:1 SLOPE OR THE NATURAL ANGLE OF REPOSE FOR THE SOIL, WHICHEVER IS GREATER.
2. WITHIN 9" OF PAVEMENT SUBGRADE ELEVATION (WHERE APPLICABLE) COMPACT BACKFILL TO 92% MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D1557. ALL OTHER BACKFILL MATERIAL TO BE COMPACTED TO 90% MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D1557.

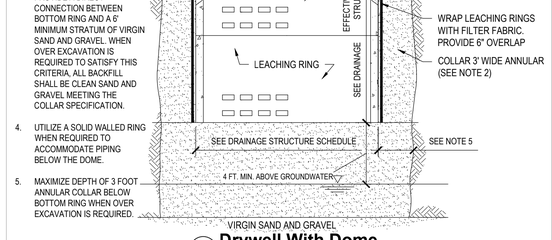
4 Pipe Trench
NTS (312333.00 H2MX1) - U



NOTES:

1. FABRIC: ASTM A392, 2" MESH, 6 GAUGE STEEL CHAIN LINK FENCE FABRIC. HOT DIPPED GALVANIZED AFTER WEAVING TO 1.2 OZ/SF.
2. TOP AND BRACE RAILS: ASTM F1043 1.66" O.D. (1.84 LBS./FT.) SS40 STEEL PIPE. HOT DIPPED GALVANIZED TO 1.8 OZ/SF IN ACCORDANCE WITH ASTM A123.
3. LINE POSTS: ASTM F1043 1.9" O.D. (2.28 LBS./FT.) SS40 STEEL PIPE. HOT DIPPED GALVANIZED TO 1.8 OZ/SF IN ACCORDANCE WITH ASTM A123.
4. END, CORNER & PULL POSTS: ASTM F1043 2.375" O.D. (3.12 LBS./FT.) SS40 STEEL PIPE. HOT DIPPED GALVANIZED TO 1.8 OZ/SF IN ACCORDANCE WITH ASTM A123.
5. FITTINGS AND ACCESSORIES: ASTM F626 MALLEABLE OR PRESSED STEEL. HOT DIPPED GALVANIZED TO 1.2 OZ/SF.
6. BOTTOM TENSION WIRE: ASTM A824 NO. 7 GAUGE STEEL-MARCELLED WIRE, HOT DIPPED GALVANIZED TO 1.2 OZ/SF.
7. STRETCHER BAR: 3/16" x 3/4" PRESSED STEEL, HOT DIPPED GALVANIZED TO 1.2 OZ/SF.
8. BARBED WIRE: GALVANIZED STEEL WIRE, DOUBLE STRAND 13-3/4 GAGE, 0.083 INCH TWISTED LINE WIRE WITH 4 POINT BARBS SPACES 3 INCHED ON CENTER.
9. CONCRETE TO ACHIEVE 4000 PSI STRENGTH AT 28 DAYS.

5 Chain Link Fence - Galvanized - Barbed Wire - 6' Height
NTS (323113.14 H2MX2) - U

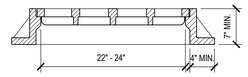


NOTES:

1. DRYWELL COMPONENTS ARE TO BE REINFORCED PRECAST CONCRETE AND CAPABLE OF SUPPORTING AASHTO HS-20 HIGHWAY LOADING.
2. COLLAR MATERIAL TO CONSIST OF CLEAN SAND AND GRAVEL CONTAINING LESS THAN 15% FINE SAND, SILT AND CLAY. SILT AND CLAY FRACTIONS NOT TO EXCEED 5%. NATIVE MATERIAL MAY BE REUSED IF IT MEETS THIS REQUIREMENT.
3. EXTEND EXCAVATION TO PROVIDE A DIRECT CONNECTION BETWEEN BOTTOM RING AND A 6' MINIMUM STRATUM OF VIRGIN SAND AND GRAVEL. WHEN OVER EXCAVATION IS REQUIRED TO SATISFY THIS CRITERIA, ALL BACKFILL SHALL BE CLEAN SAND AND GRAVEL MEETING THE COLLAR SPECIFICATION.
4. UTILIZE A SOLID WALLED RING WHEN REQUIRED TO ACCOMMODATE PIPING BELOW THE DOME.
5. MAXIMIZE DEPTH OF 3 FOOT ANNULAR COLLAR BELOW BOTTOM RING WHEN OVER EXCAVATION IS REQUIRED.

6 Drywell With Dome
NTS (334923.13 H2MX1)

PLAN



SECTION

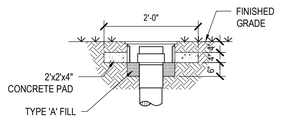
NOTE:

CASTINGS MUST BE CAST IRON AND CAPABLE OF SUPPORTING THE AASHTO HS-20 HIGHWAY LOADING.

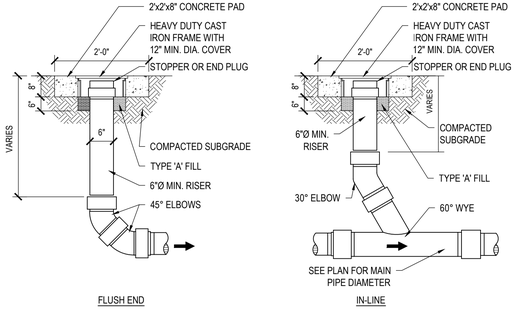
7 Circular Frame & Cover - Heavy Duty
NTS (334913.23 H2MX4)

NOTES:

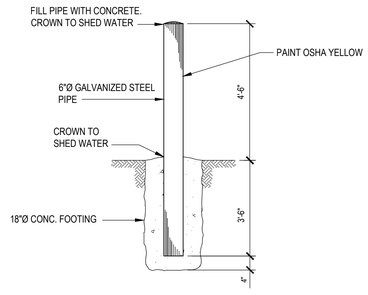
1. CAST IRON FRAME AND COVER MUST BE CAPABLE OF SUPPORTING THE AASHTO HS-20 HIGHWAY LOADING.
2. CONCRETE TO ACHIEVE 4,000 P.S.I. STRENGTH AT 28 DAYS.
3. CONCRETE PAD MAY BE OMITTED FOR CLEANOUTS IN CONCRETE SIDEWALKS.



ALTERNATE CONDITION FOR LAWN AND LANDSCAPED AREAS



8 Storm Drainage Cleanout
NTS (334915.00 H2MX1)



NOTE:

1. CONCRETE TO ACHIEVE 4000 PSI STRENGTH AT 28 DAYS.

9 Steel Bollard - 6" Diameter
NTS (323613.00 H2MX2)

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CONSULTANTS:

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STATE OF NEW YORK — MARK RONALD — LICENSED PROFESSIONAL ENGINEER — 071569

DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
BJL/SK	BJL/SK	MRM	

PROJECT No.:	DATE:	SCALE:
RDWD 17-02	MARCH 2018	AS NOTED

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Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT

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GENERAL CONSTRUCTION

STATUS

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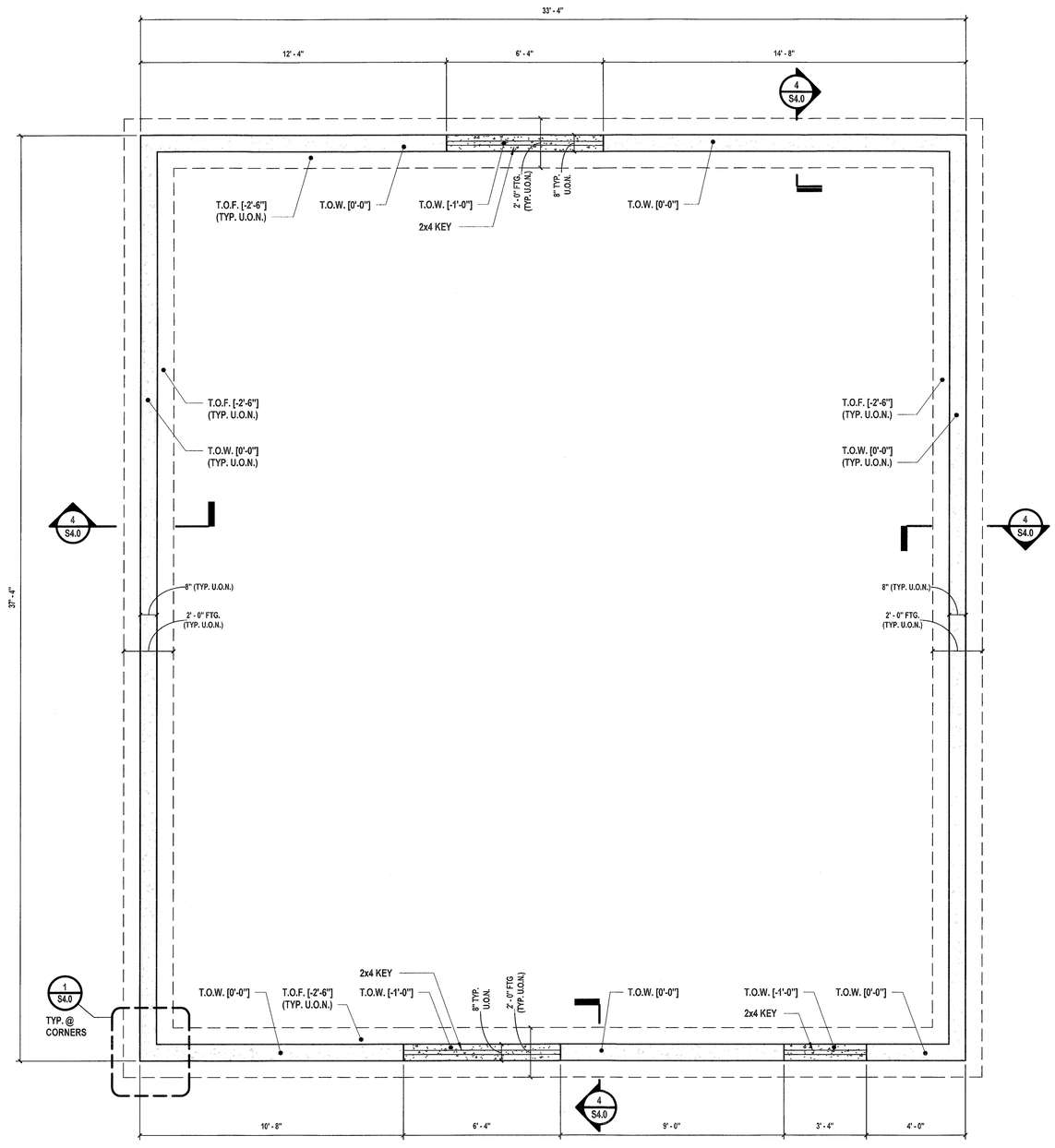
SHEET TITLE

SITE DETAILS

DRAWING No. **C4.0**

SHEET No. 8 OF 51

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1 Foundation Plan
SCALE: 3/8" = 1'-0"

LEGEND:

U.O.N. = UNLESS OTHERWISE NOTED
T.O.F. = TOP OF FOOTING
T.O.W. = TOP OF WALL

FOUNDATION PLAN NOTES:

1. ELEVATIONS SHOWN THUS [ ] ARE RELATIVE TO FINISHED FIRST FLOOR ELEVATION [0'-0"] WHICH HAS BEEN ESTABLISHED AS EL 43.5'.
2. ALL EXCAVATED EARTH SHALL BE REPLACED WITH TYPE 'C' CONTROLLED FILL AS PER SPECIFICATION SECTION 312323.13.
3. CONTRACTOR SHALL COORDINATE SIZE AND LOCATIONS OF ALL REQUIRED PIPING AND CONDUIT PENETRATIONS THROUGH CONCRETE SLAB WITH ALL OTHER CONTRACTS. PROVIDE PIPE SLEEVES AND REINFORCEMENT AROUND PENETRATIONS AS PER DETAIL 2 ON SHEET S4.0.
4. REFER TO 'A' DWGS FOR WATERPROOFING REQUIREMENTS.
5. COORDINATE LOCATIONS OF REINFORCEMENT DOWELS INTO BUILDING WALLS WITH MASONRY TRADE.

DESIGN LOADS:

ALL DESIGN LOADS ARE IN ACCORDANCE WITH 2016 BC-NYS IN CONJUNCTION WITH IBC-2015 & ASCE 7-10.

1. BUILDING DESIGN LOADS:
   - FIRST FLOOR LIVE LOAD = 100 PSF
   - FIRST FLOOR COLLATERAL DEAD LOAD = 10 PSF
   - ROOF T.C. LIVE LOAD = 22 PSF
   - ROOF T.C. DEAD LOAD = 12 PSF
   - ROOF B.C. LIVE LOAD = 10 PSF
   - ROOF B.C. DEAD LOAD = 10 PSF
2. SNOW LOADS:

GROUND SNOW LOAD,	Pg = 20 PSF
(EXPOSURE)	Ce = 1.0
(THERMAL)	Ct = 1.0
(IMPORTANCE)	Is = 1.1
FLAT ROOF SNOW LOAD	PF = Is * Pg = 22 PSF

3. WIND LOADS:

BASIC WIND SPEED:	144 MPH
EXPOSURE:	B
IMPORTANCE FACTOR:	Iw = 1.0
EXPOSURE ADJUSTMENT FACTOR:	1.0
INTERNAL PRESSURE COEFFICIENT:	Gcpi = ±0.18

		EXPOSURE B WIND LOADS		EXPOSURE ADJUSTMENT COEFFICIENT		DESIGN WIND LOADS
MWFRS WALL	(END ZONE)	45.6 PSF	x	1.0	=	45.6 PSF
MWFRS WALL	(INT. ZONE)	30.4 PSF	x	1.0	=	30.4 PSF
MWFRS ROOF	(END ZONE)	-8.3 PSF	x	1.0	=	-8.3 PSF
MWFRS ROOF	(INT. ZONE)	6.8 PSF	x	1.0	=	6.8 PSF
MWFRS ROOF	(UPLIFT)	-39.5 PSF	x	1.0	=	-39.5 PSF
COMPONENTS & CLADDING	(WALL PRESSURE)	37.4 PSF	x	1.0	=	37.4 PSF
	(WALL SUCTION)	-50.0 PSF	x	1.0	=	-50.0 PSF
	(ROOF PRESSURE)	20.5 PSF	x	1.0	=	20.5 PSF
	(ROOF SUCTION)	-59.5 PSF	x	1.0	=	-59.5 PSF

4. SEISMIC CRITERIA:
   - SITE CLASS: D
   - (IMPORTANCE) Ie = 1.25
   - Fa = 1.6 FV = 2.4
   - Ss = 0.0154%g S1 = 0.056%g
   - Sms = 0.246 Sm1 = 0.134
   - Sds = 0.164 Sd1 = 0.090
   - SEISMIC DESIGN CATEGORY: B
   - EQUIVALENT LATERAL FORCE PROCEDURE
   - ORDINARY REINFORCED MASONRY SHEAR WALLS
   - R = 2.0 Cs = 0.1025
   - LATERAL FORCES:
   - LATERAL FORCE F1 = 5.11 KIPS (ROOF)
   - BASE SHEAR = 11.5 KIPS
5. SOIL BEARING CAPACITY: 2.0 TONS/S.F.
   AS REFERENCED BY SUB-SURFACE SOILS INVESTIGATION PERFORMED BY CARLIN SIMPSON & ASSOCIATES (OCTOBER 16, 2017 REVISED NOVEMBER 2, 2017).

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CONSULTANTS:

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STATE OF NEW YORK · MICHAEL W McKEOWN · LICENSED PROFESSIONAL ENGINEER · NO. 062149

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NGZ	NGZ		

PROJECT No:	DATE:	SCALE:
RDWD 17-02	MARCH 2018	AS SHOWN

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Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT
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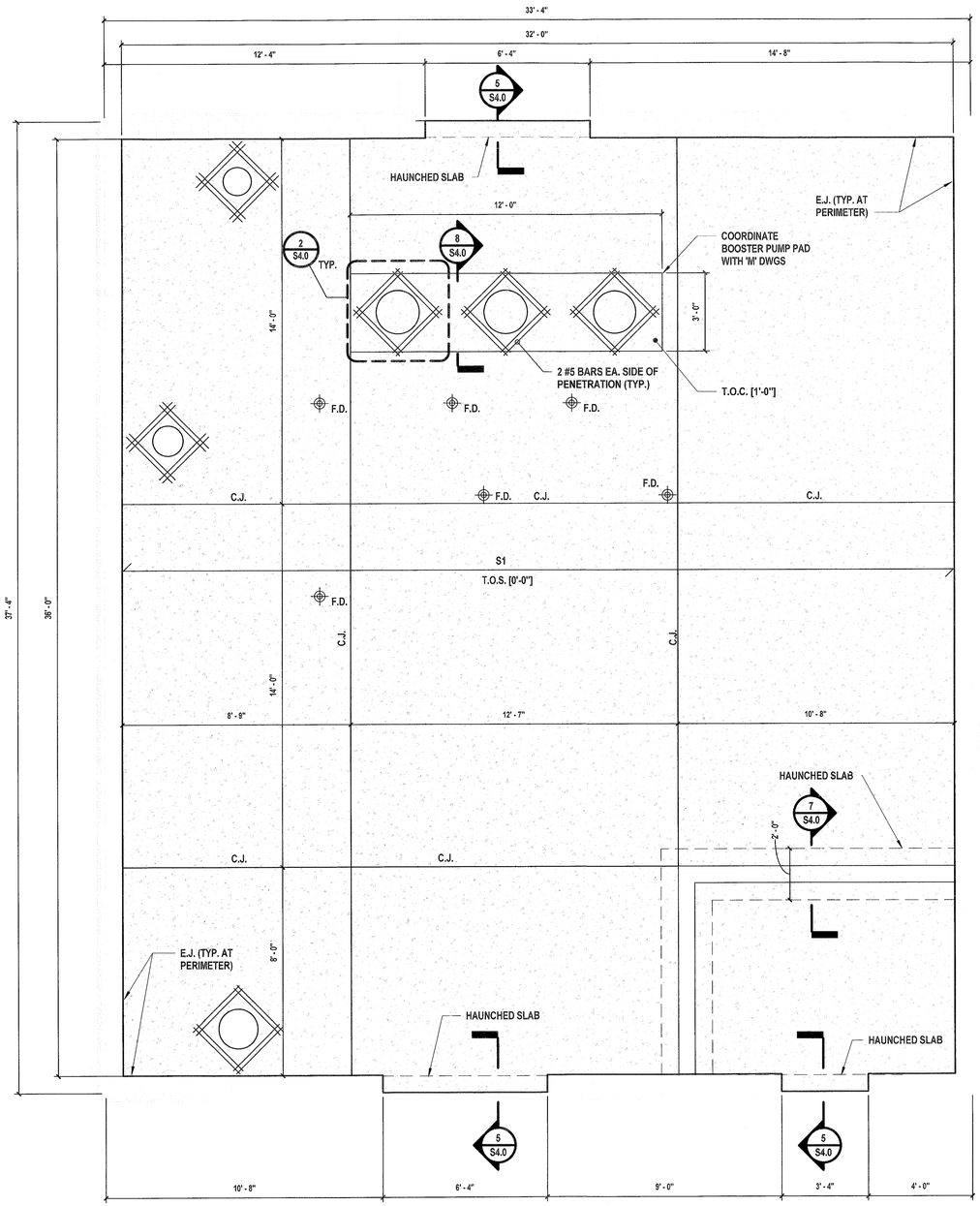
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FOUNDATION PLAN AND DESIGN LOADS

DRAWING No. **S1.0**

SHEET No. 9 OF 51

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1 **Slab Plan**
SCALE: 3/8" = 1'-0"

LEGEND:

E.J. = 1/2" PREMOLDED EXPANSION JOINT
T.O.S. = TOP OF SLAB
F.D. = FLOOR DRAIN, SEE CONTRACT 'P' FOR MORE INFORMATION
C.J. = CONTROL JOINT
T.O.C. = TOP OF CURB
U.O.N. = UNLESS OTHERWISE NOTED

SLAB NOTES:

1. ELEVATIONS SHOWN THUS [ ] ARE RELATIVE TO FINISHED FIRST FLOOR ELEVATION [0'-0"] WHICH HAS BEEN ESTABLISHED AS EL 43.5'.
2. S1 INDICATES 6" CONCRETE SLAB ON GRADE REINFORCED WITH 6x6 - W2.9xW2.9 W.W.F.
3. PROVIDE 1/2" PRE-MOLDED EXPANSION JOINT AROUND PERIMETER OF CONCRETE SLAB ON METAL DECK AND SLAB ON GRADE WHERE IT ABUTS THE FOUNDATION WALL OF THE BUILDING.
4. COORDINATE LOCATIONS OF INTERIOR MASONRY WALLS WITH 'A' DWGS. PROVIDE #5 DOWELS, 1'-4" x 6" LG. @ 48" O.C. TO BE EMBEDDED INTO CONCRETE FLOOR SLAB.
5. COORDINATE SLAB OPENINGS WITH 'M' DRAWINGS.

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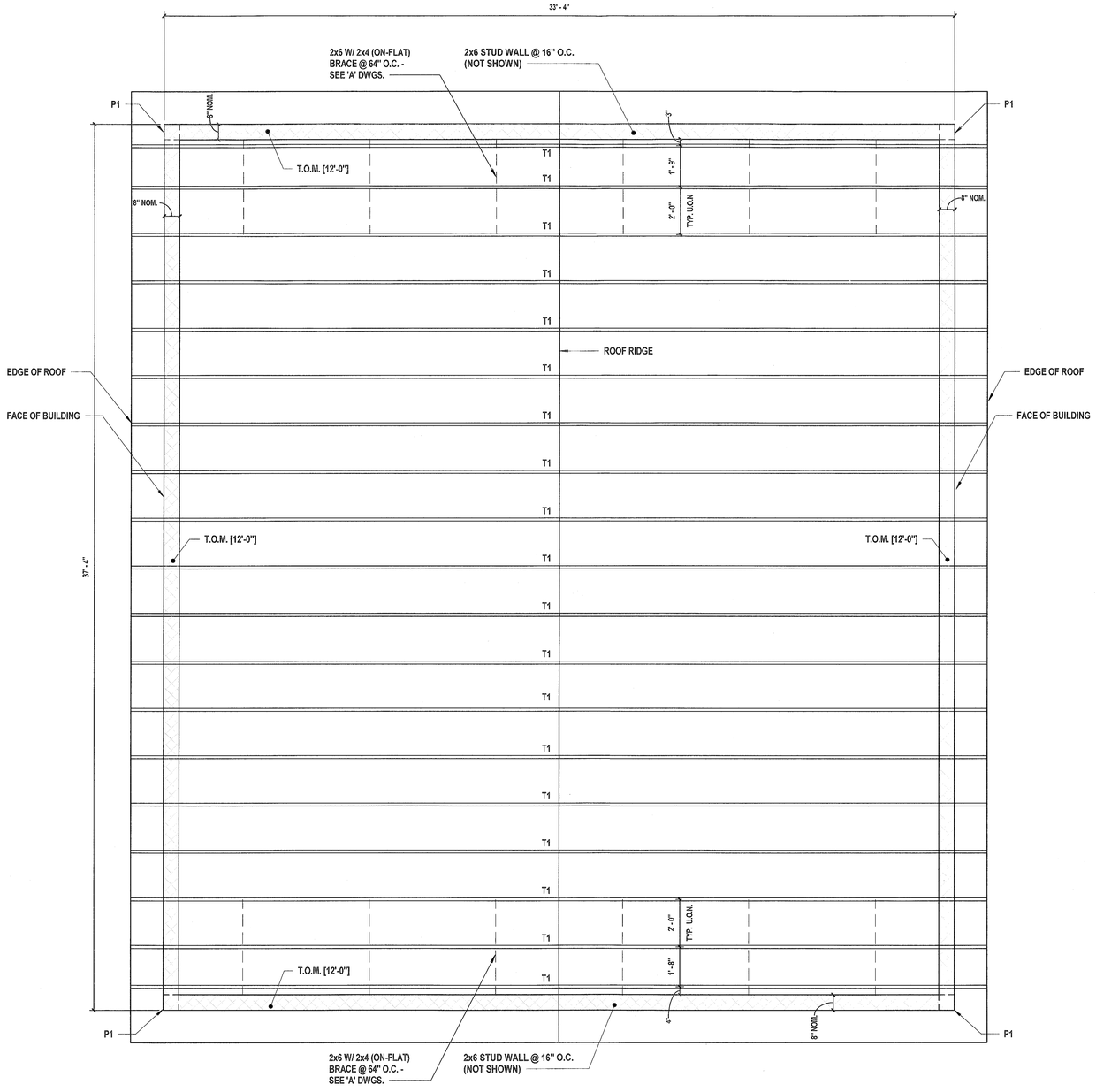
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SLAB PLAN

DRAWING No.
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1 **Roof Framing Plan**
SCALE: 3/8" = 1'-0"

LEGEND:

T.O.M. = TOP OF MASONRY

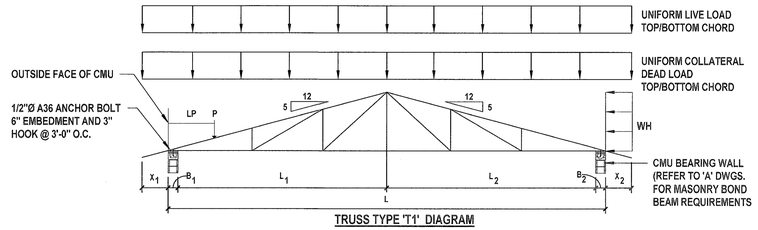
P1 = SHEAR WALL END POST (SEE DETAIL 6/S4.0)

= 8" CMU REINFORCED W/ #5 BARS @ 48" O.C.

U.O.N. = UNLESS OTHERWISE NOTED

MASONRY NOTES:

1. ALL VERTICAL MASONRY WALL REINFORCEMENT SHALL BE #5 BARS SPACED AT A MAXIMUM OF 48" O.C., TYP. UNLESS OTHERWISE NOTED.
2. THE FIRST CELL ADJACENT TO MASONRY OPENINGS, AS WELL AS ALL CORNERS, SHALL CONTAIN (1) CONT. #5 BAR, YUP. AT EACH SIDE OF OPENING.
3. FILL ALL MASONRY CELLS CONTAINING REINFORCEMENT SOLID WITH MORTAR, TYP.
4. REFER TO 'A' DWGS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS NOT OUTLINED HERE
5. ALL VERTICAL REINFORCEMENT INTERRUPTED BY STRUCTURAL STEEL SHALL BE WELDED TO TOP OF STEEL MEMBERS, TYP.
6. COORDINATE PLACEMENT OF VERTICAL WALL DOWELS EMBEDDED INTO FOUNDATION WALL WITH CELLS OF MASONRY WALL. DOWEL SPACING TO MATCH SPACING OF VERTICAL REINFORCEMENT IN WALLS, TYP.
7. SHEAR WALL END POSTS SHALL BE INSTALLED WITH A 4'-6" LG. DOWEL THAT SHALL EXTEND FROM THE FOUNDATION WALL A MIN. OF 2'-6" INTO THE CMU WALL ABOVE. REFER TO DETAIL 6/S4.0 FOR ADDITIONAL INFO.



TRUSS TYPE 'T1' DIAGRAM

TRUSS SCHEDULE									
TRUSS ASSEMBLY	L (ft.) (V.I.F.)	L_1 (ft)	L_2 (ft)	OVERHANG LENGTH		BEARING WALL WIDTH-NOMINAL		POINT LOADS	
				X_1 (ft)	X_2 (ft)	B_1 (ft)	B_2 (ft)	P (KIPS) TOP CHORD	P (KIPS) BOTTOM CHORD
T1	33' - 4"	16' - 0"	16' - 0"	1'-5"	1'-5"	0'-8"	0'-8"	-	-
UNIFORM LOADS						LATERAL LOADS		LOAD LOCATION (LP)	
TRUSS ASSEMBLY	TOP CHORD		BOTTOM CHORD			WIND WH (PSF)		TOP CHORD	BOTTOM CHORD
	DL (PLF)	LL (PLF)	DL (PLF)	LL (PLF)		8.3		-	-
T1	24.0	44.0	20.0	20.0					

2 **Truss Schedule and Diagram**
SCALE:N.T.S.

TRUSS/CONVENTIONAL FRAMING NOTES:

1. QUANTITY AND TYPE OF TRUSSES SHOWN ARE BASED ON MINIMUM DESIGN REQUIREMENTS. TRUSSES ARE ASSUMED TO BE PLACED AT 2'-0" O.C. FOR INDICATED LOADS. THE CONTRACTOR SHALL BE RESPONSIBLE TO FURNISH AND INSTALL A COMPLETE TRUSS SYSTEM, WHICH MEETS ALL DESIGN LOAD AND CONSTRUCTION REQUIREMENTS. DEVIATION FROM THE PROPOSED LAYOUT, AS INDICATED BY THE TRUSS MANUFACTURER'S SHOP DRAWINGS, RESULTING IN A CHANGE IN THE REQUIREMENTS FOR ANY CONNECTOR OR OTHER HARDWARE SPECIFIED SHALL BE COORDINATED AND SUBSTITUTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
2. BOTTOM AND TOP CHORD MEMBERS SHALL BE 2"x 6" (NOM.) MINIMUM.
3. NET UPLIFT IS EQUAL TO -14.1 PSF FOR TRUSS SYSTEM.
4. THE CONTRACTOR SHALL PROVIDE CONTINUOUS TOP AND BOTTOM CHORD LATERAL BRACING AS PER THE REQUIREMENTS OF THE TRUSS PLATE INSTITUTE AND THE TRUSS PLATE MANUFACTURER'S RECOMMENDATIONS. MINIMUM (2) ROWS TOP AND BOTTOM. ROOF SHEATHING SHALL CONSIST OF 3/4" PLYWOOD.
5. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR EXACT LENGTHS AND DETAILS OF SOFFIT OVERHANGS, AS WELL AS ROOF PITCH.
6. BOTTOM OF TRUSSES SHALL BEAR ON (2)2x8 BEARING PLATES ALONG MASONRY WALL, AS DETAILED ON THE 'A' DWGS. PLATE TO BE ATTACHED TO MASONRY BOND BEAM USING 1/2" Ø A36 ANCHOR BOLTS W/ 3" HOOK @ 3'-0" O.C.
7. DESIGN TRUSSES FOR AN UNBALANCED SNOW LOAD COMBINATION AS PER ASCE 7-10.
8. PROVIDE H2.5A SEISMIC AND HURRICANE TIES FOR ATTACHMENT OF T1 TRUSSES TO (2)2x8 BEARING PLATES. TIES SHALL BE MANUFACTURED BY SIMPSON-STRONG TIE OR EQUAL.
9. DISTANCE 'LP' IS SET RELATIVE TO THE OUTSIDE FACE OF THE CMU BEARING WALL OF THE BUILDING.

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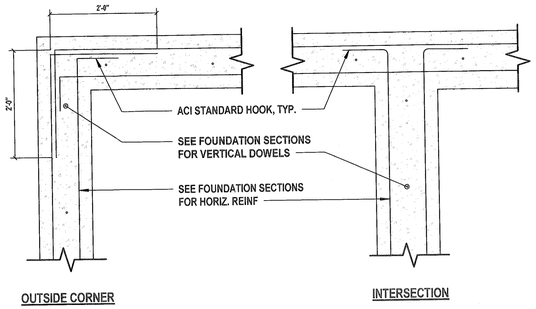
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ROOF FRAMING PLAN

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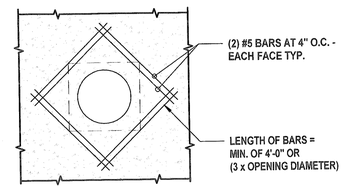
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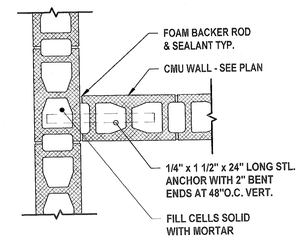
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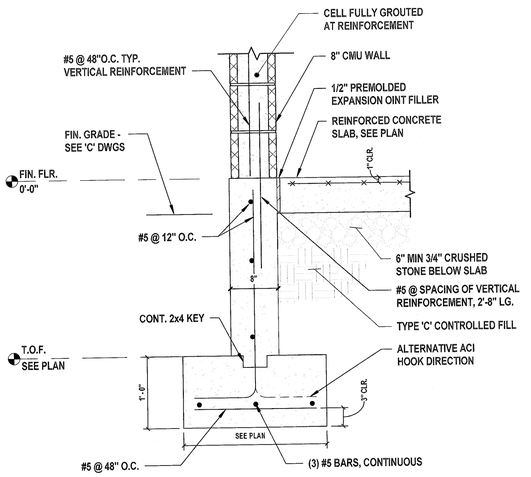
1 Typical Foundation Corner and Intersection Reinfocement
SCALE: N.T.S.



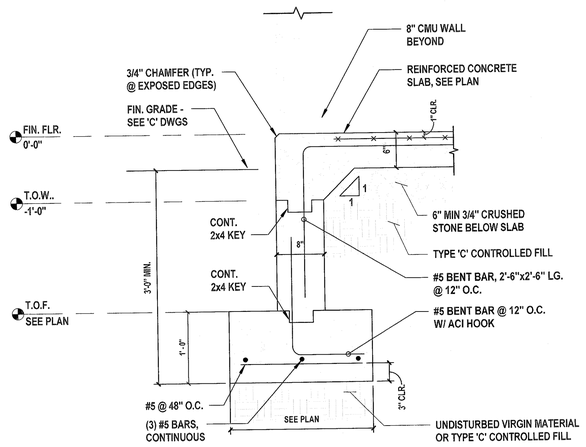
2 Typical Elevation at Wall/Slab Penetration
SCALE: N.T.S.



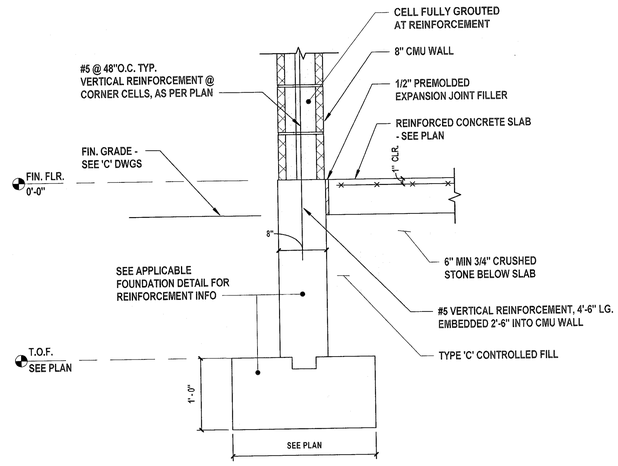
3 Typical Masonry Wall Intersection
SCALE: N.T.S.



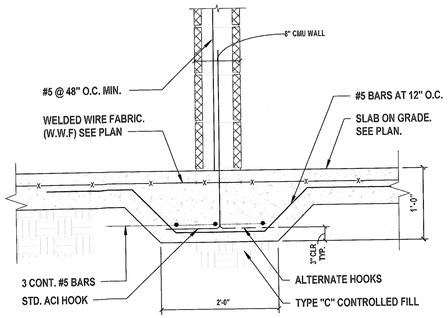
4 Typical Exterior Foundation Wall
SCALE: 1" = 1'-0"



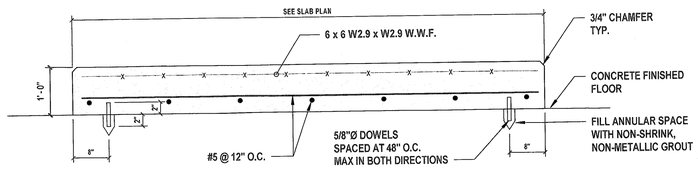
5 Typical Haunched Slab at Doorways
SCALE: 1" = 1'-0"



6 Typical Shear Wall End Post Reinforcement
SCALE: 1" = 1'-0"



7 Typical Haunched Slab at Masonry Partition
SCALE: N.T.S.



8 Booster Pump Pad
SCALE: N.T.S.

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Tuthills Lane, Jamesport

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ABBREVIATIONS

AB	ANCHOR BOLT
ABV	ABOVE
A/C	AIR CONDITIONER
ACI	AMERICA CONCRETE INSTITUTE
ACST	ACOUSTIC
ACT	ACOUSTICAL CEILING TILE
ACU	AIR CONDITIONER UNIT
AD	ACCESS DOOR
ADAPT	ADAPTATION
ADH	ADHESIVE
ADJ	ADJUSTABLE
ADMIN	ADMINISTRATION
ADO	AUTOMATIC DOOR OPERATOR
A/E	ARCHITECT/ENGINEER
AFF	ABOVE FINISH FLOOR
ALT	ALTERNATE
ALUM	ALUMINUM
ANCH	ANCHOR
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APA	ACCESS PANEL
APPROX	APPROXIMATE
ASPH	ASPHALT
ASPPLK	ASPHALT PLANK
ASSIST	ASSISTANT
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS
AT	ACOUSTICAL TILE
AWS	AMERICAN WELDING SOCIETY
BAL	BALANCE
BB	BULLETIN BOARD
BC	BRICK COURSE
BD	BOARD
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
B.O.	BOTTOM OF
BOL	BOTTOM OF LINTEL
BOT	BOTTOM
BR	BUMPER RAIL
BRKT	BRACKET
BU	BUILT-UP
CAB	CABINET
CB	CATCH BASIN
CC	CONTRACTOR
CEIL	CEILING
CEM	CEMENT
CER	CERAMIC
CFI	CONDUCTIVE FLOORING
CG	CORNER GUARD
CIP	CAST-IN-PLACE
CJ	CONTROL JOINT
CLG	CEILING
CLGL	CLEAR GLASS
CLO	CLOSER
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
CORR	CORRIDOR
CPT	CARPET
CR	CARD READER
CRS	CORROSION-RESISTANT STEEL
CRSI	CONCRETE REINFORCED STEEL INSTITUTE
CS	COUNTERSUNK
CT	CERAMIC TILE
CTG	COATING
CTR	CENTER
CU	COPPER
CW	COLD WATER
DBL	DOUBLE
DET	DETAIL
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DISP	DISPENSER
DN	DOWN
DR	DRESSING
DS	DOWNSPOUT
DWG	DRAWING
DWR	DRAWER
E	ELECTRICAL
EA	EACH
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRIC/ELECTRICAL
ELEV	ELEVATION
ENG	ENGINEER
EP	ELECTRICAL PANEL
EPY	EPOXY COATING
EQ	EQUAL
EQUIP	EQUIPMENT
E.S.	EACH SIDE
EXAM	EXAMINATION
EXIST	EXISTING
EXST	EXHAUST
EXP	EXPOSED
EXPN	EXPANSION
EXT	EXTERIOR
FAI	FRESH AIR INTAKE
F.C.	FIRE CODE
F.B.O.	FURNISHED BY OTHERS
FC	FILING CABINET
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FF	FINISH FLOOR
FHC	FIRE HOUSE CABINET
FHMS	FLAT HEAD MACHINED SCREW
FIN	FINISH
FLAM	FLAMMABLE
FLR	FLOOR
FLS	FLASH
FDN	FOUNDATION
FP	FIRE PARTITION
FR	FIRE RETARDANT
FSP	FIRE STANDPIPE
FTG	FOOTING
FXGL	FIXED GLASS
FUR'G	FURRING
G	GAS
GA	GAUGE
GALV	GALVANIZED
GB	GRAB BAR
GEN	GENERAL
GL	GLASS, GLAZED
GR	GRADE
GRT	GROUT
GWB	GYPSUM WALL BOARD
GYP	GYPSUM
GYP.BD.	GYPSUM BOARD
HC	HANDICAPPED
HDBD	HARDBOARD
HDWD	HARDWOOD
HDWE	HARDWARE
HM	HALLOW MATERIAL
HOR	HORIZONTAL
HR	HANDRAIL
HT	HEIGHT
HTG	HEATING
HW	HOT WATER
INSUL	INSULATION/INSULATING
INT	INTERIOR
JNT	JOINT
JST	JOIST
KP	KICK PLATE
LAM	LAMINATE
LAV	LAVATORY
LDR	LEADER
LKR	LOCKER
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LOC	LOCATION
LP	LOW POINT
LMSTN	LIMESTONE
LT	LIGHT
M	MECHANICAL
MANUF	MANUFACTURER
MATL	MATERIAL
MAX	MAXIMUM
MB	MODIFIED BITUMEN
MECH	MECHANICAL
M.E.P.	MECHANICAL, ELECTRICAL, PLUMBING
MET	METAL
MFD	MANUFACTURED
MFR	MANUFACTURER
MGR	MANAGER
MID	MIDDLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLDG	MOLDING
MNT	MOUNTED
MO	MASONRY OPENING
MOIST	MOISTURE
MPE	MECHANICAL PLUMBING ELECTRICAL
MR	MOISTURE RESISTANT
MT	METAL THRESHOLD
MTL	METAL
MTP	METAL TOILET PARTITION
MULT	MULTIPLE
NBS	NATIONAL BUREAU OF STANDARDS
NIC	NOT IN CONTRACT
NL	NEOPRENE LATEX
NO	NUMBER
NRCA	NATIONAL ROOFING CONTRACTORS ASSOC.
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OVERHEAD DOOR
OPGHN	OPENING
OPP	OPPOSITE
OW	OBSERVATION WINDOW
OWSJ	OPEN WEB STEEL JOIST
P	PLUMBING
PAR	PARALLEL
PC	POURED CONCRETE
PERP	PERPENDICULAR
PL	PLATE OR PLASTIC
PLAS	PLASTIC
P.LAM	PLASTIC LAMINATED
PLBG	PLUMBING
PLYWD	PLYWOOD
PNL	PANEL
PNT'D	PAINTED
PORT	PORTABLE
PROJ	PROJECTION
PS	PRODUCT STANDARD
PSF	POUNDS PER SQUARE FOOT
PSI	SOUNDS PER SQUARE INCH
PT	PAINT
PTD	PAINTED
PTN	PARTITION
PVC	POLYVINYL CHLORIDE
PW	PASS WINDOW
QA	QUALITY ASSURANCE
QT	QUARRY TILE
R	RADIUS OR RISER
(R)	RELOCATED ITEM
RBR	RUBBER BASE
R&C	RECEPTION & CONTROL
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
RDL	ROOF DRAIN LEADER
REC	RECEPTION
REINF	REINFORCED
REF	REFRIGERATION
REG	REGLET
REHAB	REHABILITATION
REPRO	REPRODUCTION
REQMT	REQUIREMENT
RESIL	RESILIENT
RM	ROOM
RO	ROUGH OPENING
RP	RETRACTABLE PARTITION
RST	RESISTANCE
RT	RUBBER TILE
SC	SPECIAL COATING
SCHED	SCHEDULE
SECT	SECTION
SGFU	STRUCTURAL GLAZED FACING UNITS
SH	SHELVING, SHELF
SIM	SIMILAR
SJC	SEISMIC JOINT CEILING
SJF	SEISMIC JOINT FLOORING
SJW	SEISMIC JOINT WALL
SPEC	SPECIFICATIONS
SQ	SQUARE
S&R	SHELF & ROD
S&S	SERVICE SINK
SS	STAINLESS STEEL
STA	STATION
STL	STEEL
STOR	STORAGE
STR	STRUCTURE
STRUC	STRUCTURAL
SUB	SUBCONTRACTOR
SUPER	SUPERVISOR
SUSP	SUSPEND
SVF	SHEET VINYL FLOORING
SW	SIDEWALK
SYM	SYMMETRICAL
T	TOILET
TECH	TECHNICIAN
TEL	TELEPHONE
TEM	TEMPERED
TEMP	TEMPERATURE
TEMPY	TEMPORARY
TERR	TERRAZZO
THK	THICK
TOM	TOP OF MASONRY
TOS	TOP OF STEEL
TOX	TOXIC
TR	TREAD
TRTD	TREATED
TRTMT	TREATMENT
TVCTV	SCREEN OR MONITOR, CEILING MOUNTED
TVWTV	SCREEN OR MONITOR, WALL MOUNTED
TYP	TYPICAL
UBC	UNIFORM BUILDING CODE
UNAS	UNASSIGNED
UNO	UNLESS NOTED OTHERWISE
UNPT	UNPAINTED
UPS	UNINTERRUPTED POWER SUPPLY
UR	URINAL
UTIL	UTILITY
V	VACUUM
VB	VAPOR BARRIER
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST	VESTIBULE
VH	VINYL HOMOGENEOUS
VIN	VINYL
VTR	VENT THRU ROOF
VWC	VINYL WALL COVERING
W	WALL COVERING
w/	WITH
WC	WATER CLOSET
WC	WHEEL CHAIR
WD	WIDTH OR WOOD
WH	WATER HEATER
WI	WROUGHT IRON
WMF	WELDED WIRE FABRIC
W/O	WITHOUT
WP	WATERPROOFING
WR	WASTE REPLACEMENT
WSCT	WAINSCOT
WT	WALL TILE
WVF	WELDED VINYL FLOORING

GENERAL NOTES

1. ALL WORK WILL BE COMPLETED IN ACCORDANCE WITH THE 2015 IBC CODES WITH 2016 NYS CODE SUPPLEMENTS, LOCAL ZONING AND PLANNING CODES AND ORDINANCES, AND THE RULES AND REGULATIONS OF ALL LOCAL AGENCIES, DEPARTMENTS AND PUBLIC UTILITY COMPANIES HAVING JURISDICTION OVER ANY PORTION OF SPECIFIC PHASE OF WORK.
2. THE CONTRACTOR SHALL CHECK AND VERIFY ALL CONDITIONS AT THE SITE BEFORE STARTING WORK AND SHALL FAMILIARIZE HIMSELF WITH THE INTENT OF THESE PLANS AND MAKE SURE WORK AGREES WITH SAME. IF DURING THE CONSTRUCTION, A CONDITION EXISTS WHICH DISAGREES WITH THAT INDICATED ON THE PLANS, THE CONTRACTOR SHALL STOP WORK AND NOTIFY ARCHITECT/ENGINEER. VERIFY EXACT LAYOUT CAPABILITY WITH ALL EXISTING CONDITIONS AND IF ANY DISCREPANCIES ARE FOUND WITH CONDITIONS ENCOUNTERED. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY MEASURES, TIME LOST, CHANGES TO THE WORK SCOPE, ETC. WITHOUT ANY ADDITIONAL COMPENSATION, IF CONTRACTOR FAILS TO PROVIDE AFOREMENTIONED VERIFICATIONS AND COORDINATION PRIOR TO COMMENCING WORK. HE SHALL ASSUME ALL RESPONSIBILITY AND LIABILITY ARISING FROM HIS ACTIONS.
3. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS, CONFIRMED BY FIELD CONDITIONS, TAKE PRECEDENCE. IF A DISCREPANCY ARISES BASED ON FIELD CONDITIONS, CONSULT WITH ARCHITECT/ENGINEER BEFORE PROCEEDING WITH WORK OR ORDERING MATERIALS.
4. BY ENTERING INTO CONTRACT ON THE CONSTRUCTION, THE CONTRACTOR ACCEPTS THE RESPONSIBILITY TO BE KNOWLEDGEABLE AS TO THE REQUIREMENTS OF THE NEW YORK STATE GOVERNING CODES AND OTHER FEDERAL STATE AND LOCAL ORDINANCES HAVING JURISDICTION. THE REQUIREMENTS OF THE FOREGOING CODES AND ORDINANCES SHALL SUPPLEMENT THE REQUIREMENTS SHOWN ON THE DRAWINGS AND ELSEWHERE IN THE SPECIFICATIONS AND IN THE EVENT OF CONFLICT WITH THE ARCHITECTURAL SPECIFICATIONS, THE REQUIREMENTS OF THE CODE OR ORDINANCE SHALL PREVAIL UNLESS THE ARCHITECTURAL SPECIFICATION IS MORE STRINGENT. NON FAMILIARITY WITH THE REQUIREMENTS OF GOVERNING CODES OR ORDINANCES WILL NOT BE CAUSE FOR AN "EXTRA." IN THE EVENT OF NONCOMPLIANCE, THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ALL COSTS OF REMOVAL OR NON COMPLYING WORK AND REPLACEMENT WITH COMPLYING WORK.
5. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE BUILDING, FIRE, PLUMBING, MECHANICAL, GAS & ENERGY CODES OF NEW YORK STATE AND WITH THE RULES AND REGULATIONS OF ALL LOCAL AGENCIES, DEPARTMENTS OR LAWS HAVING JURISDICTION OVER ANY PORTION OR SPECIFIC PHASE OF THE WORK. THE CONTRACTOR SHALL COORDINATE THE WORK WITH PUBLIC UTILITY COMPANIES HAVING JURISDICTION.
6. VERIFY ALL CHANGES TO WORK IN WRITING WITH THE ARCHITECT/ENGINEER AND OWNER BEFORE BEGINNING RELATED WORK.
7. ALL SECTIONS AND DETAILS SHALL BE CONSIDERED TYP. AND APPLY FOR THE SAME AND SIMILAR CONDITIONS, UNLESS OTHERWISE SPECIFICALLY NOTED.
8. ANY ITEM OF WORK NECESSARY FOR PROPER COMPLETION OF CONSTRUCTION, WHICH IS NOT SPECIFICALLY COVERED ON THE DRAWINGS, SHALL BE CONSIDERED INCLUDED IN THIS WORK AND SHALL BE PERFORMED IN A MANNER DEEMED GOOD PRACTICE OF THE TRADE INVOLVED.
9. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE SAFETY OF THE PUBLIC AND THE PROPERTY DURING CONSTRUCTION OPERATIONS AND UNTIL COMPLETION OF ALL WORK.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACTS AND OMISSIONS OF ALL THEIR EMPLOYEES AND ALL SUBCONTRACTORS, THEIR AGENTS, AND ALL OTHER PERSONS PERFORMING ANY OF THE WORK UNDER A CONTRACT WITH THE CONTRACTOR. THE CONTRACTOR SHALL BE FULLY INSURED WITH LIABILITY AND WORKERS COMPENSATION.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATELY BRACING AND PROTECTING ALL WORK DURING CONSTRUCTION AGAINST DAMAGE, BREAKAGE, COLLAPSE, DISTORTION AND MISALIGNMENT.
12. THE ARCHITECT/ENGINEER SHALL NOT BE RESPONSIBLE FOR THE PERFORMANCE OF THE WORK OF THE GENERAL CONTRACTOR, OWNER OR ANY OTHER SUBCONTRACTORS, NOR SHALL THEY GUARANTEE THEIR PERFORMANCE.
13. CONTRACTOR SHALL NOTIFY ARCHITECT/ENGINEER IMMEDIATELY IF HE OR SHE CANNOT COMPLY WITH ALL REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS AND THE BUILDING CODE OF NEW YORK STATE.
14. THE CONTRACTOR SHALL INDEMNIFY AND HOLD THE ARCHITECT/ENGINEER AND HIS AGENTS HARMLESS FROM AND AGAINST ALL LOSS, DAMAGE OR EXPENSE (INCLUDING REASONABLE ATTORNEY FEES) RESULTING FROM ANY CLAIM OF WHATSOEVER KIND OF NATURE.
15. THE ARCHITECT/ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY CHANGES TO THIS PROJECT MADE BY OWNER, GENERAL CONTRACTOR OR ANY SUBCONTRACTOR OR MATERIAL SUPPLIER UNLESS PROPERLY AUTHORIZED, IN WRITING, BY THE ARCHITECT/ENGINEER.
16. ALL DRAWINGS, SPECIFICATIONS, AND COPIES SHALL REMAIN THE PROPERTY OF THE ARCHITECT/ENGINEER. THEY SHALL BE USED ONLY WITH RESPECT TO THE CONTRACTORS WORK AND SHALL NOT BE USED IN ANY MANNER ON ANY OTHER PROJECT.
17. THESE DOCUMENTS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. CARE OF ADJACENT PROPERTIES DURING CONSTRUCTION, SAFETY AND COMPLIANCE WITH STATE AND FEDERAL REGULATIONS IS THE CONTRACTORS RESPONSIBILITY.
18. THE CONTRACTOR SHALL TAKE PRECAUTIONARY MEASURES TO PROTECT THE PREMISES FROM DIRT OR DAMAGE, DURING AND UNTIL COMPLETION AND FINAL ACCEPTANCE OF THE PROJECT. ALL ITEMS REMOVED FROM THE PROJECT SITE DURING THE CONSTRUCTION SHALL REMAIN THE PROPERTY OF THE OWNER EXCEPT THE DEBRIS THAT SHALL BE REMOVED FROM THE PROJECT SITE AND LEGALLY DISPOSED OF ON A DAILY BASIS.
19. EACH CONTRACTOR IS RESPONSIBLE FOR THE COORDINATION OF THEIR WORK WITH THE WORK OF OTHER CONTRACTORS INCLUDING MECHANICAL, ELECTRICAL AND PLUMBING TRADES
20. ALL NAILING SHALL BE IN ACCORDANCE WITH THE BUILDING CODE OF NEW YORK STATE AND THE WOOD FRAMING CONSTRUCTION MANUAL.
21. DATUM ELEVATION AT FINISHED FLOOR IS EL: +0'-0". ALL VERTICAL DIMENSIONS FOR THE FLOOR PLANS, ELEVATIONS, SECTIONS AND DETAILS ARE REFERENCED FROM THIS DATUM.

SYMBOL LEGEND

ROOM NAME
10001A — Room Designation

1i — Wall Type

A — Window Elevation Key

0 — Column Grid

1001A — Door Number

Name / Elevation — Elevation Line

1 / A101 — Building Section Cut

1 TITLE SCALE: 1/4" = 1'-0" — Drawing Title

1 / A101 — Wall Section Cut

XX — Revision Tag

1 / A101 — Detail Key

12'-0" / 1'-9" A.F.F. — Ceiling Height

Brick

Batt Insulation

Acoustic Tile
Ceramic Tile

Rigid Insulation

Concrete

Stud & Gypsum Board

Concrete Block

Plywood

Earth

Wood Blocking

Steel

Wood

WALL TYPES

1

METAL HORIZ. WALL REINF. EVERY SECOND COURSE
METAL VERT. WALL REINF. - GROUT CELLS SOLID
VINYL SHAKE ON TYVEK ON 5/8" EXT. GRADE PLYWOOD
2x3 P.T. FURRING W/ 2" RIGID INSULATION IN BETWEEN
8" CMU
FINISH AS SCHEDULED

EXTERIOR MASONRY WALL WITH VINYL SHAKE - 2 HOUR FIRE RATING - UL DESIGN No. U905

2

METAL HORIZ. WALL REINF. EVERY SECOND COURSE
METAL VERT. WALL REINF. - GROUT CELLS SOLID
FINISH AS SCHEDULED
8" CMU
FINISH AS SCHEDULED

H2M architects + engineers
538 Broad Hollow Road, 4th Floor East
Melville, NY 11747
631.756.8000 • www.h2m.com

CONSULTANTS:

MARK	DATE	DESCRIPTION

REGISTERED ARCHITECT KENNETH R. OSBORNE 026893 STATE OF NEW YORK

"ALTERATION OF THIS DOCUMENT EXCEPT BY A LICENSED PROFESSIONAL IS ILLEGAL"

DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
KRG, MF	REH	KRG	
PROJECT No:	DATE:	SCALE:	
RDWD 17-02	MARCH 2018	AS SHOWN	

CLIENT
Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT
CONTRACT G
GENERAL CONSTRUCTION

STATUS
FINAL BID DOCUMENT

SHEET TITLE
GENERAL NOTES, ABBREVIATIONS AND LEGENDS

DRAWING No.
A0.0

SHEET No.
13 OF 50

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GENERAL BUILDING HEIGHTS AND AREAS

(IBC TABLE 504 & 506)

	ALLOWED	PROPOSED
BUILDING OCCUPANCY	F-1	F-1
CONSTRUCTION CLASSIFICATION	III B	III B
HEIGHT (STORIES)	2	1
HEIGHT (FEET)	55' - 0"	19' - 7"
FIRE AREA	12,000 S.F.	1,245 S.F.

NOTES

1. BUILDING IS NOT SPRINKLERED.
2. THE FOLLOWING CHEMICALS ARE BEING STORED:
   (1) 50 GALLON DRUM OF CALCIUM HYPOCHLORITE 1% - OXIDIZER CLASS 2
   THIS QUANTITY IS BELOW THE MAXIMUM ALLOWABLE QUANTITY FOR ANY 'H' OCCUPANCY.

FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS

(IBC TABLE 601)

BUILDING OCCUPANCY CLASSIFICATION: FACTORY INDUSTRIAL F 1 MODERATE-HAZARD
CONSTRUCTION CLASSIFICATION: TYPE II B

BUILDING ELEMENT	HOURS
STRUCTURAL FRAME	0
EXTERIOR BEARING WALLS	2
EXTERIOR NON-BEARING WALLS [1]	0 / 0
INTERIOR BEARING WALLS	0
INT. NON-BEARING WALLS	0
FLOOR CONSTRUCTION	0
ROOF CONSTRUCTION	0

1. AS PER IBC TABLE 602, 'F' OCCUPANCY, FIRE SEPARATION DISTANCE X < 30'
2. SEE DWG. A0.0 FOR WALL TYPES.

INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCC.

(IBC TABLE 803.11)

GROUP F-1 NON-SPRINKLERED

EXIT ENCLOSURES AND EXIT PASSAGEWAYS	-CLASS B
CORRIDORS	-CLASS C
ROOMS AND ENCLOSED SPACES	-CLASS C

MINIMUM NUMBER OF EXITS PER OCCUPIED LOAD

(IBC TABLE (1006.3.1 & 1006.3.2(3))

FLOOR AREA		OCCUPANT LOAD	MINIMUM REQ'D # OF EXITS	# OF EXITS PROVIDED
FIRST FLOOR	1,245 S.F.	4	2	3

1. BASED ON IBC TABLE 1004.1.2 MECHANICAL ROOM = 300 S.F. PER OCCUPANT

CAPACITY OF EXIT DOORS

(IBC SECTION 1006)

DOOR #	MINIMUM WIDTH	ACTUAL WIDTH	# OF PERSONS ALLOWED	# OF PERSONS PROPOSED
01	34" CLEAR	72" DOOR *	170	2
02	32" CLEAR	36" DOOR	160	1
03	34" CLEAR	72" DOOR *	170	1

* - ONLY 1 LEAF ACTIVE

MEANS OF EGRESS SIZING

(IBC SECTION 1005.3.1 & 1005.3.2)

NON-SPRINKLER SYSTEM F-1

STAIRWAY	0.3 IN. PER OCCUPANT
OTHER EGRESS COMPONENTS	0.2 IN. PER OCCUPANT

EXIT ACCESS TRAVEL DISTANCE

(IBC TABLE 1017.2)

OCCUPANCY	FACTORY F-1
NON-SPRINKLER SYSTEM	200 FT. MAX ALLOWABLE 38' - 10" MAX PROVIDED

COMMON PATH OF EGRESS TRAVEL DISTANCE

(IBC TABLE 1006.2.1)

THE COMMON PATH OF EGRESS TRAVEL SHALL NOT EXCEED 75 FEET.

FIRE PROTECTION SYSTEMS

(IBC CHAPTER 9)

SPRINKLER SYSTEM (SECTION 903):	REQUIRED N	PROVIDED N
STANDPIPE SYSTEM (SECTION 905):	REQUIRED N	PROVIDED N
PORTABLE FIRE EXTINGUISHERS (SECTION 906):	REQUIRED Y	PROVIDED Y
FIRE AND SMOKE DETECTION (SECTION 907):	REQUIRED N	PROVIDED N
FIRE ALARM (SECTION 907):	REQUIRED N	PROVIDED N
SMOKE VENTS (SECTION 910):	REQUIRED N	PROVIDED N

GENERAL NOTES

1. ALL GLAZING IN DOORS, FIXED SIDE PANELS ADJOINING DOORS, INTERIOR PARTITIONS WHERE GLAZING EXTENDS TO WITHIN 1'-6" OF FINISHED FLOOR AND GLASS PANELS GREATER THAN 50 SQ. FT. TO BE FULLY TEMPERED SAFETY GLASS PER NYS CODE CHAPTER 7.
2. INSTALL FIREBLOCKING IN COMBUSTIBLE CONCEALED LOCATIONS IN ACCORDANCE WITH IBC SECTION 718.
3. DRAFTSTOPPING IS NOT REQUIRED SINCE THE ATTIC AREA IS LESS THAN 3,000 S.F.
4. THERMAL INSULATION MATERIALS SHALL COMPLY WITH IBC SECTION 720.
5. THIS BUILDING IS EXEMPT FROM THE ACCESSIBILITY REQUIREMENTS OF IBC CHAPTER 11 PER SECTION 1103.2.9.
6. PER IBC 1016.2, EXIT ACCESS THROUGH ACCESSORY SPACES IN GROUP F-1 IS PERMITTED

INTERNATIONAL ENERGY CONSERVATION CODE

EXTERIOR DESIGN CONDITIONS PER TABLE 301.1

COUNTY: SUFFOLK
ZONE: 4A

BUILDING ENVELOPE REQUIREMENTS PER TABLE 402.1.3, 2015 IECC

	REQUIRED	PROPOSED
BELOW GRADE WALL	R-7.5ci	R-10ci
SLAB ON GRADE	R-10 FOR 24" BELOW	R-10
WINDOWS	OPER U-0.45 / SHGC = 0.4 FIX U-0.38 / SHGC = 0.4	N/A
DOORS	U-0.61	U-0.29
SKYLIGHT	U-0.5 / SHGC = 0.4	N/A
ROOF ASSEMBLY	R-38	R-38
ABOVE GRADE WALL	R-9.5ci	R-13.33

ABOVE GRADE WALL ASSEMBLY CALCULATIONS

OUTSIDE AIR FILM	0.17
VINYL SIDING	0.61
5/8" EXT. GRADE PLYWOOD	0.77
2" RIGID INSULATION	10.0
8" CMU	1.11
INSIDE AIR FILM	0.68
TOTAL R-VALUE	13.34

COMcheck Software Version 4.0.8.1

Envelope Compliance Certificate

Project Information

Energy Code:	2015 IECC
Project Title:	GST at Plant No. 15
Location:	Riverhead, New York
Climate Zone:	4a
Project Type:	New Construction

Construction Site:
Tuthills Lane
Riverhead, NY 11947

Owner/Agent:
Riverhead Water District
200 Howell Avenue
Riverhead, NY 11901
(631) 727-3205

Designer/Contractor:
H2M architects + engineer
538 Broad Hollow Road
4th Floor East
Melville, NY 11747
(631) 756-8000

Additional Efficiency Package(s)

High efficiency HVAC. Systems that do not meet the performance requirement will be identified in the mechanical requirements checklist report.

Building Area	Floor Area
1-Manufacturing Facility : Nonresidential	1245

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor(a)
Roof 1: Attic Roof with Wood Joists, [Bldg. Use 1 - Manufacturing Facility]	1556	38.0	0.0	0.027	0.027
Floor 1: Slab-On-Grade:Unheated, Horizontal with vertical 3 ft., [Bldg. Use 1 - Manufacturing Facility] (c)	144	---	10.3	0.660	0.540
NORTH					
Exterior Wall 1: Concrete Block:8", Partially Grouted, Cells Empty, Normal Density, Furring: Wood, [Bldg. Use 1 - Manufacturing Facility]	407	10.0	3.3	0.072	0.104
Door 1: Other Door, Swinging, [Bldg. Use 1 - Manufacturing Facility]	42	---	---	0.290	0.610
Door 2: Other Door, Swinging, [Bldg. Use 1 - Manufacturing Facility]	21	---	---	0.290	0.610
EAST					
Exterior Wall 2: Concrete Block:8", Partially Grouted, Cells Empty, Normal Density, Furring: Wood, [Bldg. Use 1 - Manufacturing Facility]	455	10.0	3.3	0.072	0.104
SOUTH					
Exterior Wall 3: Concrete Block:8", Partially Grouted, Cells Empty, Normal Density, Furring: Wood, [Bldg. Use 1 - Manufacturing Facility]	407	10.0	3.3	0.072	0.104
Door 3: Other Door, Swinging, [Bldg. Use 1 - Manufacturing Facility]	42	---	---	0.290	0.610
WEST					
Exterior Wall 4: Concrete Block:8", Partially Grouted, Cells Empty, Normal Density, Furring: Wood, [Bldg. Use 1 - Manufacturing Facility]	455	10.0	3.3	0.072	0.104

(a) Budget U-factors are used for software baseline calculations ONLY, and are not code requirements.
(b) 'Other' components require supporting documentation for proposed U-factors.
(c) Slab-On-Grade proposed and budget U-factors shown in table are F-factors.

Envelope PASSES: Design 20% better than code

Envelope Compliance Statement

Compliance Statement: The proposed envelope design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed envelope systems have been designed to meet the 2015 IECC requirements in COMcheck Version 4.0.8.1 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title _____ Signature _____ Date _____

Project Title: GST at Plant No. 15 Report date: 02/27/18
Data filename: X:\RDWD (Riverhead Water District) - 10810\RDWD1702 - GST at Plant No. 15\02_DES\3500 - Arch\RDWD1702 - ComCheck.cck Page 1 of 1

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PROJECT No: RDWD 17-02	DATE: MARCH 2018	SCALE: AS SHOWN	

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT
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GENERAL CONSTRUCTION

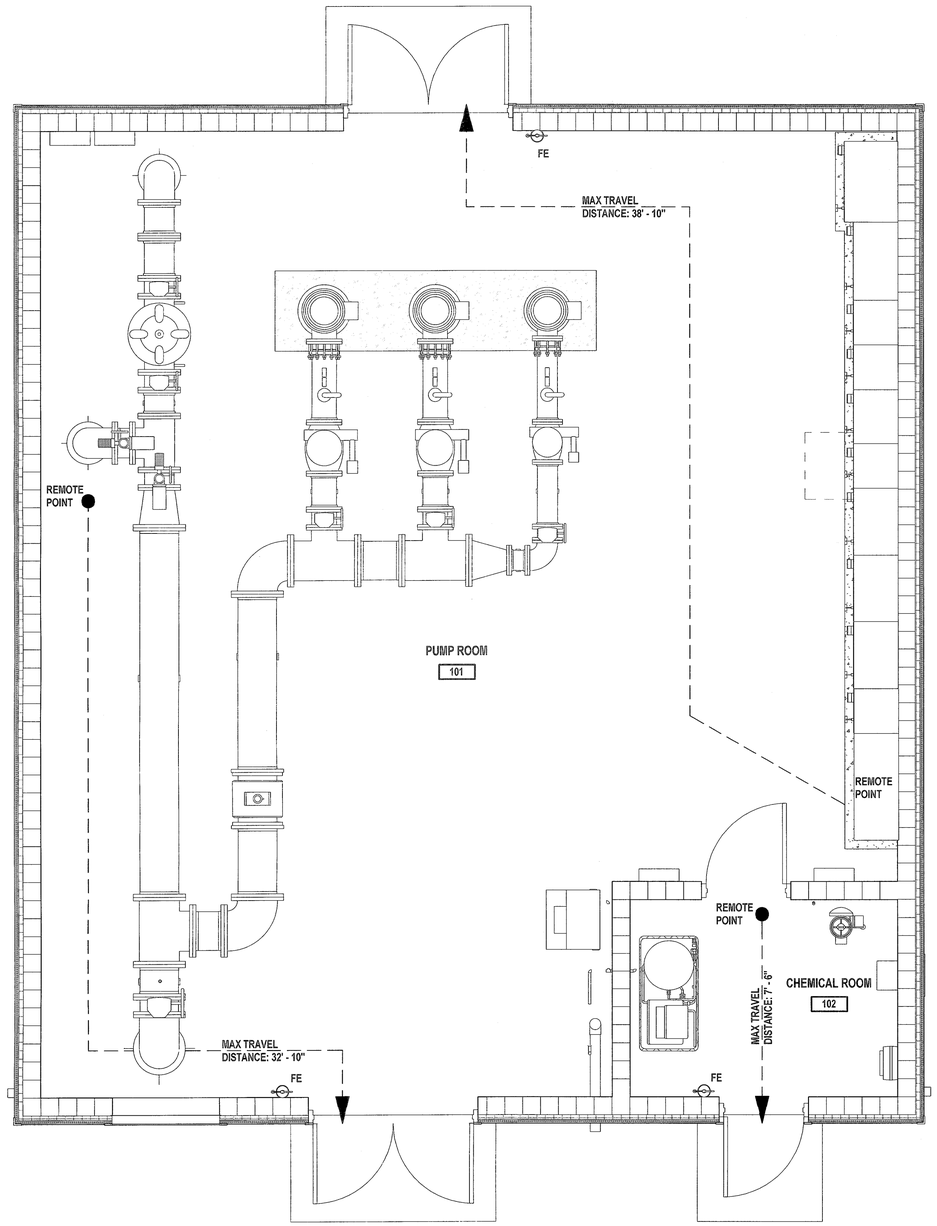
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FINAL BID DOCUMENT

SHEET TITLE
NEW YORK STATE CODE ANALYSIS

DRAWING No. **A0.1**

SHEET No. 14 OF 50

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1 Egress Plan
SCALE: 3/8" = 1'-0"

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026899
STATE OF NEW YORK

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

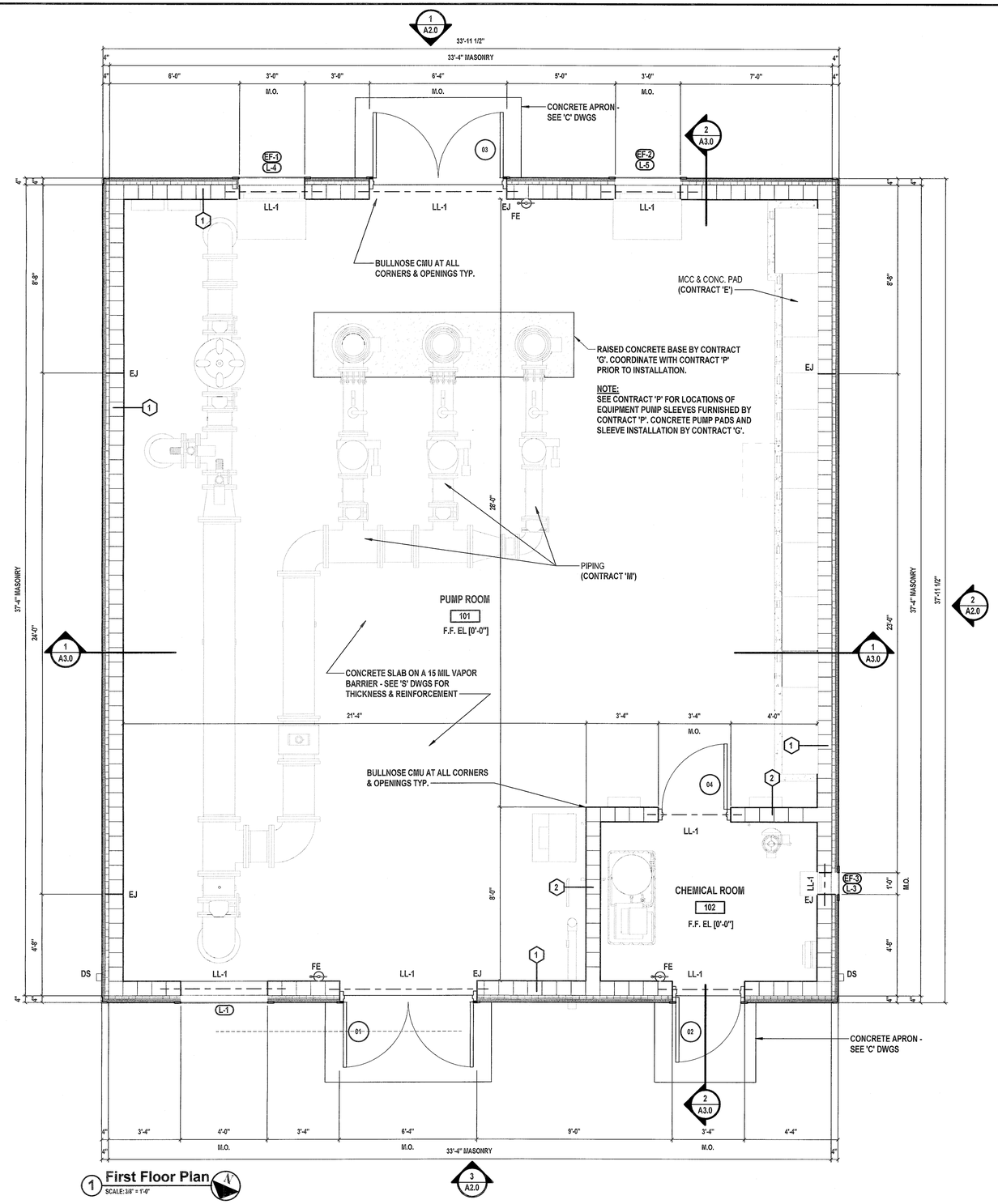
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SHEET TITLE
EGRESS PLANS

DRAWING No.	SHEET No.
A0.2	15 OF 50

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1 First Floor Plan
SCALE: 3/8" = 1'-0"

LINTEL SCHEDULE

MARK	SIZE	DETAILS	COMMENTS
LL-1	(2) L3-1/2 x 3-1/2x 1/4"	1	NOTES 1-5

NOTES:

1. LINTEL LENGTH SHALL BE M.O. + 1'-4" TO PROVIDE MIN. BEARING OF 8" ONTO SOLID MASONRY ON EACH SIDE.
2. ALL LINTELS TO BE SHOP APPLIED HOT DIPPED GALVANIZED.
3. WELD VERTICAL REINFORCEMENT INTERRUPTED BY MASONRY OPENINGS TO TOP OF THE STEEL LINTELS, TYPICAL.
4. REFER TO ARCHITECTURAL FLOOR PLANS AND ELEVATIONS FOR LINTEL LOCATIONS.
5. VERTICAL LEGS OF DOUBLE ANGLES SHALL BE WELDED TOGETHER.

LOUVER NOTES:

1. ALL LOUVERS TO BE FURNISHED BY AND INSTALLED BY CONTRACT 'G' COORDINATE WITH 'H' DWGS.
2. SEE ELEVATIONS FOR HEAD HEIGHTS.
3. CONTRACT 'E' SHALL SUPPLY POWER TO THE MOTORIZED DAMPERS.
4. CONTRACT 'E' SHALL INTERLOCK ALL MOTORIZED DAMPERS WITH THEIR ASSOCIATED EXHAUST FAN OPERATION.
5. PROVIDE BIRD & INSECT SCREENS.
6. VERIFY ALL REQUIRED OPENING WITH MFR. AND 'H' DWGS.

GENERAL PLAN NOTES:

1. FINISH FLOOR ELEVATION (0'-0") IS ESTABLISHED AT EL. 43.5 (SEE 'S' DWGS)
2. SEE ROOM FINISH SCHEDULE FOR CEILING HEIGHTS ABOVE FINISH FLOOR.
3. SLOPE FLOOR TO DRAIN MIN 1/8" PER FOOT. COORDINATE WITH 'S' & 'M' DWGS.
4. SEE SLAB PLAN ON 'S' DWGS FOR CONTROL AND EXPANSION JOINT LOCATIONS.
5. ALL MASONRY WALLS ARE NOTED AS NOMINAL DIMENSIONS.
6. COORDINATE THE WORK REQUIRED ON THIS DRAWINGS WITH THE WORK OF ALL OTHER TRADES AND SPECIFICATIONS.
7. ALL ITEMS DETAILED OR SPECIFIED TO RUN IN OR ATTACHED TO WALLS AND CEILING ARE TO BE CONCEALED OR RECESSED U.N.O.
8. ACCOMMODATE THE CONSTRUCTION TO ACCEPT ALL PIPING, CONDUITS, EQUIPMENT, PANELS, ETC., EITHER SPECIFIED OR DETAILED TO BE RECESSED OR CONCEALED IN MASONRY AND/OR FURRED WALLS, AS REQUIRED BY THIS & OTHER CONTRACTS.
9. SEE PLANS & ELEVATIONS FOR MASONRY EXPANSION JOINT LOCATIONS.
10. ALL EXTERIOR EXPOSED CONC. FOUNDATION WALLS SHALL BE PARGED.

FINISH SCHEDULE

ROOM		FLOOR			WALLS								CEILING			
					NORTH		EAST		SOUTH		WEST					
NUMBER	NAME	MATL.	BASE	FIN.	MATL.	FIN.	MATL.	FIN.	MATL.	FIN.	MATL.	FIN.	MATL.	FIN.	HGT.	COMMENTS
101	PUMP ROOM	CONC.	PT	SEALER	CMU	PT	CMU	PT	CMU	PT	CMU	PT	ACT	2x2	11' - 8"	
102	CHEMICAL ROOM	CONC.	PT	SEALER	CMU	PT	CMU	PT	CMU	PT	CMU	PT	ACT	2x2	11' - 8"	

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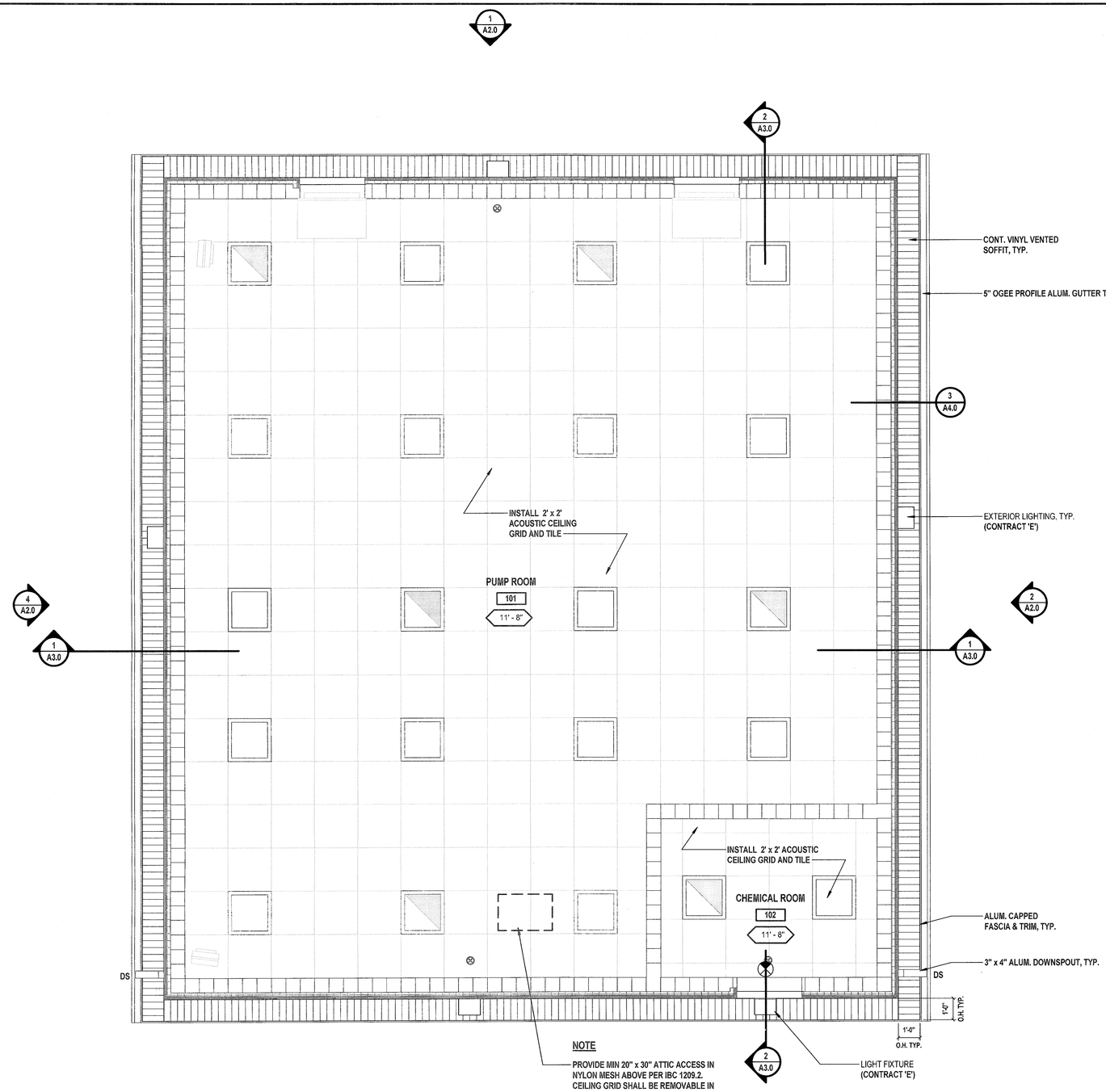
SHEET TITLE
FIRST FLOOR PLAN, SCHEDULE AND NOTES

DRAWING No. **A1.0**

SHEET No. 16 OF 50

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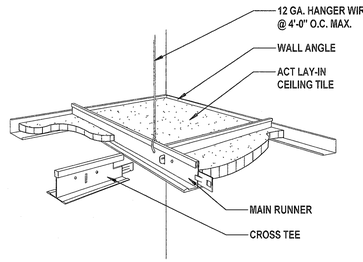
2 First Floor RCP
SCALE: 3/8" = 1'-0"

GENERAL NOTES:

1. INSTALLATION OF SUSPENDED CEILING SYSTEM SHALL BE COORDINATED WITH 'H' & 'E' DRWGS.
2. LIGHTING FURNISHED & INSTALLED BY CONTRACT 'E.'

REFLECTED CEILING PLAN LEGEND

- LIGHT FIXTURES (CONTRACT 'E')
- EMERGENCY LIGHTS w/ BATTERY BACKUP (CONTRACT 'E')
- EXIT SIGN (CONTRACT 'E')
- UNIT HEATER
- ACT - 2'x2' SUSPENDED ACOUSTICAL CEILING
- X'-X" CEILING OR SOFFIT HEIGHT



1 ACT Detail
SCALE: NTS

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CONTRACT
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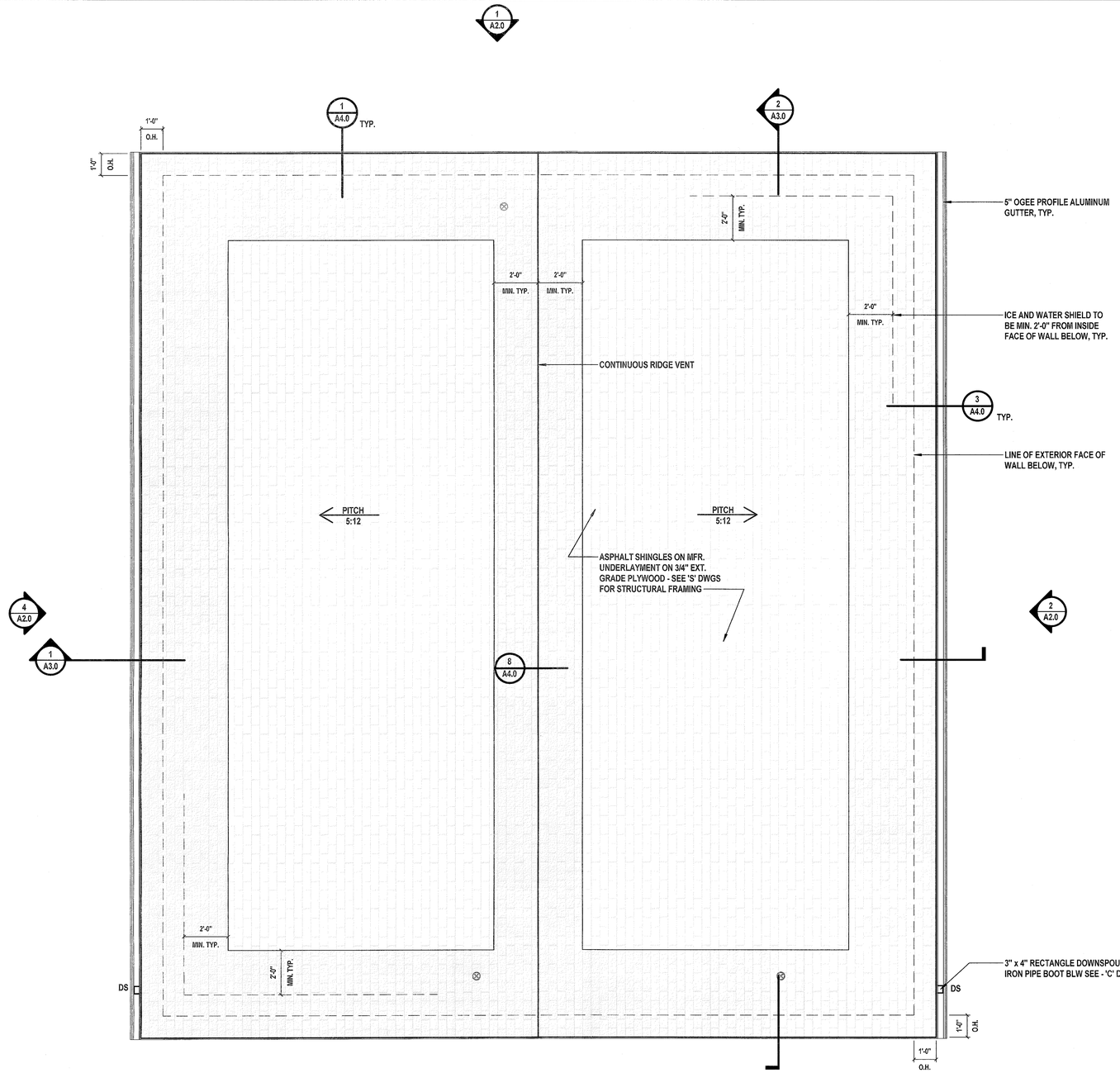
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FIRST FLOOR REFLECTED CEILING PLAN

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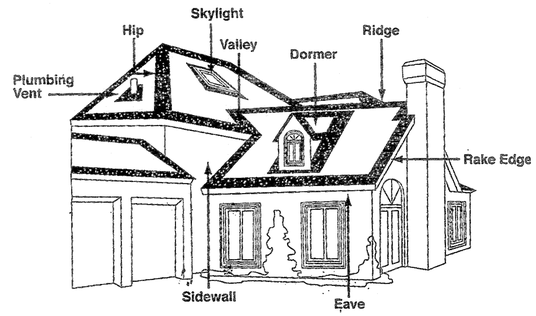
SHEET No. 17 OF 50

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1 **Roof Plan**
SCALE: 3/8" = 1'-0"



STORMGUARD LEAK BARRIER MUST BE INSTALLED
1) AT ALL VALLEYS
2) AT ALL DORMERS, CHIMNEYS AND SIDEWALLS
3) AROUND ALL PENETRATIONS
4) AT ALL RAKES AND EAVES AT LEAST 24" INSIDE THE WARM WALL IN ALL REGIONS AFFECTED BY ICE DAMS

2 **Ice & Water Shield Locations**
SCALE:NTS

GENERAL ROOFING NOTES - PITCHED ROOF

1. THESE DRAWINGS PROVIDE A GRAPHICAL REPRESENTATION OF PRINCIPAL ROOFING ITEMS IS NOT A COMPLETE LIST OF EVERY ROOFING ITEM & ACCESSORY. THE DRAWINGS MUST BE COORDINATED WITH ALL OTHER DWGS, THE SPECIFICATIONS, ROOF DETAILS & MANUFACTURER REQUIREMENTS.
2. THE INTENDED SCOPE OF WORK INCLUDES THE COMPLETE INSTALLATION OF A NEW ASPHALT SHINGLE ROOF SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIALS, LABOR, ROOFING ITEMS AND ACCESSORIES REQUIRED FOR INSTALLATION & A WATER TIGHT WARRANTIED ROOF SYSTEM WHETHER INDICATED ON THE DRAWINGS OR NOT.
3. THE CONTRACTOR SHALL PROTECT AT ALL TIMES THE BUILDING INTERIOR, EXTERIOR, & GROUNDS. ANY DAMAGED ITEMS THAT RESULTED FROM, AND DURING, ROOFING INSTALLATION SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER AND INCLUDES BUT IS NOT LIMITED TO DEBRIS, WATER LEAKS, ETC. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN A WEATHER TIGHT ROOF AT ALL TIMES.
4. THE NEW ROOF FLASHING SHALL EXTEND A FULL 12" ALONG ALL ADJOINING VERTICAL SURFACES AS RECOMMENDED BY THE MANUFACTURER. THE CONTRACTOR SHALL VERIFY THE HEIGHTS OF COUNTER FLASHING PRIOR TO INSTALLATION. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ALL LABOR AND MATERIALS AS REQUIRED TO MAKE ADJUSTMENTS & REMOVE AND REINSTALL SIDING MATERIALS AS REQUIRED.
5. CONTRACTOR SHALL FOLLOW MANUFACTURER, NCRA, AND OTHER PERTINENT ROOFING STANDARDS FOR THIS WORK.
6. THE ALUMINUM DRIP EDGE SHALL BE OF UNIFORM LENGTH AND LEVEL AROUND THE ENTIRE PERIMETER.
7. CONTRACTOR SHALL FIELD MEASURE AND VERIFY ALL ROOFING MATERIAL QUANTITIES PRIOR TO PURCHASING ROOFING MATERIAL.
8. ROOF SHINGLES SHALL BE INSTALLED IN ACCORDANCE WITH IBC SECTION 1507.2 AND MUST HAVE MINIMUM OF 6 FASTENERS PER SHINGLE PER BCNYS SECTION 1507.2.6. UNLESS MFR. TEST RESULTS ARE PROVIDED.
9. COORDINATE THE WORK REQUIRED ON THIS DRAWING WITH ALL STRUCTURAL, ARCHITECTURAL, MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS, AND SPECIFICATIONS.
10. THE DETAILS ON THE FOLLOWING SHEETS ARE TYPICAL MANUFACTURER DETAILS, CONDITIONS WHICH MAY OR MAY NOT APPLY TO ALL BUILDINGS CONDITIONS. ADDITIONAL DETAILS MAY BE REQUIRED FROM THE MANUFACTURER FOR SPECIFIC FIELDS CONDITIONS.
11. ROOF UNDERLAYMENT SHALL BE APPLIED WITH CORROSION - RESISTANT FASTENERS IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS. FASTENERS ARE TO BE APPLIED ALONG THE OVERLAP AT A MAXIMUM SPACING OF 36 INCHES ON CENTER AS PER IBC SECTION 1507.2.8.1
12. PROVIDE ICE & WATER SHIELD UNDERNEATH ASPHALT SHINGLE ROOFING SYSTEM WHERE SHOWN AND AS REQ'D BY MFR.
13. ALL WORK BY CONTRACT 'G' UNLESS NOTED OTHERWISE.

ROOF LEGEND:

ROOF SLOPE

ICE AND WATER SHIELD

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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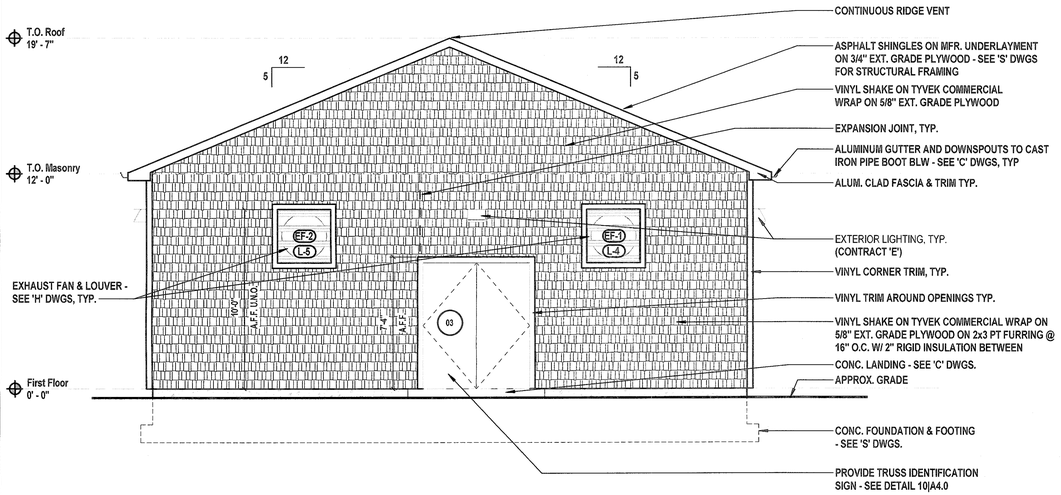
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ROOF PLAN

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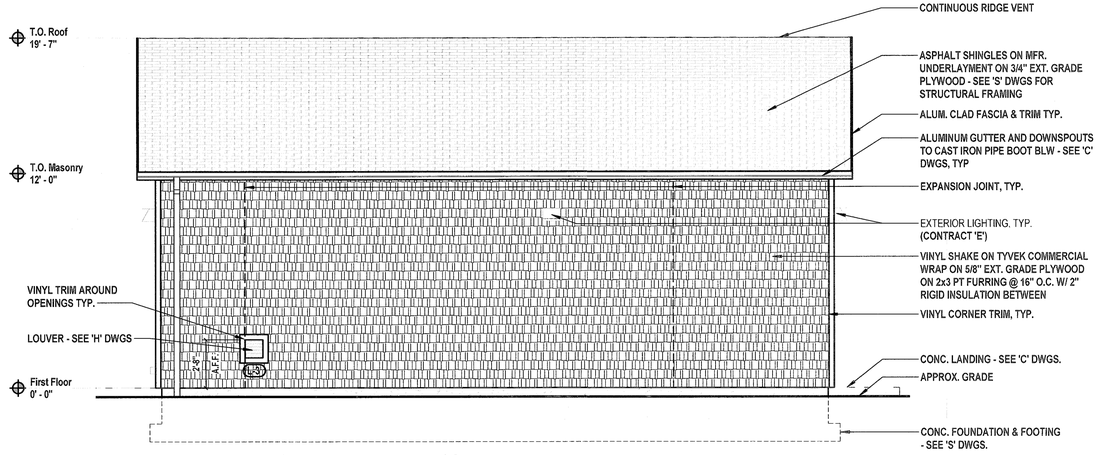
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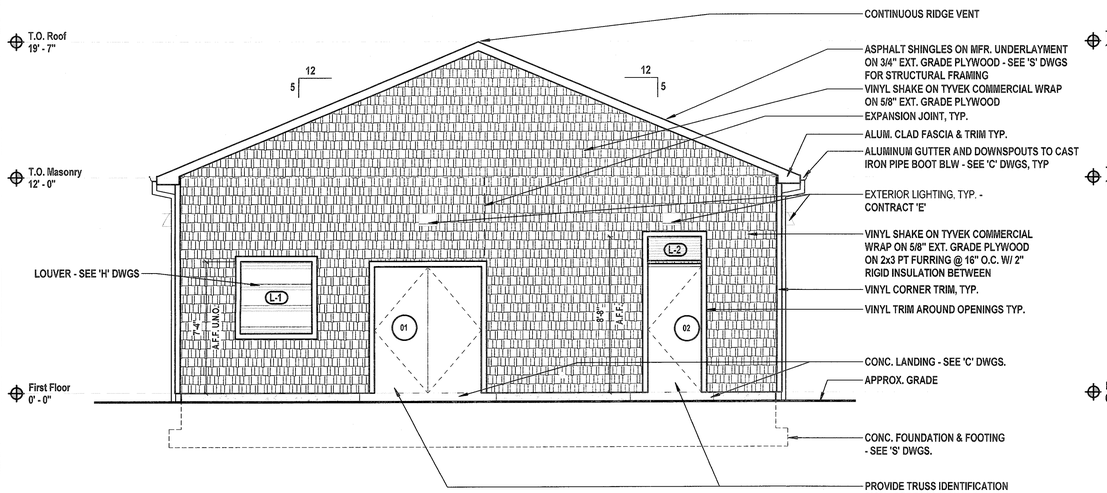
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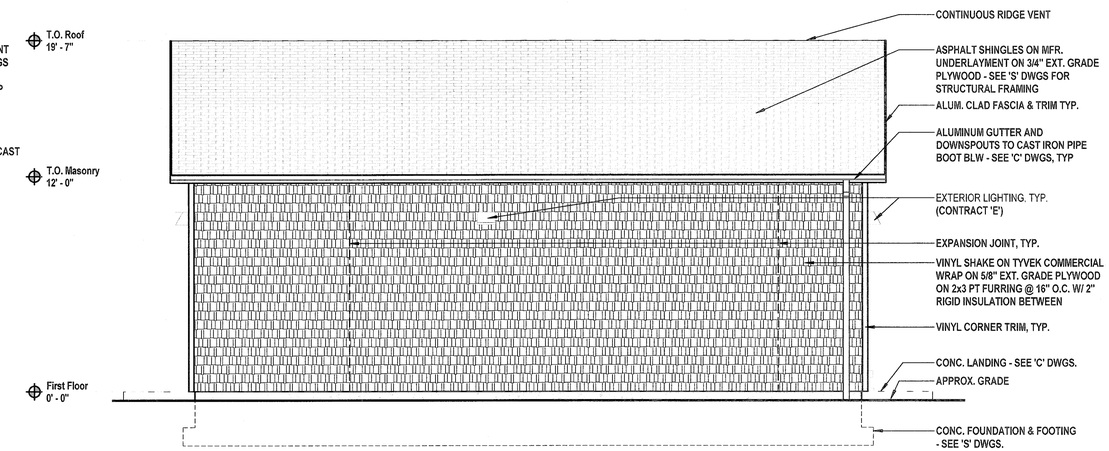
1 South Elevation
SCALE: 1/4" = 1'-0"



2 West Elevation
SCALE: 1/4" = 1'-0"



3 North Elevation
SCALE: 1/4" = 1'-0"



4 East Elevation
SCALE: 1/4" = 1'-0"

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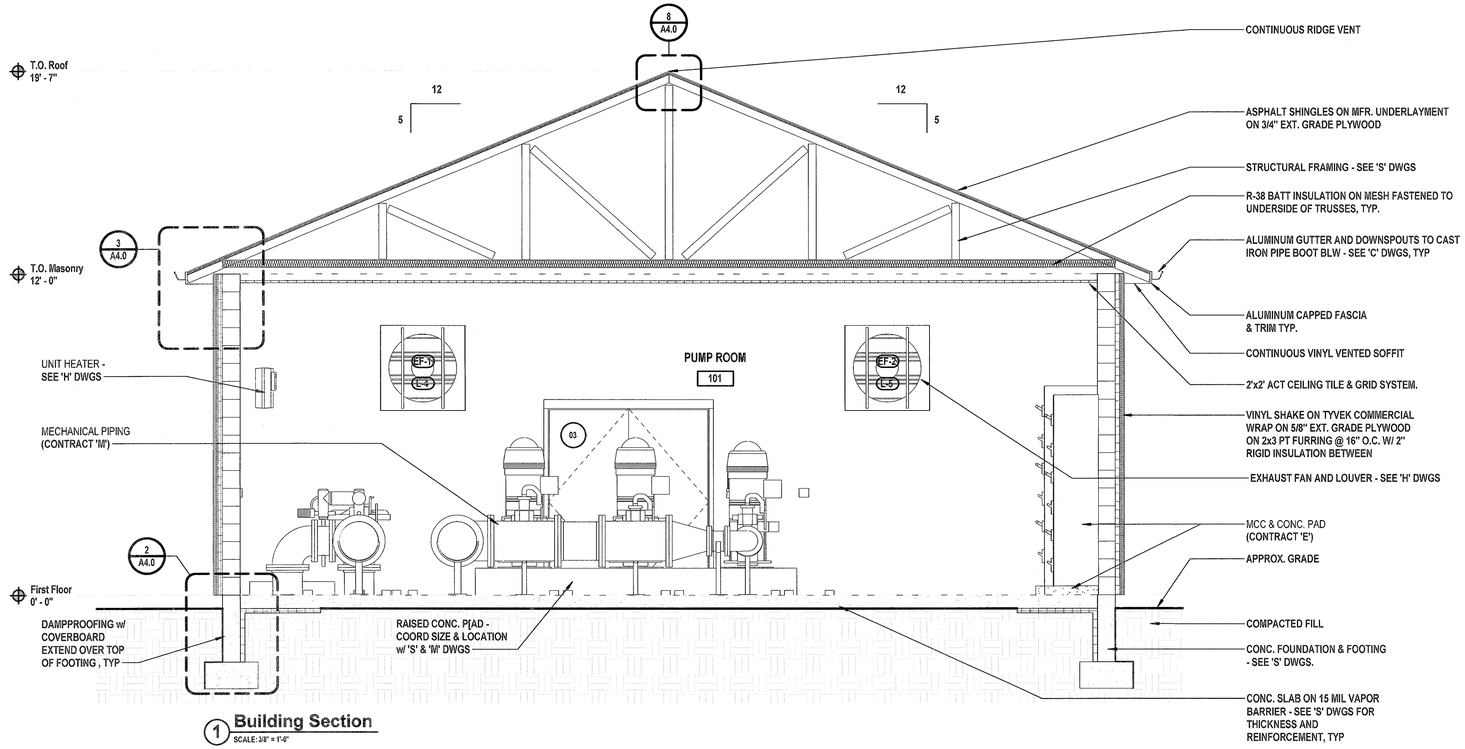
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BUILDING ELEVATIONS

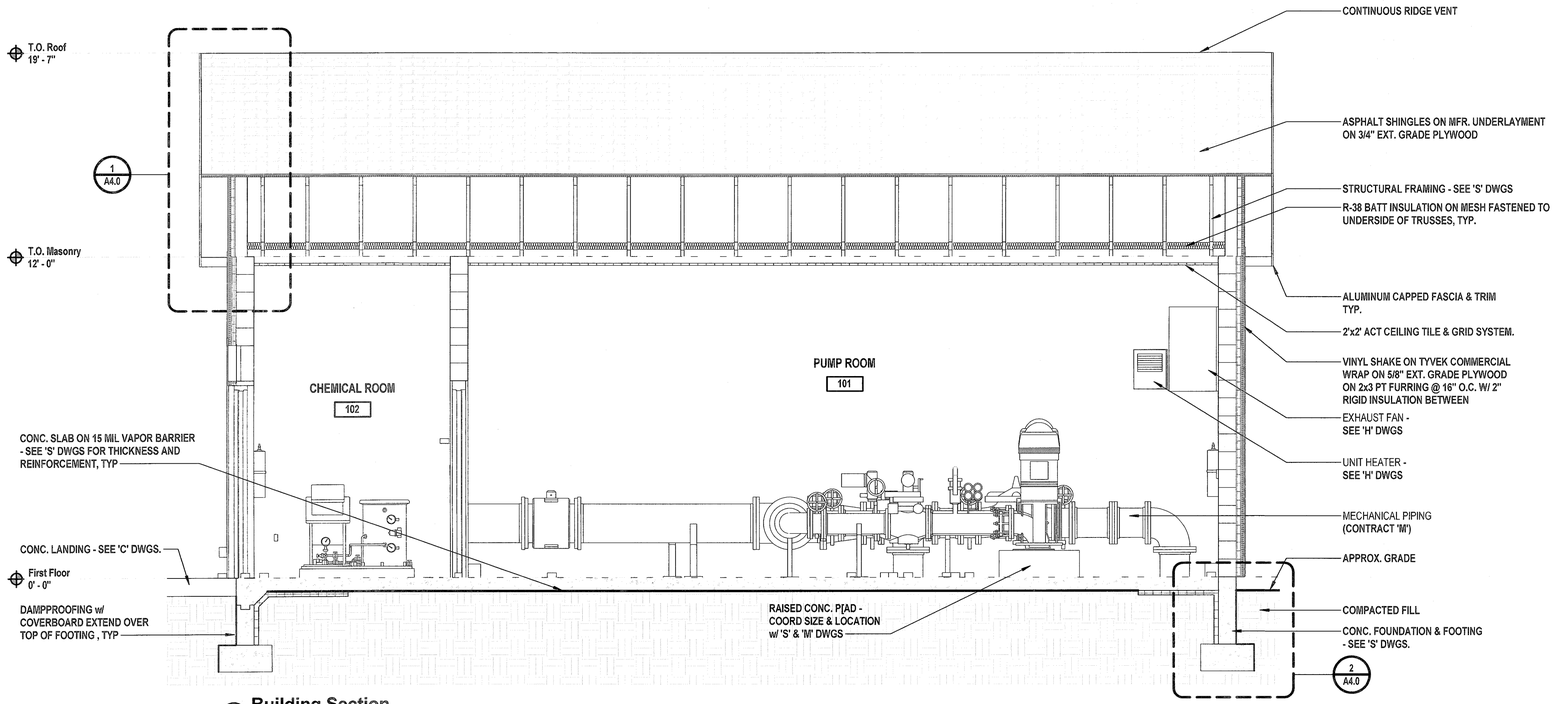
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A2.0

SHEET No.
19 OF 50

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1 **Building Section**
SCALE: 3/8" = 1'-0"



2 **Building Section**
SCALE: 3/8" = 1'-0"

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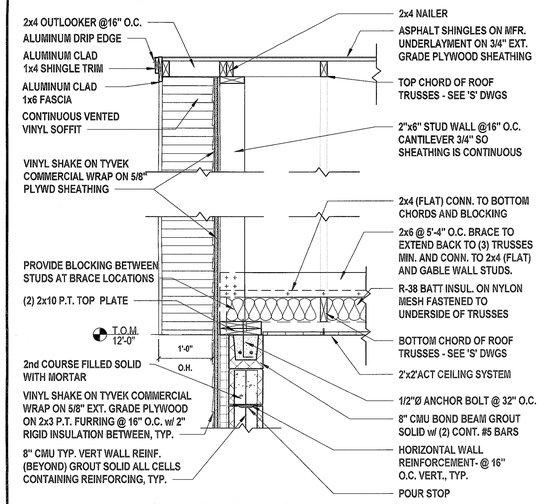
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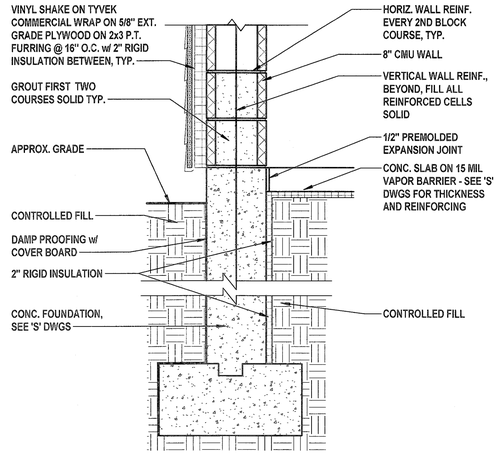
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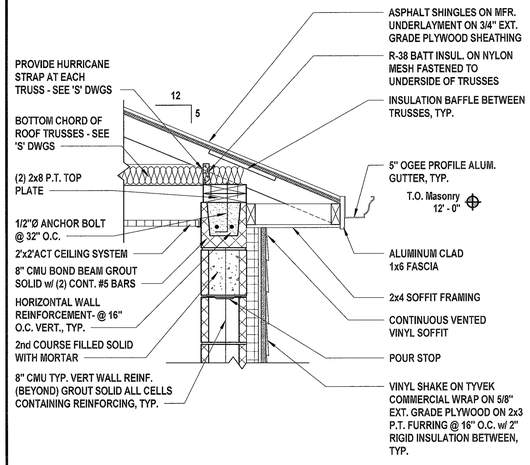
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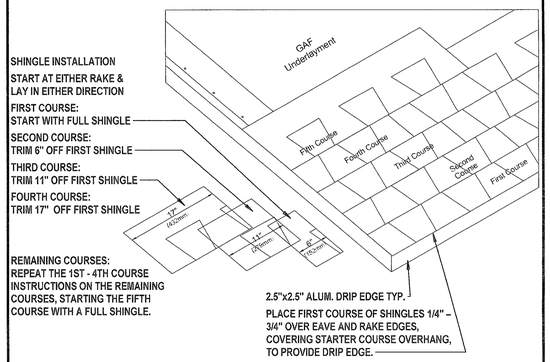
1 Gable End Wall Construction
SCALE: 3/4" = 1'-0"



2 Foundation Detail
SCALE: 1" = 1'-0"

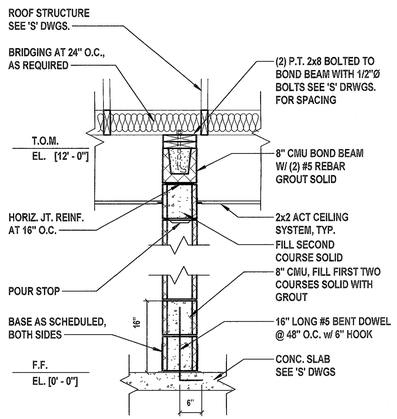


3 Eave Detail
SCALE: 1" = 1'-0"

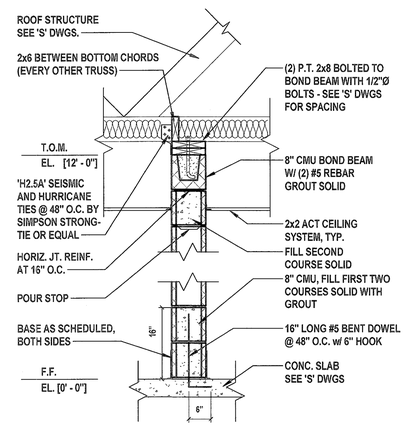


NOTE:
1.CONTINUE EACH COURSE WITH WHOLE SHINGLES.
2. STRIKE A CHALK LINE ABOUT EVERY 6 COURSES TO CHECK PARALLEL ALIGNMENT WITH EAVES.

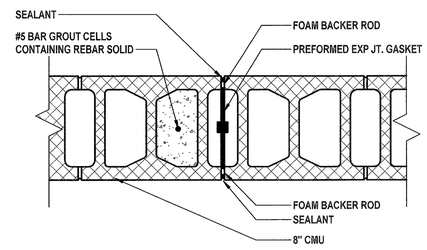
4 Shingle Installation Detail
SCALE:NTS



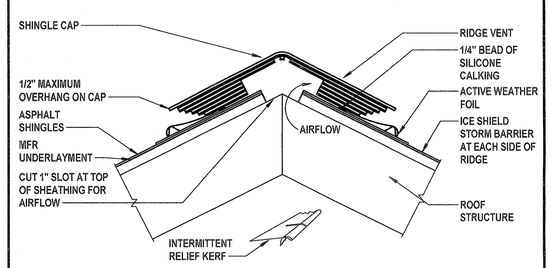
5 Interior Wall Detail
SCALE: 12" = 1'-0"



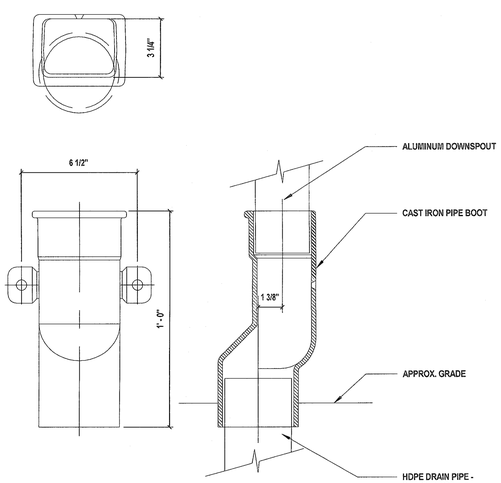
6 Interior Wall Detail
SCALE: 12" = 1'-0"



7 Typ. Expansion Joint Detail
SCALE: 1 1/2" = 1'-0"



8 Ridge Vent Detail
SCALE: N.T.S.



9 Downspout Boot Detail
SCALE: 3" = 1'-0"



IDENTIFICATION IF BUILDING UTILIZING TRUSS CONSTRUCTION:

SIGNS IDENTIFYING THE EXISTENCE OF TRUSS CONST. SHALL CONSIST OF A CIRCLE 6" IN DIAMETER, WITH A STROKE WIDTH IF 1/2". THE SIGN BACKGROUND SHALL BE REFLECTIVE WHITE IN COLOR, CONFORMING TO PANTONE MATCHING SYSTEM (PMS) #187, WHERE A SIGN IS DIRECTLY APPLIED TO A DOOR OR SIDELIGHT, IT MAY BE PERMANENT NON-FADING STICKER OR DECAL. SIGNS NOT DIRECTLY APPLIED TO DOORS OR SIDELIGHTS SHALL BE STURDY, NON-FADING, WEATHER RESISTANT MATERIAL. (a) SIGNS INDEMNIFYING THE EXISTENCE OF TRUSS CONSTRUCTION SHALL CONTAIN THE ROMAN ALPHANUMERIC DESIGNATION OF THE CONSTRUCTION TYPE OF THE BUILDING, IN ACCORDANCE WITH THE PROVISION FOR THE CLASSIFICATION OF TYPES OF CONSTRUCTION SET FORTH IN SECTION 602 OF THE BUILDING CODE OF NEW YORK STATE, AND AN ALPHABETIC DESIGNATION FOR THE STRUCTURAL COMPONENTS THAT ARE OF TRUSS CONSTRUCTION AS FOLLOWS:

"F" SHALL MEAN FLOOR FRAMING, INCLUDING GIRDERS AND BEAMS

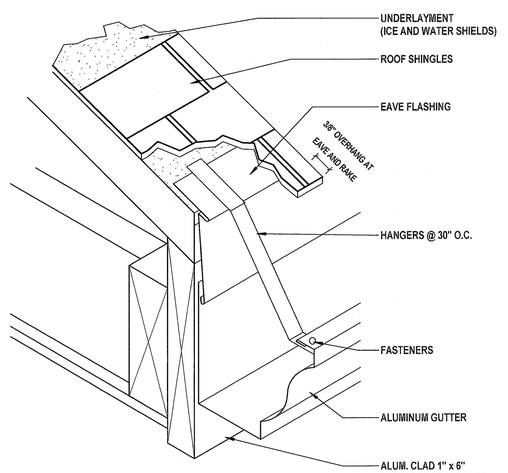
"R" SHALL MEAN ROOF FRAMING

"FR" SHALL MEAN FLOOR AND ROOF FRAMING

THE CONSTRUCTION TYPE DESIGNATION SHALL BE PLACED AT THE TWELVE O' CLOCK POSITION OVER THE STRUCTURAL COMPONENT DESIGNATION. WHICH SHALL BE PLACED AT SIX O' CLOCK POSITION.

AT EXTERIOR BUILDING ENTRANCE DOORS, EXTERIOR EXIT DISCHARGE DOORS, AND EXTERIOR ROOF ACCESS DOORS TO A STAIRWAY, SIGNS SHALL BE ATTACHED TO DOOR, OR ATTACHED TO A SIDELIGHT OF THE FACE OF THE BUILDING NO MORE THEN 12 INCHES HORIZONTALLY FROM THE LATCH SIDE OF THE DOOR JAMB, AND NOT LESS THAN 42 INCHES NOR MORE THAN 60 INCHES ABOVE THE ADJOINING WALKING SURFACE.

10 Truss Identification Sign
SCALE:NTS



11 Gutter Detail
SCALE: N.T.S.

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CONSULTANTS:

MARK	DATE	DESCRIPTION

REGISTERED ARCHITECT KENNETH R. GEORGE 028668 STATE OF NEW YORK

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DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
KRG, MF	REH	KRG	
PROJECT No: RDWD 17-02	DATE: MARCH 2018	SCALE: AS SHOWN	

CLIENT
Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT
CONTRACT G
GENERAL CONSTRUCTION

STATUS
FINAL BID DOCUMENT

SHEET TITLE
DETAILS

DRAWING No. A4.0

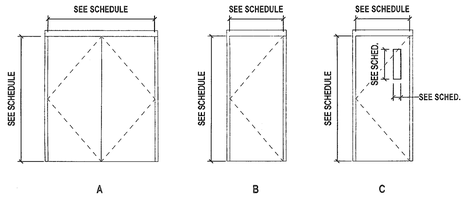
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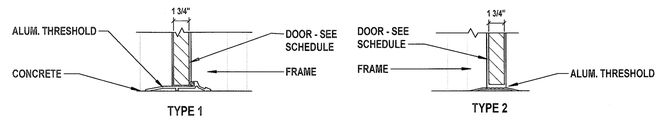
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DOOR SCHEDULE

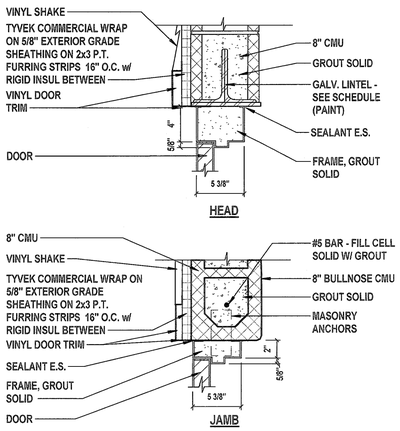
MARK	FROM ROOM NAME	TO ROOM NAME	DOOR SIZE				DOOR INFORMATION			FRAME INFORMATION		HEAD & JAMB DETAIL	SADDLE DETAIL	HARDWARE SET	COMMENTS
			# OF LEAFS	WIDTH	HEIGHT	THICKNESS	DOOR TYPE	MATERIAL	FINISH	FRAME MATERIAL	FRAME FINISH				
01	PUMP ROOM	EXTERIOR	2	3' - 0"	7' - 0"	1 3/4"	A	FRP	MFR	FRP	MFR	1	1	1	
02	CHEMICAL ROOM	EXTERIOR	1	3' - 0"	7' - 0"	1 3/4"	B	FRP	MFR	FRP	MFR	1	1	2	
03	PUMP ROOM	EXTERIOR	2	3' - 0"	7' - 0"	1 3/4"	A	FRP	MFR	FRP	MFR	1	1	1	
04	CHEMICAL ROOM	PUMP ROOM	1	3' - 0"	7' - 0"	1 3/4"	C	FRP	MFR	FRP	MFR	2	2	3	VP: 5"x20"



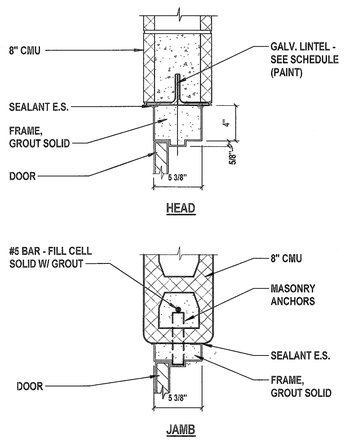
Door Types
SCALE: 1/4" = 1'-0"



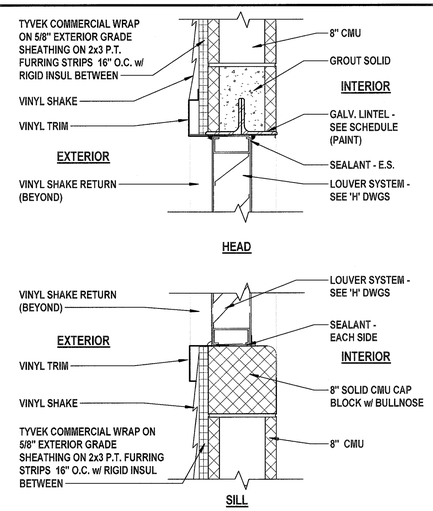
Saddle Details
SCALE: 1 1/2" = 1'-0"



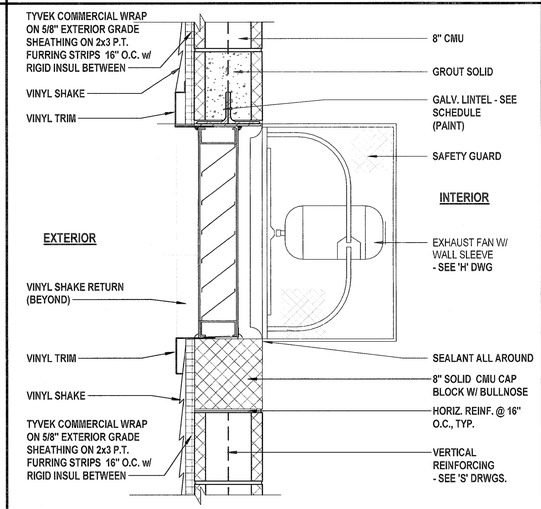
1 Door Head and Jamb Detail
SCALE: 1 1/2" = 1'-0"



2 Door Head and Jamb Detail
SCALE: 1 1/2" = 1'-0"



3 Louver Head and Sill Detail
SCALE: 1 1/2" = 1'-0"



4 Exhaust Fan Detail
SCALE: NTS

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CONSULTANTS:

MARK	DATE	DESCRIPTION

REGISTERED ARCHITECT — KENNETH R. GERVAIS — 029999 — STATE OF NEW YORK

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DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
KRG, MF	REH	KRG	

PROJECT No:	DATE:	SCALE:
RDWD 17-02	MARCH 2018	AS SHOWN

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Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT
CONTRACT G
GENERAL CONSTRUCTION

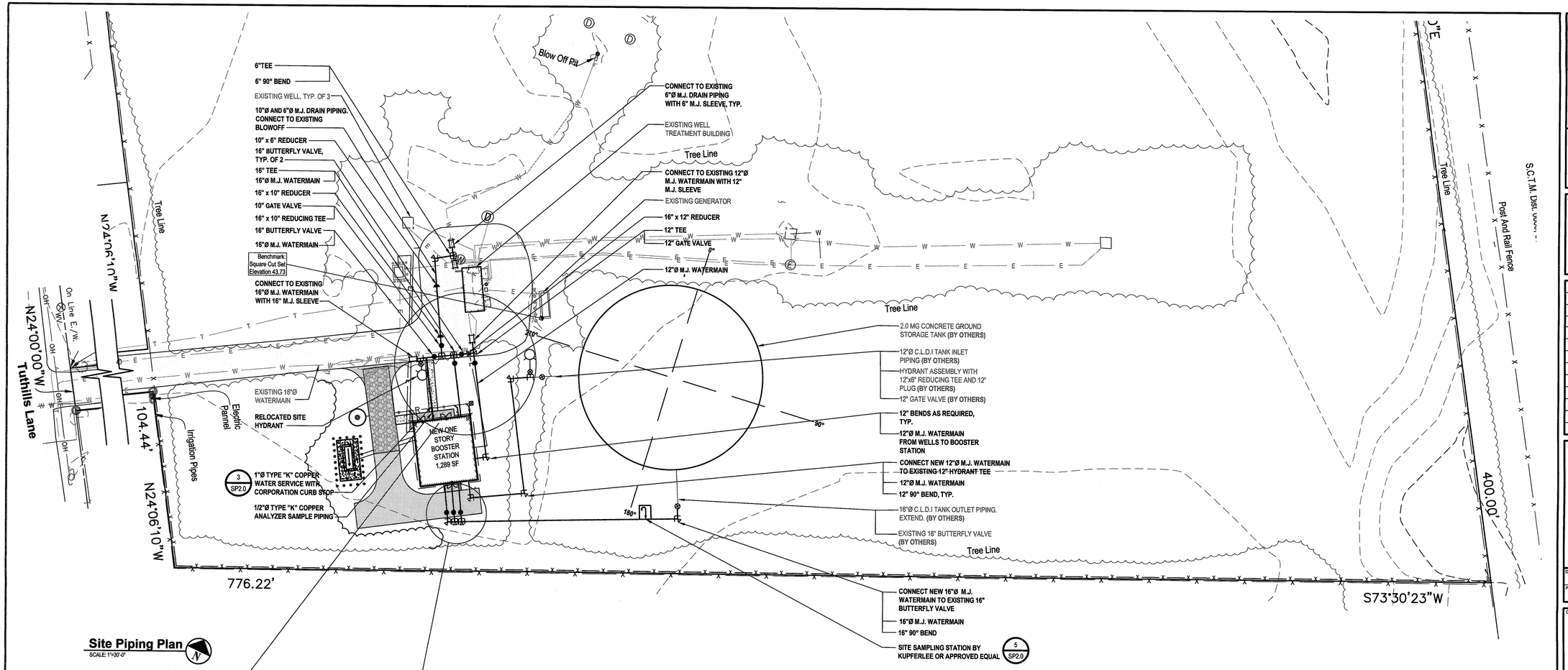
STATUS
FINAL BID DOCUMENT

SHEET TITLE
DOOR SCHEDULE AND DETAILS

DRAWING No.
A5.0

SHEET No.
22 OF 50

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Site Piping Plan

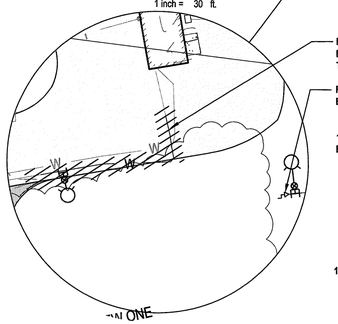
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GRAPHIC SCALE

30 0 15 30

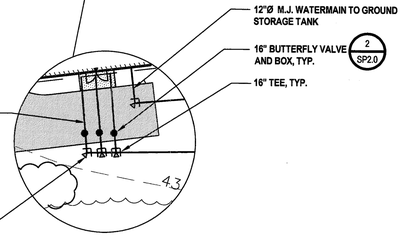
(IN FEET)

1 inch = 30 ft.



1 Site Piping Removal Detail

SCALE: 1"=20'-0"



2 Booster Suction Piping Detail

SCALE: 1"=20'-0"

SITE PLAN NOTES:

1. NOTIFY THE OWNER AND H2M AT LEAST 24 HOURS PRIOR TO THE COMMENCEMENT OF THE WORK. THE SAME NOTICE SHALL BE REQUIRED WHEN RESUMING WORK AFTER ANY STOPPAGE OR DELAY.
2. LOCATION OF ALL UNDERGROUND UTILITIES, ELECTRIC AND TELEPHONE CONDUITS, STORM DRAINS AND UNDERGROUND PIPING WERE OBTAINED FROM EITHER OLD MAPS, SURVEYS, DRAWINGS AND RECORDS SUPPLIED BY OTHERS. THE OWNER AND ENGINEER DO NOT GUARANTEE OR ACCEPT RESPONSIBILITY FOR ANY DAMAGE TO SUCH FACILITIES DUE TO DISCREPANCIES IN LOCATION AND SIZE SHOWN ON THE PLANS, NOR WILL ANY COMPENSATION BE MADE TO THE CONTRACTOR FOR ANY INCONVENIENCES CAUSED BY HIM BY ENCOUNTERING THE AFOREMENTIONED UTILITIES WHICH ARE NOT SHOWN, OR ARE INCORRECTLY SHOWN ON THE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATIONS OF ANY UNDERGROUND UTILITIES, GAS MAINS, ELECTRIC AND TELEPHONE CONDUITS.
3. COMPLETE ALL SURVEY AND STAKEOUT AS REQUIRED TO PROPERLY COMPLETE THE WORK.
4. PERFORM DAILY CLEANUP OPERATIONS INCLUDING REMOVAL OF DEBRIS AND EXCESS CONSTRUCTION MATERIAL, AND DRIVEWAY/STREET CLEANING TO THE SATISFACTION OF THE OWNER.
5. DURING ALL NON-WORKING HOURS, STORE ALL EQUIPMENT AND MATERIALS WITHIN AN AREA DESIGNATED BY THE OWNER AT THE PROJECT SITE.
6. COORDINATE CONSTRUCTION ACTIVITIES WITH OWNER TO MINIMIZE INTERRUPTION TO THE OWNER'S OPERATIONS.
7. RESTORE ALL DISTURBED GRASS AREAS AND ALL AREAS NOT SPECIFICALLY IDENTIFIED FOR OTHER IMPROVEMENTS WITH 4 INCHES OF TOPSOIL AND SEED.
8. REMOVE ALL ASPHALT FROM EXISTING CASTINGS.
9. SEAL ALL JOINTS BETWEEN NEW ASPHALT AND EXISTING ASPHALT WITH HOT ASPHALT CEMENT.

LEGEND

⊗	EXISTING WATER VALVE	W	EXISTING WATER MAIN
	EXISTING HYDRANT ASSEMBLE		ABANDONED WATER MAIN
	EXISTING TEE		EXISTING WATER SERVICE
	EXISTING CROSS	G	EXISTING GAS MAIN
	EXISTING REDUCER	S	EXISTING SANITARY SEWER
	EXISTING PLUG	D	EXISTING STORM DRAIN
	EXISTING PLUG & BLOW-OFF	OH	EXISTING OVERHEAD ELECTRIC
	EXISTING BENDS (ANGLES VARY)	E	EXISTING UNDERGROUND ELECTRIC
	EXISTING SLEEVE	T	EXISTING UNDERGROUND TELEPHONE
●	PROPOSED WATER VALVE	X	EXISTING FENCE
	PROPOSED HYDRANT ASSEMBLY		PROPOSED WATER MAIN
	PROPOSED TEE		PROPOSED WATER SERVICE
	PROPOSED CROSS	FS	PROPOSED FIRE SERVICE
	PROPOSED REDUCER		LOT LINE
	PROPOSED CAP/PLUG		RIGHT OF WAY
	PROPOSED PLUG & BLOW-OFF		PROPERTY LINE
	PROPOSED BENDS (ANGLES VARY)		
	PROPOSED SLEEVE		
	PROPOSED CURB STOP		
	PROPOSED BENDS (ANGLES VARY)		
	TRAFFIC SIGN		
	UTILITY POLE		
	LEACHING POOL		
	CATCH BASIN		
X	MANHOLE		
	TREE		

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CONSULTANTS:

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STATE OF NEW YORK — JAMES M. ANDERSON — No. 85891 — LICENSED PROFESSIONAL ENGINEER

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AMM/JMA	JMA		

PROJECT No:	DATE:	SCALE:
RDWD 17-02	MARCH 2018	AS SHOWN

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Riverhead Water District

Booster Pumping Station at Plant No. 15

TOWN OF RIVERHEAD — 1792 — PAX ET PROSPERITAS PER PROGRESSUM

Tuthills Lane, Jamesport

CONTRACT

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GENERAL CONSTRUCTION

STATUS

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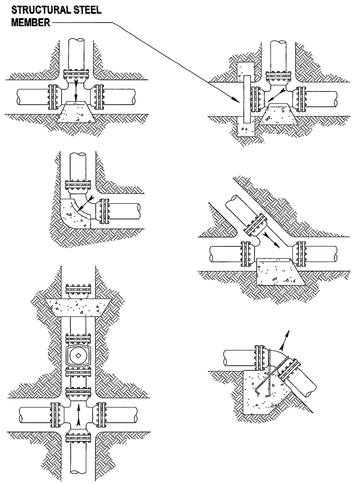
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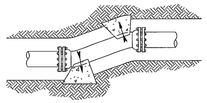
SITE PIPING PLAN

DRAWING No. **SP1.0**

SHEET No. 23 OF 51

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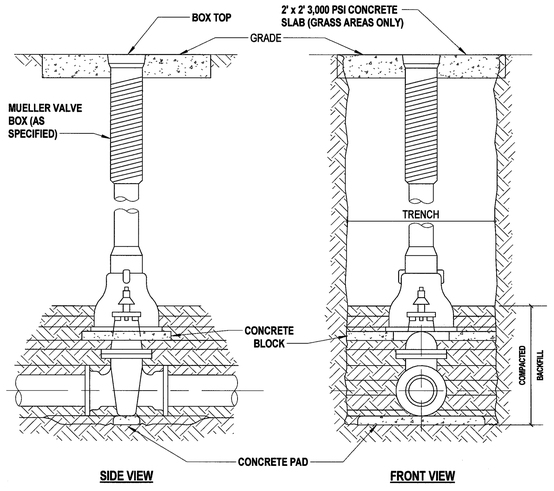




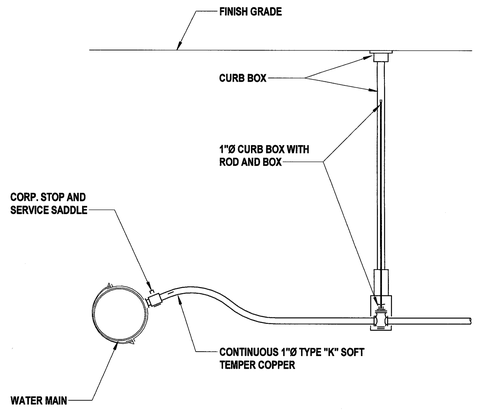
NOTES:

1. CONCRETE BLOCKING SHALL BE APPLIED ON ALL PIPE LINES 4-INCH IN DIAMETER AND LARGER AT ALL HYDRANTS, TEES, PLUGS, CAPS, AND AT BENDS DEFLECTING 22-1/2 DEGREES OR MORE. BLOCKING SHALL BE OF CONCRETE OF A MIX HAVING COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI AT 28 DAYS, AND BLOCKING SHALL BE PLACED BETWEEN SOLID GROUND AND THE FITTING TO BE ANCHORED. THE BLOCKING SHALL BE SO PLACED THAT THE PIPE AND FITTING JOINTS WILL BE ACCESSIBLE FOR REPAIR.
2. THE SQUARE FOOT BEARING AREA OF THE BLOCKING ON SOLID GROUND SHALL BE AS INDICATED IN THE TABLE PROVIDED IN SPECIFICATION SECTION 331411 OR AS INDICATED BY THE ENGINEER.
3. FOR ALL PIPELINES, TIE RODS WITH PIPE CLAMPS AND RETAINER GLANDS SHALL BE PROVIDED IN ADDITION TO CONCRETE BLOCKING SPECIFIED ABOVE AT AND IN THE VICINITY OF TEES, PLUGS, CAPS, AND BENDS DEFLECTING 22-1/2 DEGREES OR MORE.
4. FOR ALL VERTICAL BENDS, 3/4 INCH DIAMETER TIE RODS AND PIPE CLAMPS OR RETAINER GLANDS SHALL BE PROVIDED IN ADDITION TO THE CONCRETE BLOCKING SPECIFIED ABOVE FOR BENDS DEFLECTING 22-1/2 DEGREES OR MORE.
5. BLOCKING AT PLUG END SHALL BE SIMILAR TO TEE WITH CAP USING STRUCTURAL STEEL MEMBER.
6. SEE SPECIFICATIONS FOR CONCRETE THRUST BLOCK VOLUME.

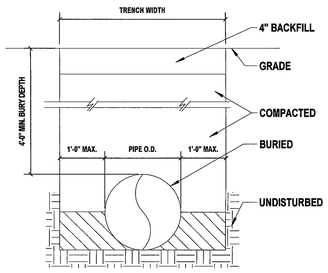
1 Typical Thrust Block Location Details
SCALE NO SCALE



2 Valve Box / Curb Stop Installation Detail
SCALE NO SCALE



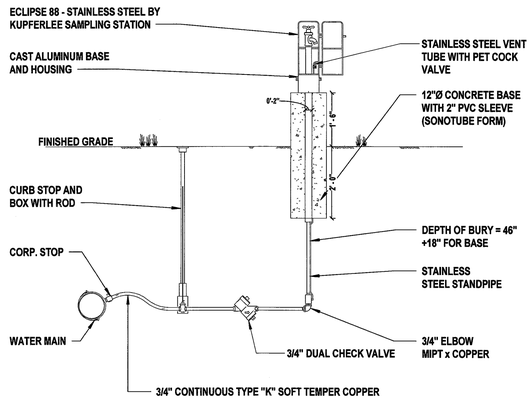
3 Typical Water Main Tap Detail
SCALE NO SCALE



NOTE:

1. ALL TRENCH WIDTHS TO BE MINIMIZED IN ORDER TO AVOID EXCESSIVE DISTURBANCE OF ADJACENT AREAS. TRENCH WALLS SHALL BE VERTICAL WHERE NECESSARY, SHEET PILING OR A SHEETING BOX SHALL BE USED TO MAINTAIN THE SPECIFIED TRENCH.

4 Typical Pipe Trench Detail
SCALE NO SCALE



NOTES:

1. ALL STATIONS SHALL BE ENCLOSED IN A LOCKABLE, NONREMOVEABLE, ALUMINUM-CAST HOUSING.

5 Sampling Station Detail
SCALE 1/2" = 1'-0"

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CONSULTANTS:

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STATE OF NEW YORK — JOSHUA M. MELLER — No. 59891 — LICENSED PROFESSIONAL ENGINEER

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AMM/JMA	JMA		*

PROJECT No:	DATE:	SCALE:
RDWD 17-02	MARCH 2018	AS SHOWN

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Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT

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GENERAL CONSTRUCTION

STATUS

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SITE PIPING DETAILS

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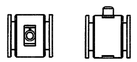
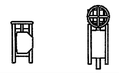
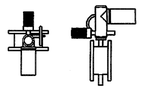
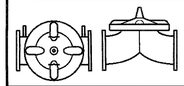
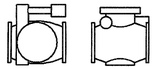
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LARGE PIPING VALVE LEGEND

IMAGE	VALVE
	FLANGED ELECTROMAGNETIC FLOW METER
	FLANGED MANUALLY OPERATED BUTTERFLY VALVE
	FLANGED MOTORIZED BUTTERFLY VALVE
	FLANGED PUMP CONTROL VALVE
	FLANGED SWING ARM CHECK VALVE
	FLANGED x PLAIN END (FLGxPE) PIPE COUPLING

LARGE PIPING FITTING LEGEND

IMAGE	FITTING
	FLANGED ELBOW
	FLANGED REDUCER
	FLANGED REDUCING TEE
	FLANGED TEE

MECHANICAL NOTES:

1. THE CONTRACTOR SHALL SUPPORT AND ANCHOR ALL EXPOSED PIPING IN ACCORDANCE WITH THE SPECIFICATIONS. WHERE METHODS OF SUPPORT ARE SHOWN, SUCH METHODS SHALL BE CONSIDERED AS SUGGESTED. SUCH SUGGESTED METHODS SHALL NOT RELIEVE THE CONTRACTOR FROM INSTALLING ALL PIPING IN ACCORDANCE WITH SPECIFIED
2. THE CONTRACTOR SHALL PROVIDE JOINT RESTRAINT FOR ALL FLANGED ADAPTERS. EACH FLANGED ADAPTER SHALL BE TIE RODDED UTILIZING 3/4"Ø STEEL THREADED ROD. INSTALL TWO (2) RODS PER JOINT, EQUALLY SPACED, AND RODDED BACK TO THE NEAREST FLANGED JOINT. ALL NUTS SHALL BE STAINLESS STEEL. INSTALL JAM NUTS. THE CONTRACTOR'S METHOD OF INSTALLING RODS SHALL BE MECHANICALLY RESTRAINED.
3. MECHANICAL IDENTIFICATION SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS. VALVE DESIGNATIONS AND EQUIPMENT NAMES SHALL BE AS SHOWN ON MECHANICAL DRAWINGS.
4. ALL MEASUREMENT AND CONTROL PRIMARY ELEMENTS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS. MAINTAIN MANUFACTURER'S REQUIRED DISTANCE UPSTREAM AND DOWNSTREAM BETWEEN FLOW METERS AND PIPING ELEMENTS SUCH AS FITTINGS AND VALVES. SHOW SEPARATION DISTANCES ON PIPING LAYOUT DRAWINGS SPECIFIED TO BE PROVIDED.
5. ALL REDUCERS ARE TO BE CONCENTRIC, UNLESS OTHERWISE NOTED.
6. THE CONTRACTOR SHALL SUBMIT, FOR ENGINEER'S REVIEW AND APPROVAL, PIPING LAYOUT DRAWINGS TO A SCALE OF ¼"=1'-0". THE CONTRACTOR SHALL NOT INSTALL INSERTS IN CONCRETE OR BOX FOR WALL AND DECK OPENINGS UNTIL THE LOCATIONS AND ELEVATIONS OF ALL SLAB AND WALL PENETRATIONS HAVE BEEN VERIFIED AND CHECKED FOR ACCURACY BY THE CONTRACTOR. THE LOCATIONS OF WALL SLEEVES, OPENINGS AND OTHER CONCRETE INSERTS SHOWN ON THE DRAWINGS ARE BASED ON EQUIPMENT AND VALVES WHICH MAY OR MAY NOT HAVE DIMENSIONS EQUAL TO THAT BEING USED FOR THE PROJECT. LAYOUT DRAWINGS SHALL BE PREPARED IN ACCORDANCE WITH THE SPECIFICATIONS. THE LAYOUT DRAWINGS SHALL USE THE DIMENSIONS OF EQUIPMENT AND VALVES BEING USED FOR THE PROJECT OR PROVISIONS SHALL BE MADE TO ACCOUNT FOR DIMENSIONAL DIFFERENCES IN EQUIPMENT. THE CONTRACTOR SHALL SUBMIT THE LAYOUT DRAWINGS FAR ENOUGH IN ADVANCE SO THAT CONCRETE INSERTS CAN BE ORDERED AND INSTALLED IN SEQUENCE AND IN ACCORDANCE WITH THE CONSTRUCTION SCHEDULE. PREPARE PIPE LAYOUT DRAWINGS AND SUBMIT DETAILS OF SUPPORT FOR ALL PROCESS PIPING, BOTH BURIED AND EXPOSED, WITH A DIAMETER EQUAL TO OR GREATER THAN 6".
7. ALL MECHANICAL JOINT FITTINGS SHALL BE PROVIDED WITH THRUST BLOCKING AS DETAILED ON THE DRAWINGS. IN ADDITION TO THRUST BLOCKING, EACH MECHANICAL JOINT SHALL BE MECHANICALLY RESTRAINED.
8. CORE DRILL FLOORS AND WALLS TO INSTALL SMALL PIPING AS REQUIRED. UNLESS SPECIFICALLY DIMENSIONED ON THE DRAWINGS, VERIFY LOCATIONS OF CORE DRILLING WITH ENGINEER PRIOR TO DRILLING.
9. SINGLE LINE REPRESENTATIONS OF SMALL PIPING ARE DIAGRAMMATIC.
10. CONTRACTOR SHALL PROVIDE AND COORDINATE THE INSTALLATION OF ALL ACCESS PANELS THAT ARE NEEDED TO ACCESS OR SERVICE ITEMS INSTALLED AS PART OF THEIR SCOPE OF WORK.
11. ALL MECHANICAL EQUIPMENT, LARGE AND SMALL PIPING, VALVES AND APPURTENANCES CALLED OUT OR SHOWN ON MECHANICAL DRAWINGS ARE TO BE FURNISHED AND INSTALLED NEW BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.
12. CONTRACTOR SHALL FURNISH AND INSTALL NEW SPOOL PIECES AND SPACERS, WITH LENGTHS AND DIMENSIONS AS REQUIRED, TO COMPLETE PIPING SYSTEMS SHOWN ON MECHANICAL DRAWINGS.
13. UNUSED MANUFACTURER SUPPLIED FIELD SERVICES SHALL BE CREDITED TO THE OWNER AS SPECIFIED.
14. CONSTRUCT THRUST BLOCKS WHERE SHOWN ON THE DRAWINGS. DOWEL THRUST BLOCKS INTO SLAB AS SPECIFIED.
15. ALL NEW PIPING SHALL BE PREPARED, PRIMED AND PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS. ALL COLORS SHALL BE AS APPROVED BY THE OWNER/ENGINEER.

PIPING SCHEDULE

ABBREVIATION	DESCRIPTION	MATERIAL
CWP	COLD WATER (PROTECTED)	TYPE K COPPER
CWU	COLD WATER (UNPROTECTED)	TYPE K COPPER
DR	DRAIN	SCHEDULE 40 PVC
FW	FINISHED WATER	CLASS 150 FLANGED C.L.D.I.
HYDI	CALCIUM HYPOCHLORITE (DISINFECTION)	SCHEDULE 80 PVC
SP	SAMPLING LINE	TYPE K COPPER
TWP	TEPID WATER (PROTECTED)	TYPE K COPPER W/ INSULATION

ABBREVIATIONS

ABBREVIATION	DEFINITION
%	PERCENT
@	AT
A.F.F.	ABOVE FINISHED FLOOR
C.L.D.I.	CEMENT-LINED DUCTILE IRON
CFM	CUBIC FEET PER MINUTE
DCV	DOUBLE CHECK VALVE
FLG	FLANGED
FPT	FEMALE PIPE THREAD
FRP	FIBERGLASS REINFORCED PLASTIC
GAC	GRANULAR ACTIVATED CARBON
GHS	GLOBALLY HARMONIZED SYSTEM
HP	HORSE POWER
I.D.	INSIDE DIAMETER
MAX.	MAXIMUM
MIN.	MINIMUM
MPT	MALE PIPE THREAD
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
NO.	NUMBER
NPT	NATIONAL PIPE THREAD
O.C.	ON CENTER
O.C.E.W.	ON CENTER EACH WAY
O.D.	OUTSIDE DIAMETER
PE	PLAIN END
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
RPZ	REDUCED PRESSURE ZONE DEVICE
S.S.	STAINLESS STEEL
T&B	TOP AND BOTTOM
T&C	THREADED AND COUPLED
TYP.	TYPICAL
W/	WITH
°	DEGREES
±	PLUS OR MINUS, APPROXIMATELY
Ø	DIAMETER

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Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT

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GENERAL CONSTRUCTION

STATUS

FINAL BID DOCUMEMT

SHEET TITLE

GENERAL MECHANICAL INFORMATION

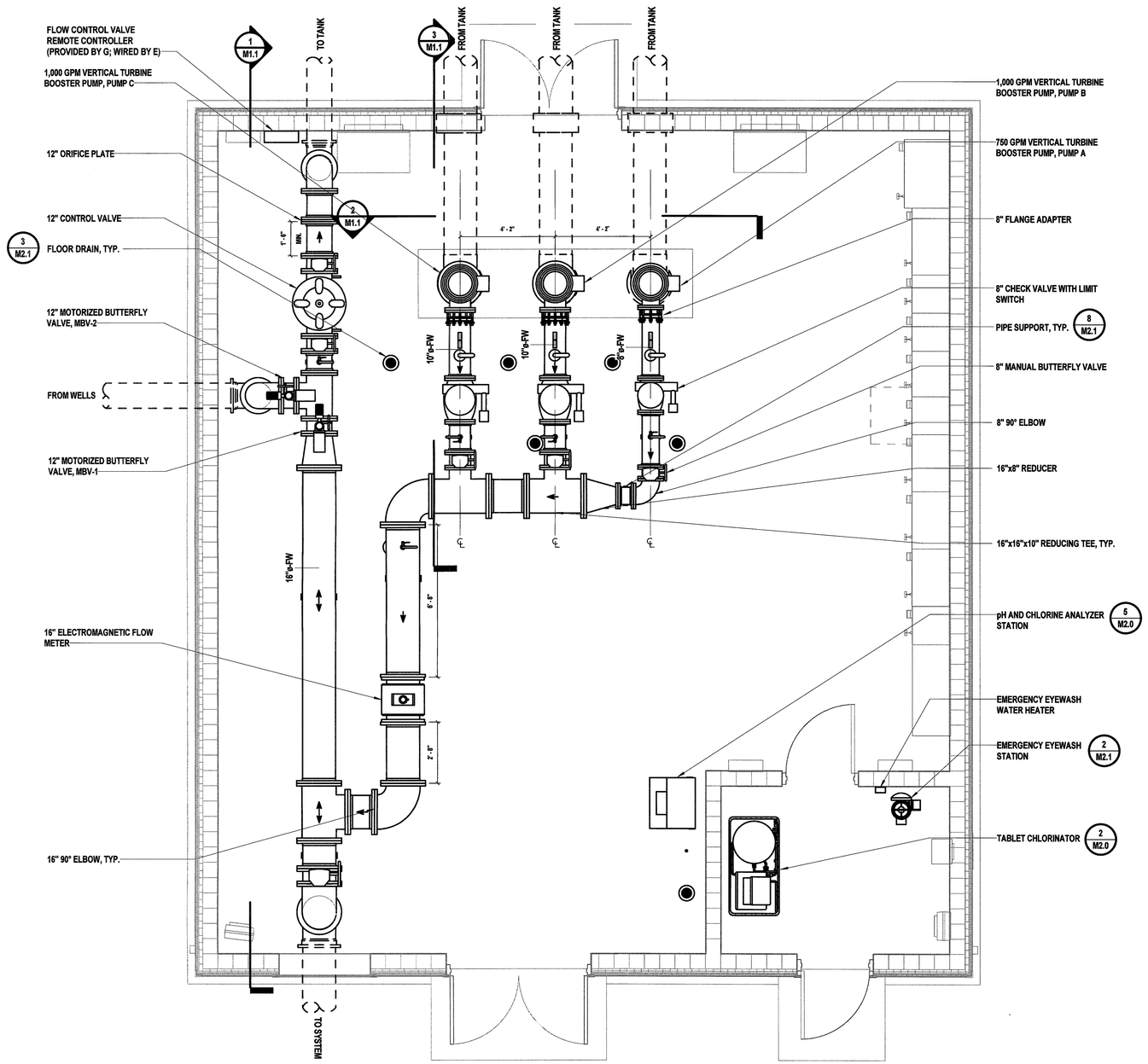
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1 Booster Station Large Piping Plan

SCALE 3/8" = 1'-0"

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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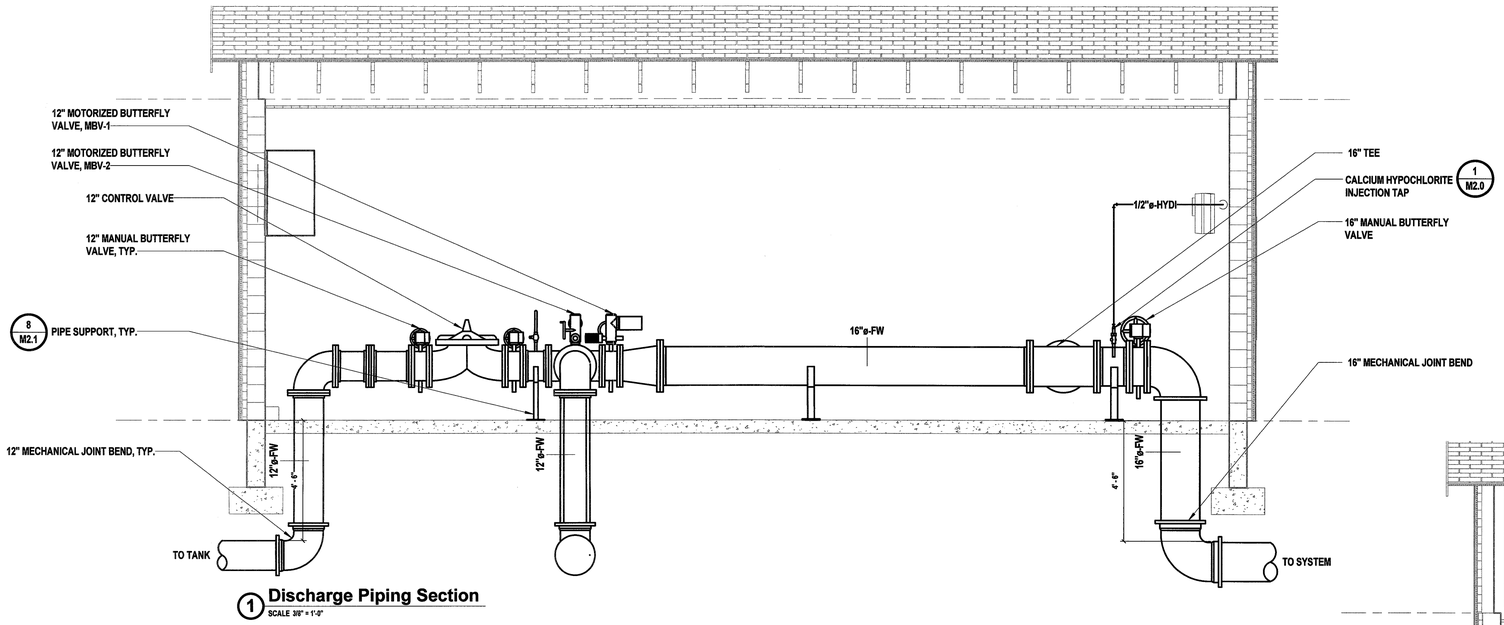
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BOOSTER STATION LARGE PIPING PLAN

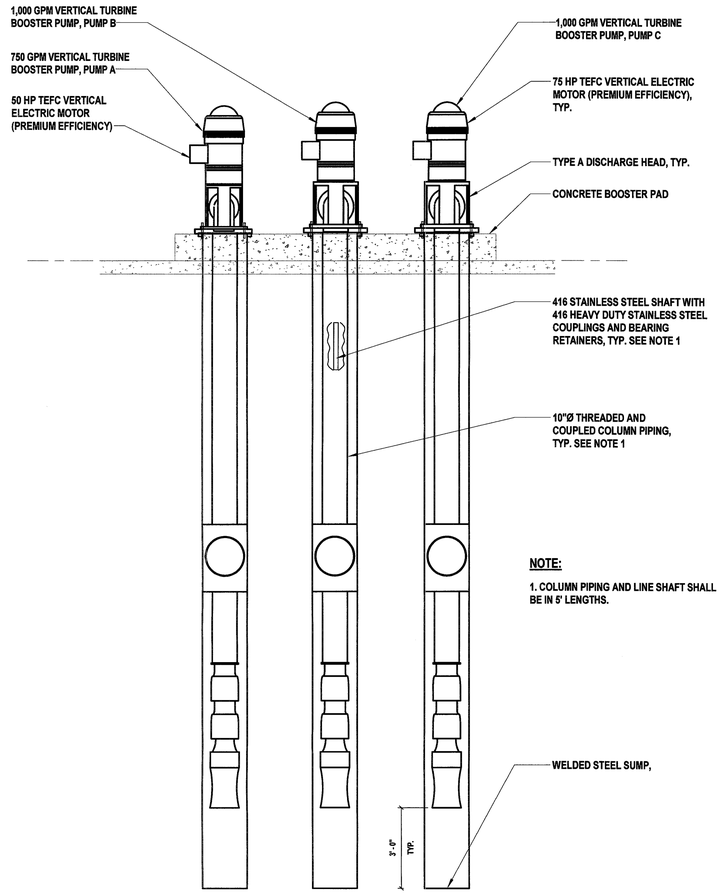
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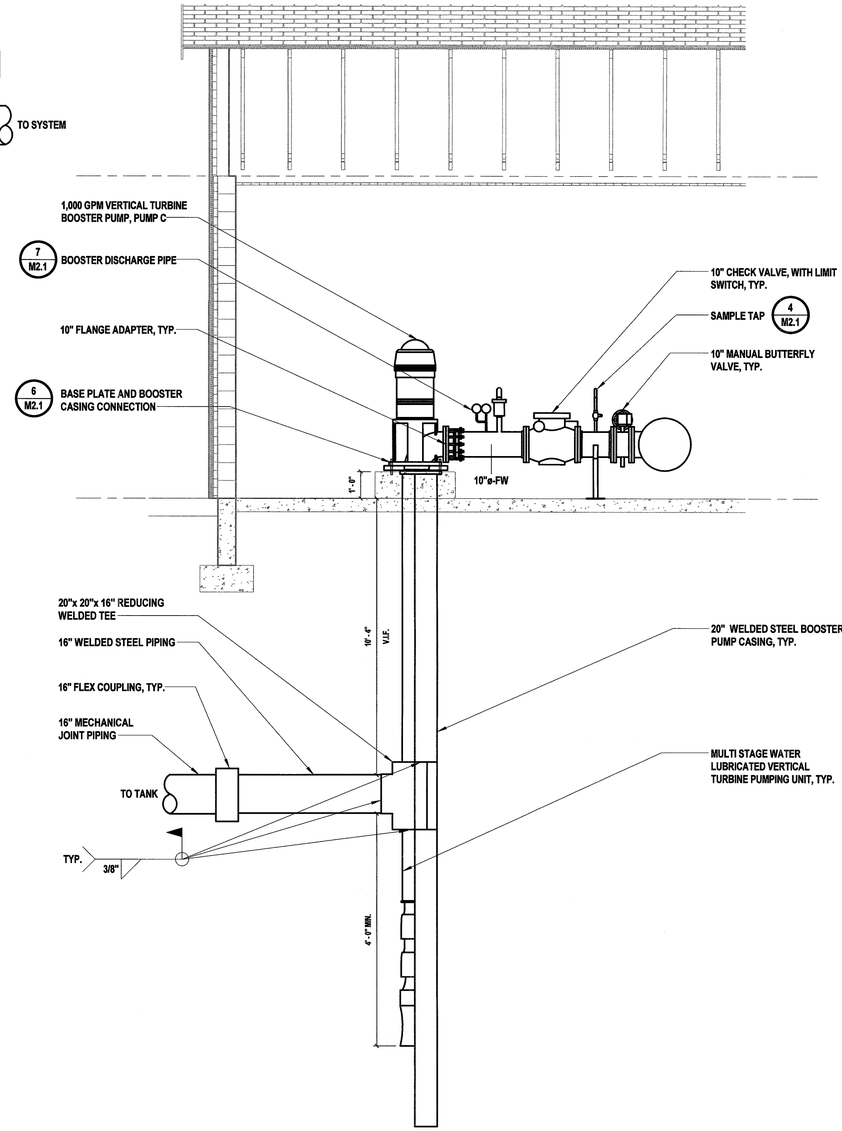
1 Discharge Piping Section
SCALE 3/8" = 1'-0"



NOTE:

1. COLUMN PIPING AND LINE SHAFT SHALL BE IN 5' LENGTHS.

2 Booster Elevation
SCALE 3/8" = 1'-0"



3 Typical Booster Pump B and C Section
SCALE 3/8" = 1'-0"

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Booster Pumping Station at Plant No. 15

TOWN OF RIVERHEAD — 1792 — PATET PROSPICIENTIBUS PROSPERITAS

Tuthills Lane, Jamesport

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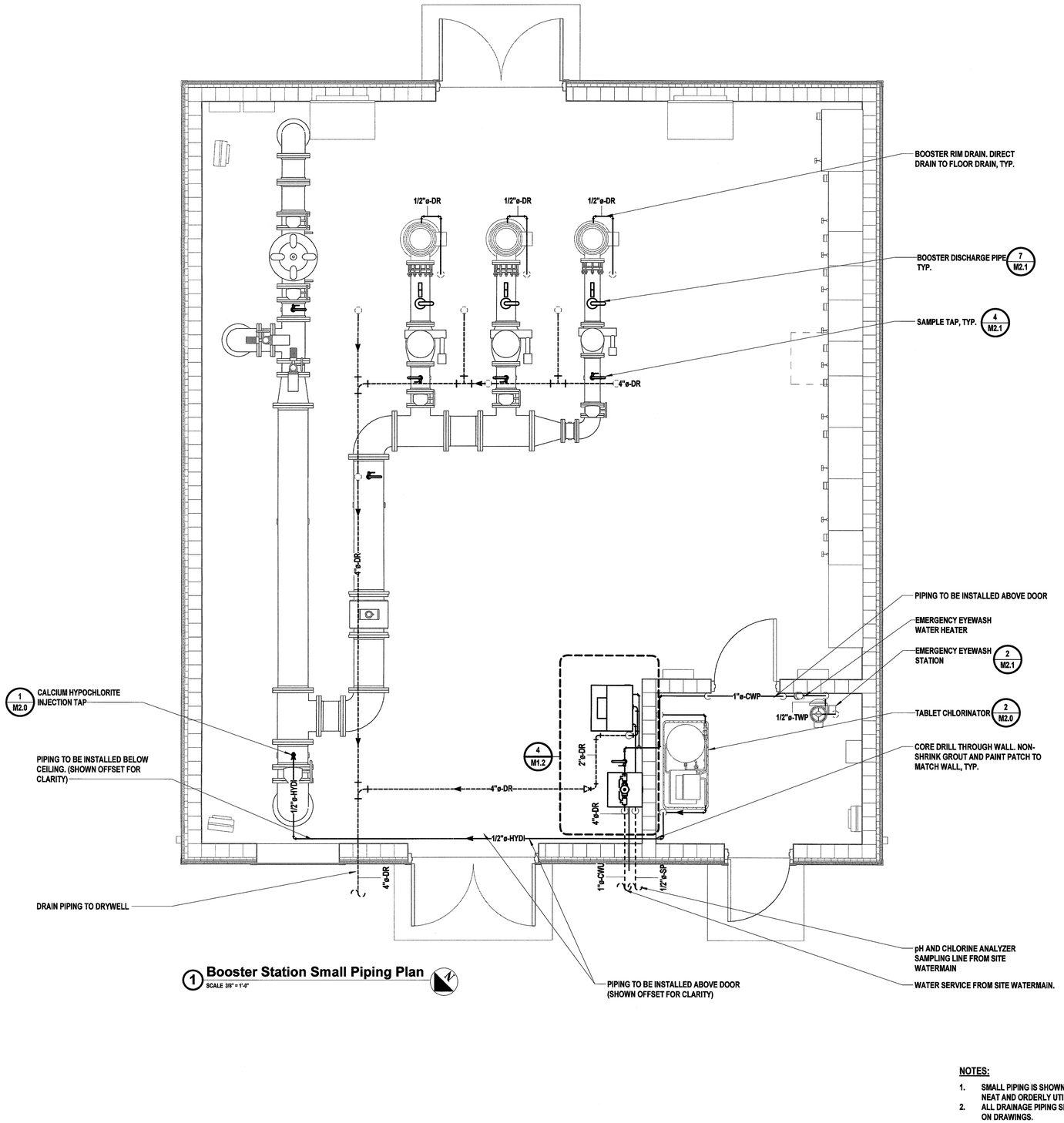
BOOSTER STATION LARGE PIPING SECTIONS

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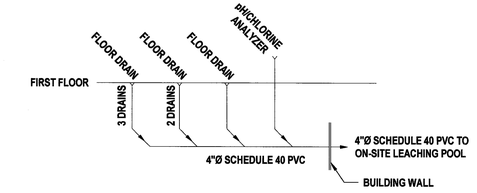
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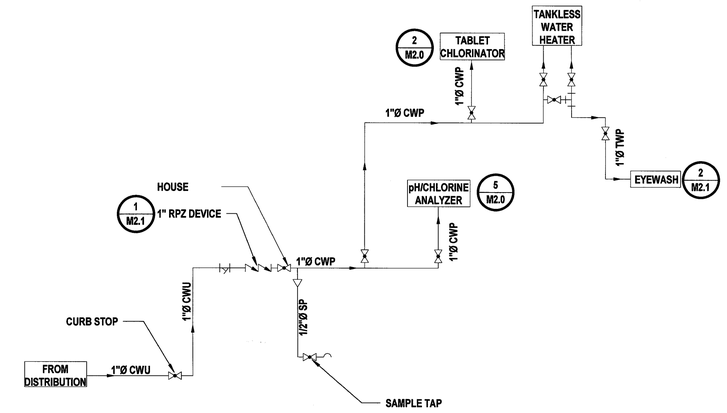
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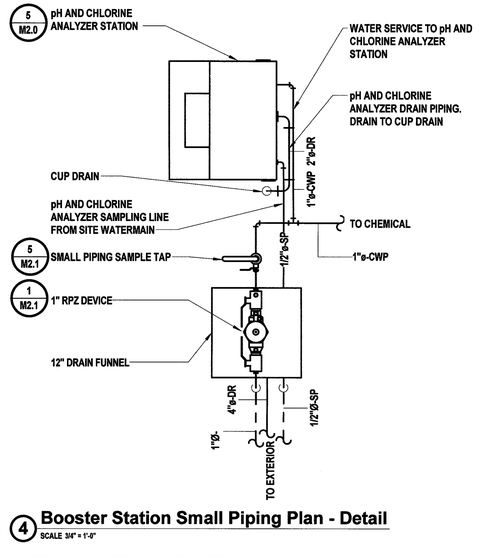
1 Booster Station Small Piping Plan
SCALE 3/8" = 1'-0"



2 Drainage Piping Diagram
SCALE NO SCALE



3 Potable Water Service Riser Diagram
SCALE NO SCALE



4 Booster Station Small Piping Plan - Detail
SCALE 3/4" = 1'-0"

NOTES:

1. SMALL PIPING IS SHOWN FOR CLARITY. ALL SMALL PIPING SHALL BE ROUTED NEAT AND ORDERLY UTILIZING STAINLESS STEEL HARDWARE.
2. ALL DRAINAGE PIPING SHALL BE PITCHED 1/4" PER FOOT IN DIRECTION SHOWN ON DRAWINGS.

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Tuthills Lane, Jamesport

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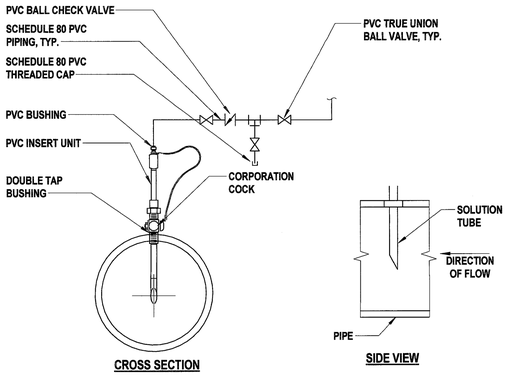
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SHEET TITLE
BOOSTER STATION SMALL PIPING PLAN

DRAWING No.
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SHEET No. 28 OF 51

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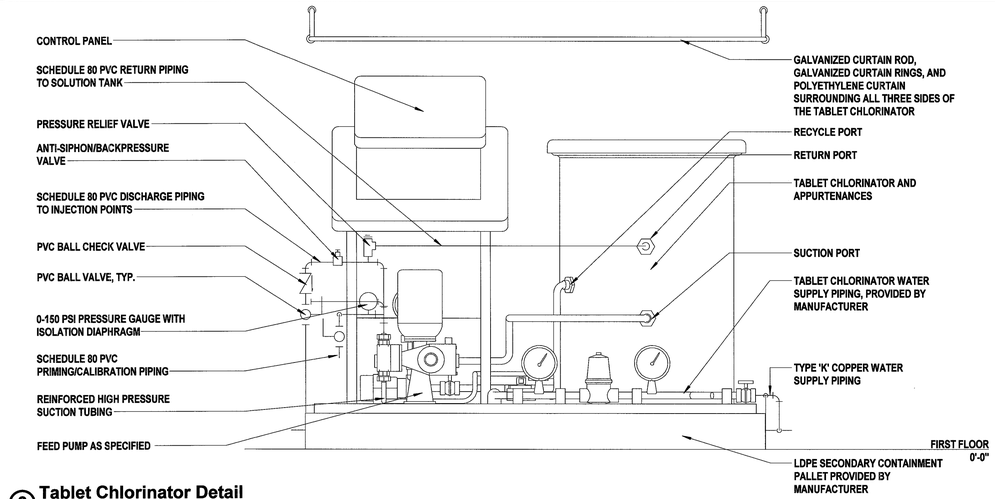


NOTE:

1. ALL VALVES AND FITTINGS SHALL BE SAME DIMENSION AS PIPING, AS SHOWN ON SMALL PIPING PLAN.

1 Calcium Hypochlorite Injection Tap Detail

SCALE NO SCALE



2 Tablet Chlorinator Detail

SCALE NO SCALE

NOTES:

1. LEVEL SWITCHES, LEVEL GAUGES AND LEVEL SENSORS SHALL BE PROVIDED BY CONTRACT G. WIRING AND TERMINATIONS SHALL BE PROVIDED BY CONTRACT E.
2. ALL VALVES AND FITTINGS SHALL BE SAME DIMENSIONS AS PIPING SHOWN ON SMALL PIPING PLAN.

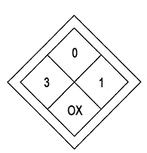


NOTE:

1. SIGN TO BE LOCATED AT CHEMICAL USAGE AND STORAGE AREA ENTRANCES.

3 "DANGER - CHLORINE" Signage

SCALE NO SCALE



<1% CALCIUM HYPOCHLORITE

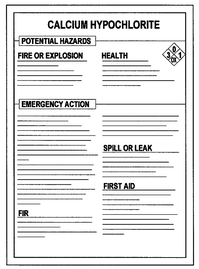
NOTE:

1. SIGN TO BE LOCATED ON EACH



NOTE:

1. "NO SMOKING" SIGNS SHALL BE PLACED CONSPICUOUSLY WITHIN AND AT ALL ENTRANCES TO CHEMICAL ROOM'S BUILDING.

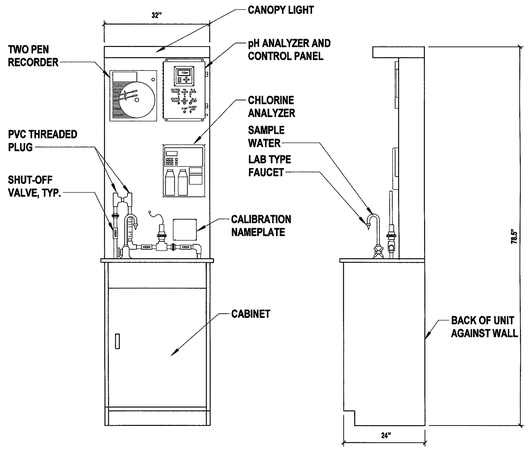


NOTES:

1. NFPA DIAMOND SIGN TO BE LOCATED ON THE TABLET CHLORINATOR AND AT ENTRANCES TO CHEMICAL ROOM.
2. CHEMICAL SAFETY DATA SIGN TO BE LOCATED AT TABLET CHLORINATOR.
3. SIGNS SHALL NOT BE OBSCURED BY MARKINGS, ATTACHMENTS, PLACEMENT OF OBJECTS OR OTHER MATERIALS.
4. WHERE NECESSARY, ATTACH SIGNS TO EXISTING MASONRY WITH STAINLESS STEEL HARDWARE.
5. SIGNS SHALL CONFORM TO OSHA/ANSI STANDARDS.

4 Calcium Hypochlorite Signage Details

SCALE NO SCALE



5 Analyzer - Chlorine and pH

SCALE NO SCALE

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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GENERAL CONSTRUCTION

STATUS

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CHEMICAL DETAILS

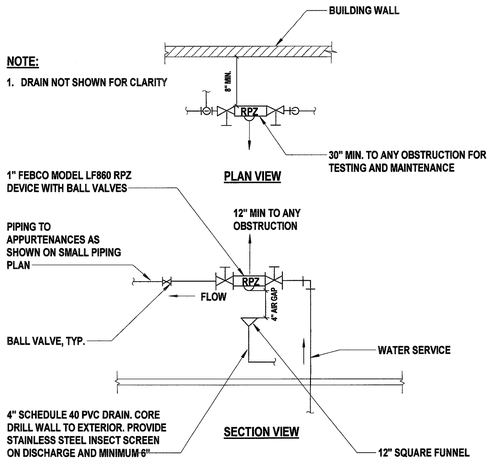
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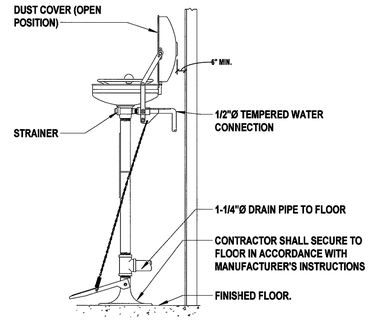
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1 Backflow Prevention Device Detail
SCALE NO SCALE

RPZ GENERAL NOTES:

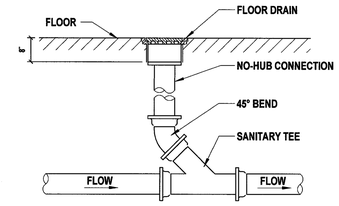
1. ALL CONNECTIONS ON THE DOMESTIC WATER SHALL BE DOWNSTREAM FROM THE REDUCED PRESSURE ZONE DEVICE. BYPASSING OF A BACKFLOW PREVENTION DEVICE IS A VIOLATION OF NEW YORK STATE HEALTH DEPARTMENT RULES AND REGULATIONS.
2. INSTALLATIONS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE SUFFOLK COUNTY DEPARTMENT OF HEALTH SERVICES AND NEW YORK STATE HEALTH DEPARTMENT REGULATIONS. BACKFLOW PREVENTION DEVICES SHALL BE INDICATED ON NEW YORK STATE DEPARTMENT OF HEALTH ACCEPTABLE LIST.
3. A NEW YORK STATE HEALTH DEPARTMENT CERTIFIED BACKFLOW PREVENTION DEVICE TESTER SHALL TEST THE REDUCED PRESSURE ZONE DEVICE ON INSTALLATION AND AT LEAST ANNUALLY WITH RESULTS REPORTED TO THE SUFFOLK COUNTY DEPARTMENT OF HEALTH SERVICES ON NEW YORK STATE FORM DOH 1013.
4. THE PLUMBER SHALL BE LICENSED BY THE TOWN OF RIVERHEAD.
5. SHUTOFF VALVES ON DEVICES MUST BE RESILIENT SEAT AND BE BY SAME MANUFACTURER AS BACKFLOW PREVENTION DEVICE.
6. TEST COCKS SHALL BE POSITIONED TO FACILITATE TESTING.
7. DEVICES MUST BE PROTECTED AGAINST FREEZING AND FLOODING.
8. PROPER MAINTENANCE OF THE DEVICE WILL BE PERFORMED BY OWNER.
9. ALL PIPING AND BRANCHES NOT PROTECTED BY THE PREVENTION DEVICE SHALL BE STENCILED OR OTHERWISE MARKED WITH "DO NOT TAP TO THIS LINE". SMALL PIPING SHALL BE MARKED WITH WRAP AROUND PIPE MARKERS. MARKINGS SHALL BE AT 5-FOOT INTERVALS.



NOTE:

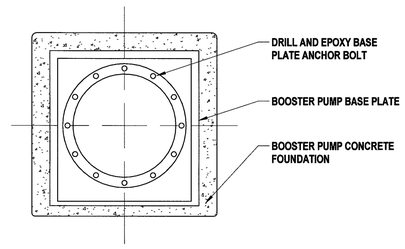
1. TO COMPLY WITH ANSI Z358.1-2009 FOR EMERGENCY EYEWASH OR EYE/FACE WASH AND SHOWER EQUIPMENT:
   - UNIT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND ACCEPTABLE PLUMBING PRACTICES.
   - EYEWASH OR EYE/FACE WASH SHALL BE POSITIONED WITH NOZZLES NOT LESS THEN 33 IN. AND NO GREATER THAN 45 IN. FROM SURFACE ON WHICH USER STANDS (F.F. 0'-0") AND 6 IN. MINIMUM FROM WALL OR NEAREST OBSTRUCTION.

2 Emergency Eyewash Detail
SCALE NO SCALE

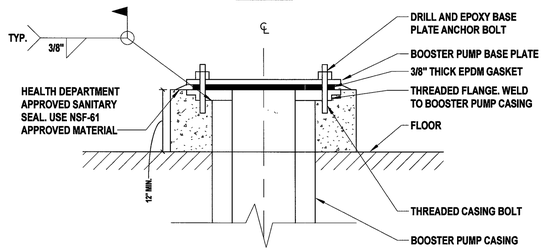


FLOOR DRAIN

3 Floor Drain Detail
SCALE NO SCALE

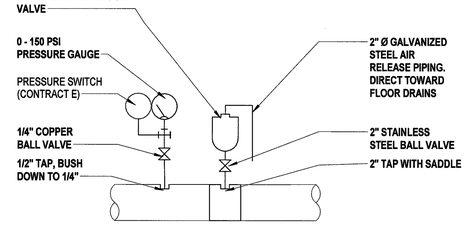


PLAN VIEW

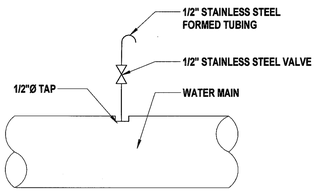


SECTION VIEW

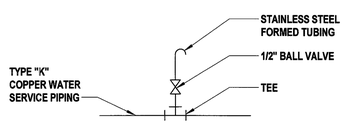
6 Booster Baseplate
SCALE NO SCALE



7 Discharge Pipe Tap Detail
SCALE NO SCALE



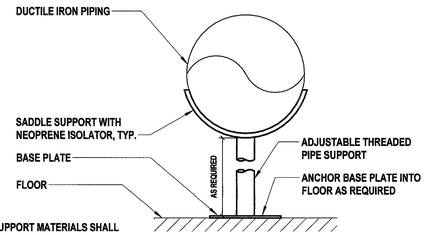
4 Sample Tap Detail
SCALE NO SCALE



NOTE:

1. ALL VALVES AND FITTINGS SHALL BE SAME DIMENSION AS PIPING SHOWN ON SMALL PIPING PLAN.

5 Small Pipe Sample Tap Detail
SCALE NO SCALE



NOTES:

1. ALL PIPE SUPPORT MATERIALS SHALL BE 304 STAINLESS STEEL.
2. PIPING SUPPORTS SHALL BE UTILIZED FOR PIPING ≥ 4"Ø AND SPACED NO LESS THAN 10' - 0" ON CENTER.

8 Single Pipe Saddle Support Detail
SCALE NO SCALE

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Tuthills Lane, Jamesport

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MECHANICAL DETAILS

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ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
BCU	BUILDING CONTROL UNIT
BTU	BRITISH THERMAL UNIT
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CLG	CEILING
COMM.	COMMUNICATION
CV	CONTROL VALVE
(D)	DEMOLISHED
DB	DRY BULB
DCV	DEMAND CONTROLLED VENTILATION
DEG. F	DEGREES FAHRENHEIT
DIA	DIAMETER
DX	DIRECT EXPANSION
'E'	ELECTRICAL CONTRACTOR
(E)	EXISTING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATING
ESP	EXTERNAL STATIC PRESSURE
FAI	FRESH AIR INTAKE
FD	FLOOR DRAIN
FLA	FULL LOAD AMPS
FT. H20	FEET OF WATER
'G'	GENERAL CONSTRUCTION CONTRACT
GPM	GALLONS PER MINUTE
GPH	GALLONS PER HOUR
H	HEIGHT
HP	HORSEPOWER
IN.	INCHES
IN. W.C.	INCHES WATER COLUMN (WATER GAUGE)
KW	KILOWATTS
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LCD	LIQUID CRYSTAL DISPLAY
LDB	LEAVING DRY BULB TEMPERATURE
LWB	LEAVING WET BULB TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
M	METER
MAX	MAXIMUM
MBH	1,000 BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MIN	MINIMUM
MNF	MANUFACTURER
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
NFPA	NATIONAL FIRE PROTECTION AGENCY
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE
OAI	OUTSIDE AIR INTAKE
OD	OUTER DIAMETER
OED	OPEN ENDED DUCT
'P'	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PSIG	LBS / PER SQUARE INCH (GAUGE PRESSURE)
RD	ROOF DRAIN
RPM	REVOLUTIONS PER MINUTE
RPZ	REDUCED PRESSURE ZONE
SAT	SUPPLY AIR TEMPERATURE
SEER	SEASONAL ENERGY EFFICIENCY RATING
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TYP	TYPICAL
VFD	VARIABLE FREQUENCY DRIVE
W	WIDTH
WB	WET BULB
WMS	WIRE MESH SCREEN

DUCTWORK LEGEND

SYMBOL	ABBREV	DESCRIPTION
		NEW DUCTWORK WITH 45 DEGREE TAKE OFF
	VD	VOLUME DAMPER
	CD	ROUND SUPPLY CEILING DIFFUSER
	SEE AIR DEVICE SCHEDULE	SIDEWALL SUPPLY, RETURN OR EXHAUST
	SEE AIR DEVICE SCHEDULE	SQUARE SUPPLY CEILING DIFFUSER
	SEE AIR DEVICE SCHEDULE	CEILING RETURN OR EXHAUST GRILLE
		FLEX DUCT
	FC	FLEXIBLE CONNECTION
		TURNING VANES
		RECTANGULAR TO ROUND TRANSITION
	AL	ACOUSTICAL LINING
		END CAP
	SEE AIR DEVICE SCHEDULE	SUPPLY DIFFUSER WITH DIRECTIONAL FLOW (SOLID HATCH INDICATES BLANK OFF PANEL)
		SUPPLY DUCT DROP
		RETURN/EXHAUST DUCT DROP
		SUPPLY DUCT RISE
		RETURN/EXHAUST DUCT RISE
CM RAL D WP S	DSD	DUCT SMOKE DETECTOR (SUPPLY)
CM RAL D WP R	DSD	DUCT SMOKE DETECTOR (RETURN)
M	MD	MOTORIZED DAMPER WITH ACTUATOR
	FD/AD	FIRE DAMPER WITH ACCESS DOOR
	FSD/AD	FIRE SMOKE DAMPER WITH ACCESS DOOR
		WORK TO BE REMOVED
		POINT OF DISCONNECTION FROM EXISTING
		POINT OF RECONNECTION TO EXISTING

CONTROLS LEGEND

SYMBOL	ABBREV	DESCRIPTION
T		THERMOSTAT

PIPING LEGEND

SYMBOL	ABBREV	DESCRIPTION
		NEW WORK
		PIPING DOWN/ PIPING UP
		BALL VALVE WITH HOSE END CONNECTION
	TH	THERMOMETER
	U	UNION
	FPC	FLEXIBLE PIPE CONNECTION/ FLEX PIPE
		DIRECTION OF FLOW
	PSR	PRESSURE SAFETY AND RELIEF VALVE
	PRV	PRESSURE REDUCING VALVE
	BV	BALL VALVE
	BA	BALANCING VALVE
	BFV	BUTTERFLY VALVE
		TEMPERATURE SENSOR WITH THERMOWELL
	GA	GATE VALVE
	GB	GLOBE VALVE
	AV	AUTOMATIC AIR VENT
	CV	2-WAY CONTROL VALVE
	CV	3-WAY CONTROL VALVE
		PLUG VALVE
	STR	STRAINER
	FD	FLOOR DRAIN
S		AIR SEPARATOR
F&T		STEAM TRAPS (INDICATE TYPE)
	CH	CHECK VALVE
	PG	PRESSURE GAUGE WITH GAUGE COCK
	RED	REDUCER
CO.	CO	CLEANOUT END CAP
		CAPPED PIPE
		PUMP
		WORK TO BE REMOVED
		POINT OF DISCONNECTION FROM EXISTING
		POINT OF RECONNECTION TO EXISTING
	TDV	TRIPLE DUTY VALVE

GENERAL NOTES

1. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
2. THE CONTRACTOR, BY PRESENTING THEIR BID FOR THE WORK, REPRESENTS THAT HE/SHE HAS INSPECTED THE SITE AND IS COMPLETELY FAMILIAR WITH THE SCOPE OF WORK AND ALL FIELD CONDITIONS RELATED TO, AND AFFECTING THE WORK AND ITS PERFORMANCE. EXCEPTIONS AFFECTING THE WORK AND ITS PERFORMANCE, OR CONFLICTS BETWEEN FIELD CONDITIONS, SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE SUBMISSION OF BIDS.
3. PERFORM ALL WORK IN ACCORDANCE WITH THE INTERNATIONAL PLUMBING CODE, INTERNATIONAL FIRE CODE, INTERNATIONAL MECHANICAL CODE, INTERNATIONAL ENERGY CONSERVATION CODE, AND INTERNATIONAL FUEL GAS CODE AND REQUIREMENTS OF THE LOCAL AUTHORITIES HAVING JURISDICTION.
4. COMPLY WITH THE NATIONAL ELECTRIC CODE AND THE REQUIREMENTS OF DIVISION 26 FOR ALL ELECTRICAL INSTALLATIONS.
5. FIRE STOP ALL OPENINGS IN FIRE RATED CONSTRUCTION FOR PIPING, DUCTWORK, CONDUIT, ETC. PROVIDE FIRE DAMPERS AND ACCESS DOORS IN ALL OPENINGS IN FIRE RATED FLOORS, PARTITIONS, AND WALLS FOR DUCTWORK AS PER THE INTERNATIONAL MECHANICAL CODE. (SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF FIRE RATED CONSTRUCTION.)
6. DO NOT SCALE DRAWINGS. DRAWINGS FOR HVAC WORK ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY. THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE. COORDINATE CONTRACT DOCUMENTS, PROJECT REQUIREMENTS, WORK OF OTHERS, AND EQUIPMENT AND MATERIALS PURCHASED WITH FIELD DIMENSIONS. INSTALL ALL EQUIPMENT AS PER MANUFACTURER'S REQUIREMENTS TO PROVIDE PROPER CLEARANCE FOR INSTALLATION, OPERATION, AND MAINTENANCE. CONTRACTOR'S INTENDED MEANS AND METHODS OF INSTALLATION AND CONTRACTOR'S FABRICATED ITEMS SHALL ENSURE A PROPER "FIT" AND INSTALLATION. BRING ANY CONFLICTS TO THE ATTENTION OF THE ARCHITECT/ENGINEER DURING THE SUBMITTAL PHASE FOR RESOLUTION PRIOR TO PURCHASING ANY EQUIPMENT.
7. MAINTAIN MAXIMUM HEADROOM AND SPACE CONDITIONS AT ALL POINTS. WHERE HEADROOM AND SPACE CONDITIONS APPEAR INADEQUATE, NOTIFY THE ARCHITECT/ENGINEER PRIOR TO PROCEEDING WITH INSTALLATION. MAINTAIN A MINIMUM OF 6'-8" CLEARANCE FROM FINISHED FLOOR TO UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT ETC., THROUGHOUT ACCESS ROUTES IN MECHANICAL ROOMS.
8. FIELD VERIFY AND COORDINATE ALL DUCT DIMENSIONS BEFORE FABRICATION. MAKE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICT WITH WORK OF OTHER TRADES OR FOR PROPER EXECUTION OF THE WORK. OBTAIN THE APPROVAL OF THE ARCHITECT/ENGINEER FOR MODIFICATIONS.
9. PROVIDE PRODUCTS OF ONE MANUFACTURER WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF MATERIAL OR EQUIPMENT IS REQUIRED.
10. INSTALL ALL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS. REFER TO DETAILS FOR ADDITIONAL PIPING AND EQUIPMENT INSTALLATION REQUIREMENTS.
11. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL PIPING AND DUCT TRANSITIONS REQUIRED FOR FINAL CONNECTIONS TO EQUIPMENT.
12. COORDINATE LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS WITH ALL OTHER TRADES. COORDINATE ALL PIPING AND EQUIPMENT SUPPORTED FROM STRUCTURE WITH GENERAL CONSTRUCTION WORK.
13. COMPLETE ALL PRESSURE TESTS BEFORE ANY MECHANICAL EQUIPMENT, DUCTWORK, OR PIPING INSULATION IS APPLIED.
14. MAKE ALL ATTACHMENTS TO JOISTS, TRUSSES, OR JOIST GIRDERS AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. THE USE OF C-CLAMPS IS NOT PERMITTED.
15. INSTALL PIPING, DUCTWORK, AND CONDUIT CONCEALED IN AREAS HAVING HUNG CEILINGS AND/OR FURRED SPACES UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
16. FURNISH AND INSTALL ALL NECESSARY CONTROL WIRING, CONDUIT, AND ACCESSORIES AS REQUIRED TO PROVIDE FULLY FUNCTIONING SYSTEMS AND SEQUENCES OF OPERATION.

LEGENDS/ABBREVIATIONS NOTES

1. ABBREVIATIONS AND SYMBOLS ON THIS SHEET DO NOT DEFINE THE SCOPE OF WORK.

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PROJECT No: RDWD 17-02	DATE: MARCH 2018		SCALE: AS SHOWN

CLIENT
Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT
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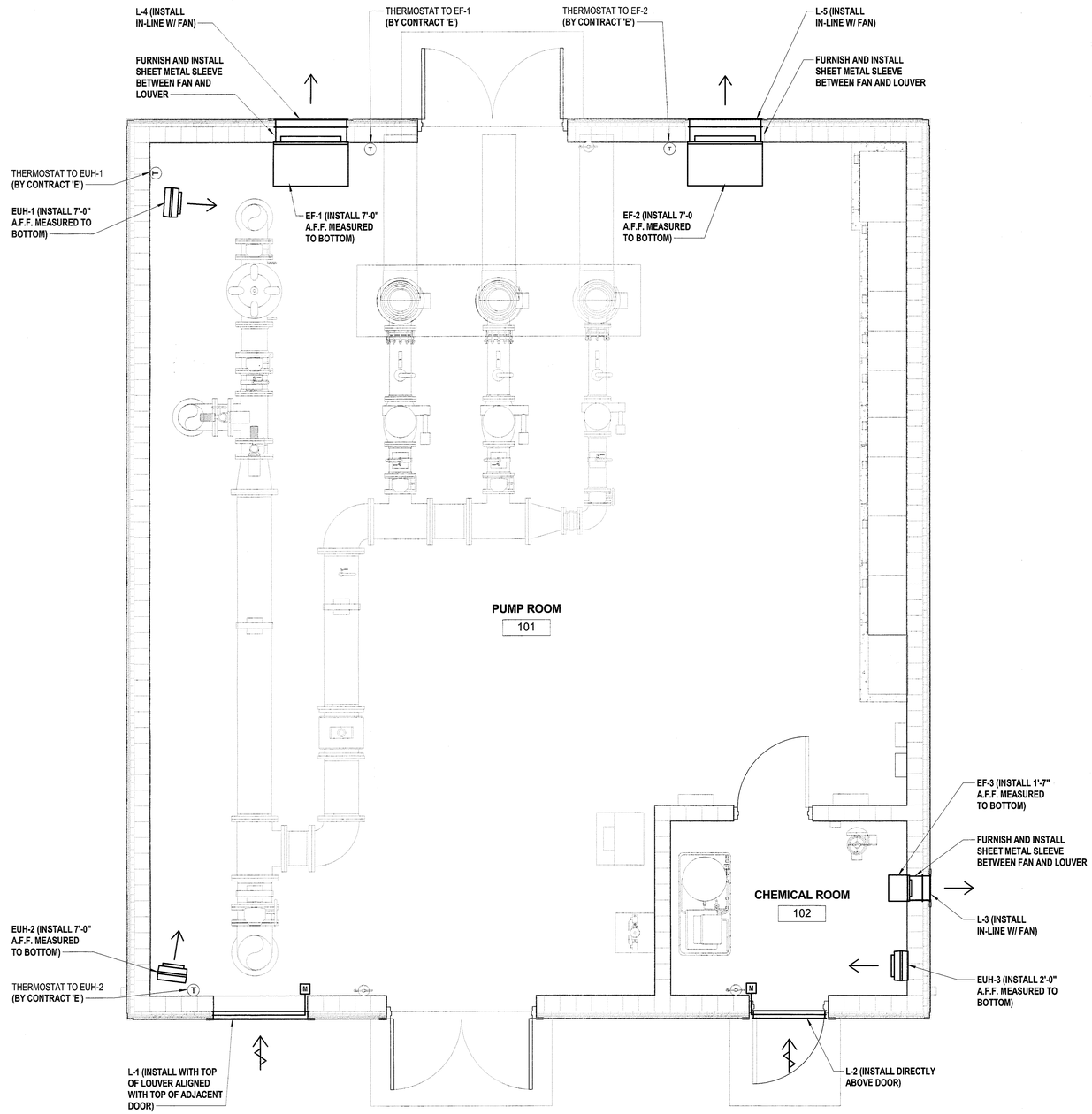
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HVAC LEGENDS, SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES

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SHEET No. 31 OF 51

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1 HVAC First Floor Plan

SCALE 3/8" = 1'-0"

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Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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HVAC FIRST FLOOR PLAN

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EXHAUST FANS

EQUIPMENT NO.	LOCATION	PERFORMANCE/ CONSTRUCTION REQUIREMENTS						BASIS OF DESIGN INFORMATION									
													ELECTRICAL DATA				
		AIR FLOW (CFM)	EXT S.P. (IN. W.G.)	FAN RPM	BHP	DRIVE TYPE	FAN TYPE	MNF	MODEL NO.	NOMINAL DIMENSIONS L x W x H (IN.)	NOMINAL OPERATING WEIGHT (LBS.)	NOMINAL WALL OPENING (IN.)	VOLTAGE/ PHASE	MOTOR POWER	MOTOR RPM	INLET SOUND POWER DATA (SONES)	REMARKS
EF-1	PUMP ROOM 101	2600	0.6	1160	0.86	DIRECT	SIDEWALL PROPELLER	GREENHECK	SE2-30-605-B10	21.8 x 37.9 x 37.9	185	32.5 x 32.5	460/3	1 HP	1160	30	1-3
EF-2	PUMP ROOM 101	2600	0.6	1160	0.86	DIRECT	SIDEWALL PROPELLER	GREENHECK	SE2-30-605-B10	21.8 x 37.9 x 37.9	185	32.5 x 32.5	460/3	1 HP	1160	30	1-3
EF-3	CHEMICAL ROOM 102	200	0.3	1725	0.04	DIRECT	SIDEWALL PROPELLER	GREENHECK	SE1-8-440-VG	9.6 x 13.1 x 13.1	29	10.5 x 10.5	115/1	1/10 HP	1725	10.1	1-4

1. NEMA-1 DISCONNECT SWITCH
2. OSHA APPROVED MOTOR SIDE GUARD
3. HI-PRO POLYESTER COATING ON FAN AND ACCESSORIES
4. VARIABLE SPEED MOTOR WITH DIAL MOUNTED ON MOTOR ENCLOSURE (GREENHECK VARI-GREEN)

LOUVERS

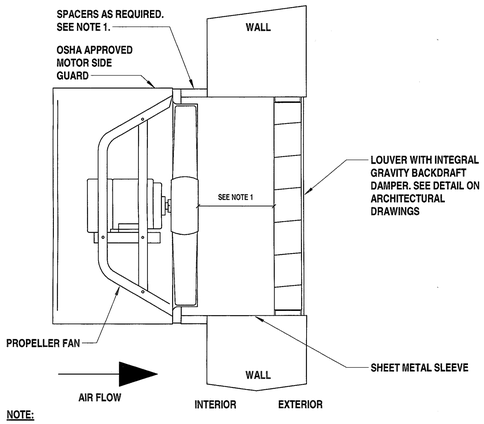
EQUIPMENT NO.	LOCATION	PERFORMANCE/ CONSTRUCTION REQUIREMENTS					BASIS OF DESIGN INFORMATION		REMARKS
		AIR FLOW (CFM)	MAX. PD (IN. W.C.)	MINIMUM FREE AREA REQUIRED (SQ. FT.)	OVERALL NOMINAL DIMENSIONS W x H (IN.)	SERVICE	MNF	MODEL NO.	
L-1	PUMP ROOM 101	5200	0.1	7.0	48 x 48	INTAKE	ARROW UNITED	EA-450-D	1-3
L-2	CHEMICAL ROOM 102	200	0.1	0.4	36 x 16	INTAKE	ARROW UNITED	EA-450-D	1-3
L-3	CHEMICAL ROOM 102	200	0.2	0.4	12 x 12	EXHAUST	ARROW UNITED	377	3-5
L-4	PUMP ROOM 101	2600	0.5	3.9	36 x 36	EXHAUST	ARROW UNITED	377	3-5
L-5	PUMP ROOM 101	2600	0.5	3.9	36 x 36	EXHAUST	ARROW UNITED	377	3-5

1. 120V MOTORIZED ACTUATOR. POWER OPEN, SPRING RETURN (MS4120F1006 BY HONEYWELL)
2. ALUMINUM INSECT SCREEN
3. KYNAR COATING (COORDINATE COLOR WITH OWNER)
4. ALUMINUM BIRD SCREEN
5. INTEGRAL GRAVITY DAMPER

ELECTRIC HEATERS

EQUIPMENT NO.	LOCATION	TYPE	PERFORMANCE/CONSTRUCTION REQUIREMENTS						BASIS OF DESIGN INFORMATION				REMARKS
			FAN DATA			ELECTRIC HEATING DATA							
			AIR FLOW (CFM)	HP	THROW (FT.)	TOTAL CAPACITY (MBH)	VOLTAGE/ PHASE	KW	MNF	MODEL NO.	NOMINAL DIMENSIONS L x W x H (IN.)	NOMINAL OPERATING WEIGHT (LBS.)	
EUH-1	PUMP ROOM 101	ELECTRIC UNIT HEATER	850	1/15	27	25.6	480/3	7.5	CHROMALOX	HVH-07-43-30	12.8 x 17.1 x 20.6	50	1-3
EUH-2	PUMP ROOM 101	ELECTRIC UNIT HEATER	850	1/15	27	25.6	480/3	7.5	CHROMALOX	HVH-07-43-30	12.8 x 17.1 x 20.6	50	1-3
EUH-3	CHEMICAL ROOM 102	ELECTRIC WALL HEATER	100	-	-	16.4	208/3	4.8	QMARK	AWH45083F	5.3 x 15.8 x 19.3	25	3-5

1. CONTACTOR WITH 24V CONTROLS TRANSFORMER
2. WALL SWIVEL MOUNTING BRACKET
3. DISCONNECT SWITCH
4. INTEGRAL THERMOSTAT
5. SURFACE MOUNTING FRAME



NOTE:

1. MAINTAIN MINIMUM CLEARANCE BETWEEN FAN PROPELLER AND LOUVER AS PER MANUFACTURER'S INSTALLATION MANUAL. PROVIDE SPACERS AS NECESSARY TO MAINTAIN CLEARANCE CALLED FOR IN MANUAL. SPACERS SHALL BE PRESSURE TREATED LUMBER. FOR MASONRY WALLS, FASTENERS SHALL BE 1/4" MASONRY SCREWS WITH MAXIMUM 8" BETWEEN FASTENERS. FOR FRAMED WALLS, FASTENERS SHALL BE 16D NAILS WITH MINIMUM 2 NAILS PER STUD. ALL FASTENERS SHALL BE COATED FOR USE WITH PRESSURE TREATED LUMBER.

① Exhaust Fan Detail
SCALE NTS

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RDWD 17-02	MARCH 2018	AS SHOWN

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Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT
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GENERAL CONSTRUCTION

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ELECTRICAL LEGEND

SYMBOL	DESCRIPTION	COMMENTS
S_3	THREE - WAY	46" AFF TO CL
S_4	FOUR - WAY	46" AFF TO CL
S_I	ILLUMINATED	46" AFF TO CL
S^A	SINGLE POLE SWITCH; "A" INDICATES SWITCH	46" AFF TO CL
S_D	SINGLE POLE DIMMER	46" AFF TO CL
S_{3D}	THREE - WAY DIMMER	46" AFF TO CL
S_K	SINGLE POLE KEYED	46" AFF TO CL
S_{K3}	KEYED THREE - WAY	46" AFF TO CL
S_{K4}	KEYED FOUR - WAY	46" AFF TO CL
S_M	HORSEPOWER RATED SWITCH, WITH INDICATOR (CONTRACTOR SHALL COORDINATE VOLTAGE AND PHASE WITH EQUIPMENT)	46" AFF
S_P	SWITCH AND PILOT	
S_T	SWITCH WITH THERMAL OVERLOAD PROTECTION (CONTRACTOR SHALL COORDINATE VOLTAGE AND PHASE WITH EQUIPMENT)	
S_{OS}	OCCUPANY SENSOR WITH MANUAL OVERRIDE, WALL	
TC	TIME	
PC	PHOTOCEL	
PB	PUSH	
E,G	EMERGENCY SHUT OFF SWITCH; 'E' INDICATES ELECTRICAL; 'G' INDICATES	
OS	OCCUPANCY SENSOR, CEILING	
	OCCUPANCY SENSOR POWER PACK, MOUNTED ABOVE	
	2 #12 AWG + #12 AWG GND IN 3/4" E.C. CONCEALED IN WALL OR	
IIIII	5 #12 AWG + #12 AWG GND IN 3/4" E.C. CONCEALED IN WALL OR	
III	3 #12 AWG + #12 AWG GND IN 3/4" E.C. CONCEALED IN OR BELOW	
LP1-35	DEDICATED HOME RUN TO PANEL LP1 FOR CIRCUIT No. 35 ONLY. 2 #12 AWG + #12 AWG GND IN 3/4" E.C. CONCEALED IN WALL OR CEILING	
	SIMPLEX RECEPTACLE: 120V, 20A. COORDINATE MOUNTING HEIGHT WITH MECHANICAL CONTRACTOR TO CLEAR BASEBOARDS.	FLUSH
	DUPLEX RECEPTACLE: 120V, 20A. COORDINATE MOUNTING HEIGHT WITH MECHANICAL CONTRACTOR TO CLEAR BASEBOARDS.	FLUSH
	QUAD RECEPTACLE, DOUBLE DUPLEX RECEPTACLE: 120V, 20A. COORDINATE MOUNTING HEIGHT WITH MECHANICAL CONTRACTOR TO CLEAR BASEBOARDS.	FLUSH
C	DUPLEX RECEPTACLE: 120V, 20A; SUBSCRIPT "C" INDICATES CEILING	FLUSH
	DUPLEX RECEPTACLE: 120V, 20A; FLOOR	FLUSH
IG	ISOLATED GROUND DUPLEX RECEPTACLE. COORDINATE MOUNTING HEIGHT WITH MECHANICAL CONTRACTOR TO CLEAR BASEBOARDS.	FLUSH
GFI	DUPLEX RECEPTACLE: 120V, 20A; WITH GROUND FAULT INDICATOR. COORDINATE MOUNTING HEIGHT WITH MECHANICAL CONTRACTOR TO CLEAR BASEBOARDS.	FLUSH
UC	DUPLEX RECEPTACLE: 120V, 20A; SUBSCRIPT "UC" INDICATES UNDER	AS PER ENGINEER
CT	DUPLEX RECEPTACLE: 120V, 20A; SUBSCRIPT "CT" INDICATES COUNTER	AS PER ENGINEER
WP	DUPLEX RECEPTACLE: 120V, 20A; SUBSCRIPT "WP" INDICATED WEATHER	AS PER ENGINEER
40 240	SPECIAL PURPOSE OUTLET: 240V, 40A. VERIFY NEMA CONFIGURATION WITH EQUIPMENT	AS PER ENGINEER
3W 125V TL 20A	TWISTED LOCK RECEPTACLE: 125V, 20A, 3 WIRE; UNLESS OTHERWISE	AS PER ENGINEER
	TELEPHONE/POWER	
S1	MAGNETIC STARTER "S1"; SEE STARTER	
DS1	DISCONNECTION SWITCH "DS1"; SEE DISCONNECT SWITCH	
J	JUNCTION	
JX	NEMA 4X STAINLESS STEEL JUNCTION BOX WITH GASKET	
JS	JUNCTION BOX RECESSED IN WALL WITH BLANK COVER, PROVIDE 3/4" E.C. AND DRAG LINE TO ABOVE FINISHED CEILING. MOUNT 18" AFF, UNLESS OTHERWISE NOTED.	
JM	FOR MONITOR, JUNCTION BOX RECESSED IN WALL WITH BLANK COVER. PROVIDE 3/4" E.C. AND DRAG LINE TO ABOVE FINISHED CEILING.	
T1	TRANSFORMER "T1"; SEE TRANSFORMER	
	ELECTRICAL PANEL "P1", RECESSED; SEE PANEL SCHEDULE.	
P1	ELECTRICAL PANEL "P1", SURFACE MOUNT; SEE PANEL SCHEDULE.	
	CONDUIT GOING UP.	
	CONDUIT GOING DOWN.	
	PULLBOX	
T	TELEPHONE. PROVIDE 3/4" E.C. WITH DRAG LINE TO AFC AND EMPTY J. BOX RECESSED IN WALL WITH BLANK	
TV	CABLE TELEVISION. PROVIDE 3/4" E.C. WITH DRAG LINE TO AFC AND EMPTY J. BOX RECESSED IN WALL WITH BLANK COVER.	
D	DATA. PROVIDE 3/4" E.C. WITH DRAG LINE TO AFC AND EMPTY J. BOX RECESSED IN WALL WITH BLANK	
D/T	COMBINED DATA AND TV. PROVIDE 3/4" E.C. WITH DRAG LINE TO AFC AND EMPTY J. BOX RECESSED IN WALL WITH BLANK COVER.	
S	SECURITY CAMERA. PROVIDE 3/4" E.C. WITH DRAG LINE TO AFC AND EMPTY J. BOX RECESSED IN WALL WITH BLANK COVER.	

ABBREVIATION	DESCRIPTION
AFF	ABOVE FINISH FLOOR
AFC	ABOVE FINISH CEILING
AFG	ABOVE FINISH GRADE
AMP, A	AMPERE
ATS	AUTOMATIC TRANSFER SWITCH; SEE TRANSFER SWITCH SCHEDULE
AWG	AMERICAN WIRE GUAGE
BFC	BELOW FINISHED CEILING
CL	CENTERLINE
CT	COUNTERTOP
EC	ELECTRICAL CONDUIT
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INDICATOR
PSEG	PUBLIC SERVICE ELECTRIC AND GAS COMPANY (LOCAL ELECTRIC UTILITY)
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUGS ONLY
NTS	NOT TO SCALE
UON	UNLESS OTHERWISE NOTED
UC	UNDERCOUNTER
V	VOLTS
VAC	VOLTS ALTERNATING CURRENT
VDC	VOLT DIRECT CURRENT
X-FMR	TRANSFORMER
WP	WEATHERPROOF

SECURITY J-BOX LEGEND

SYMBOL	DESCRIPTION	MOUNT. HEIGHT
J KP	SECURITY KEYPAD	5'-0" A.F.F.
J DC	DOOR STATUS CONTACT	6" ABOVE DOOR
J MD	MOTION DETECTOR	7'-6" A.F.F.

SECURITY

1. PROVIDE 3/4" E.C. WITH DRAG LINE TO 6" A.F.C.,U.O.N.

SYMBOL	DESCRIPTION	COMMENTS
T	LINE VOLTAGE THERMOSTAT, 120V,	
	CIRCUIT BREAKER WITH TRIP AND POLES AS	
TS1	TRANSFER SWITCH TS1; SEE TRANSFER SWITCH	
M.C.B 100A/3P PANEL "P1"	DISTRIBUTION PANEL P1 WITH 30A, 2 POLE M.C.B.; SEE DISTRIBUTION PANEL	
	DISCONNECT SWITCH DS1, 100A, 3 POLES; SEE DISCONNECT SWITCH	
DS3 100A/3P	FUSED DISCONNECT SWITCH DS2, FUSED AT 40A, 3 POLES; SEE DISCONNECT SWITCH	
G1	GENERATOR SET	
M	ELECTRIC METER AND METER PAN AS PER PSEG	
5	MOTOR, NUMBER INDICATED	
	CURRENT	
PTS	VOLTAGE	
T2	TRANSFORMER WITH SIZE, PRIMARY AND SECONDARY VOLTAGES AS	
RVRM 10	REDUCED VOLTAGE SOLID STATE RAMPING MODULE, SIZED FOR 10	
RVSS 150	REDUCED VOLTAGE SOLID STATE STARTER, SIZED FOR 150	
VFD 25	VARIABLE FREQUENCY DRIVE, RATED FOR 25	
FVNR 5	FULL VOLTAGE NON-REVERSING STARTER, NEMA SIZE	
FVR 5	FULL VOLTAGE REVERSING STARTER, NEMA SIZE	
JJS	FAST ACTING SOLID STATE FUSES AS PER	
	MULTIPLE BRANCH CIRCUITS AS	
	CONTROL CIRCUIT; MIN 2 #12 AWG IN 3/4"	

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Riverhead Water District

Booster Pumping Station at Plant No. 15

TOWN OF RIVERHEAD 1792 — MOST PROMISING SEAT OF PROGRESSION

Tuthills Lane, Jamesport

CONTRACT

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ELECTRICAL CONSTRUCTION

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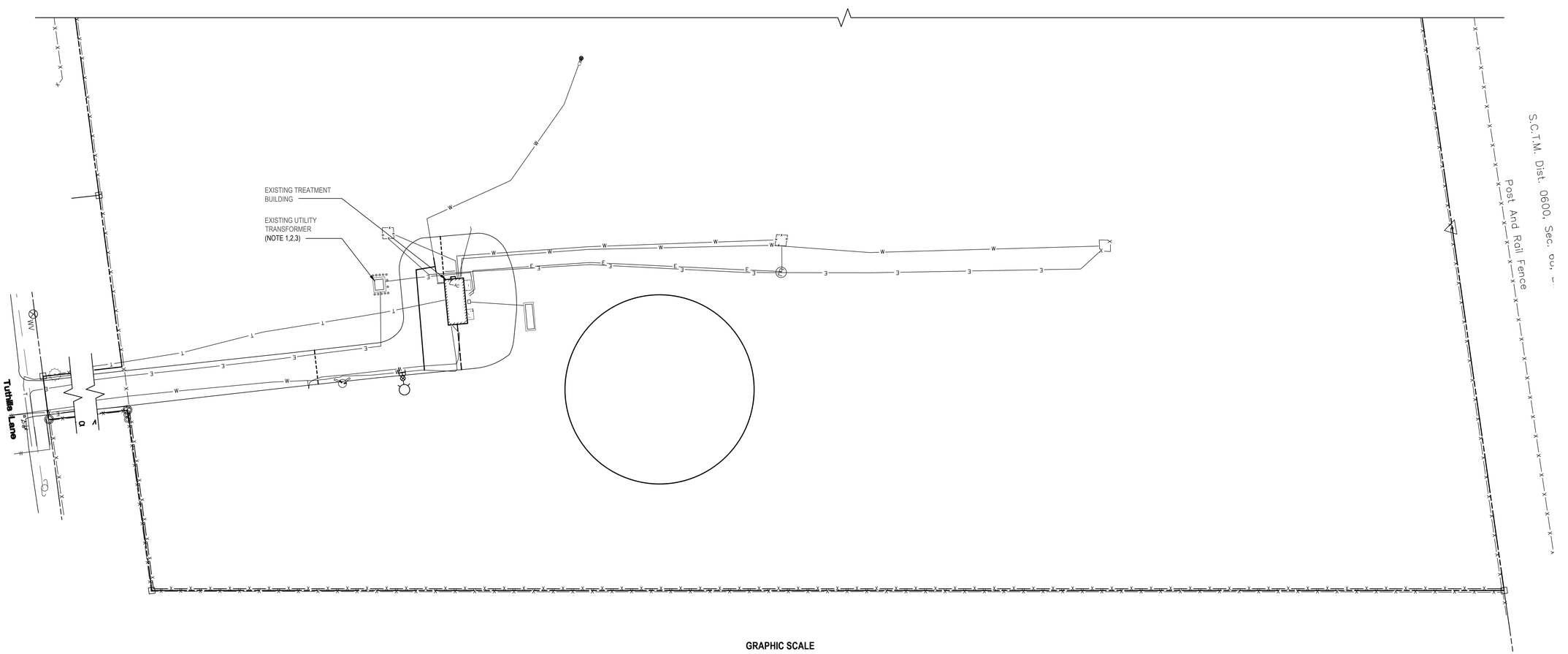
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GRAPHIC SCALE

30 0 15 30

(IN FEET)
1 inch = 30 ft.

1 Site Demolition Plan

SCALE:1"=30'-0"

SITE PLAN LEGEND

	CURB
G	EXISTING NATURAL GAS SERVICE
S	EXISTING SEWER SERVICE
W	EXISTING WATER SERVICE
T	EXISTING TELEPHONE SERVICE
T	NEW TELEPHONE SERVICE
E	EXISTING ELECTRICAL LINES
E	NEW ELECTRICAL LINES
PE	EXISTING PRIMARY ELECTRIC SERVICE
PE	NEW PRIMARY ELECTRIC SERVICE
OH	EXISTING OVERHEAD ELECTRIC LINES
X X X X	EXISTING FENCE
	ELECTRIC PULL BOX
T	TRANSFORMER

ELECTRICAL SITE PLAN GENERAL NOTES:

G1. CONTRACTOR SHALL INSPECT CONSTRUCTION SITE PRIOR TO SUBMISSION OF BIDS AND SHALL MAKE NO ADDITIONAL CLAIMS REGARDING SITE CONDITIONS THEREAFTER.

G2. LOCATION OF ALL UNDERGROUND UTILITIES BOTH PUBLIC AND CUSTOMER OWNED, WERE OBTAINED FROM EITHER MAPS, SURVEYS, DRAWINGS AND RECORDS SUPPLIED BY OTHERS. THE OWNER AND ENGINEER DO NOT GUARANTEE OR ACCEPT RESPONSIBILITY FOR ANY DAMAGE TO SUCH FACILITIES DUE TO DISCREPANCIES IN LOCATION AND SIZE SHOWN ON THE PLANS OR THOSE UTILITIES NOT SHOWN. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING A PRIVATE MARKOUT COMPANY FOR DETERMINING THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO BEGINNING WORK. CONTRACTOR SHALL LOCATE ALL UTILITIES WITHIN PROXIMITY OF CONSTRUCTION LIMITS.

G3. CONTRACTOR SHALL COMPLETELY RESTORE ALL AREAS DISTURBED DURING CONSTRUCTION, INCLUDING BUT NOT LIMITED TO GRASS AREAS, LANDSCAPING, PAVEMENTS, SIDEWALKS, CURBING AND IN-GROUND SPRINKLER SYSTEMS.

G4. THE CONTRACTOR SHALL PERFORM DAILY CLEAN-UP OPERATIONS WHICH INCLUDE REMOVAL OF DEBRIS AND EXCESS CONSTRUCTION MATERIAL TO THE SATISFACTION OF THE OWNER AND THE ENGINEER.

G5. DURING ALL NON-WORKING HOURS, THE CONTRACTOR WILL BE REQUIRED TO STORE ALL EQUIPMENT AND MATERIALS WITHIN THE AREA DESIGNATED BY THE ENGINEER AT THE PROJECT SITE.

G6. PROVIDE TEMPORARY FENCING TO PROTECT WORK AREAS.

ELECTRICAL SITE PLAN KEY NOTES:

1. CONTRACTOR SHALL DISCONNECT EXISTING SECONDARY FEEDERS FROM THE UTILITY TRANSFORMER AND PULL BACK THE FEEDER TO THE LOCATION OF THE NEW PULL BOX AS INDICATED ON DRAWING E1.1. THESE FEEDERS SHALL REMAIN FOR RE-USE/SPLICING WITH NEW FEEDERS FROM BOOSTER STATION TO BACK FEED EXISTING WELL TREATMENT BUILDING FROM NEW BOOSTER STATION MCC. REFER TO E1.1 FOR ADDITIONAL DETAIL
2. EXISTING SECONDARY CONDUIT SUBBING INTO TRANSFORMER PAD/PULLBOX SHALL REMAIN FOR EXTENSION TO NEW BOOSTER STATION ELECTRICAL SERVICE ENTRANCE EQUIPMENT. REFER TO E1.1 FOR ADDITIONAL DETAIL.
3. COORDINATE ALL REQUIRED ELECTRICAL SHUT DOWNS WITH UTILITY. SHUTDOWNS SHALL NOT BE SCHEDULED WITHOUT WRITTEN APPROVAL FROM OWNER.

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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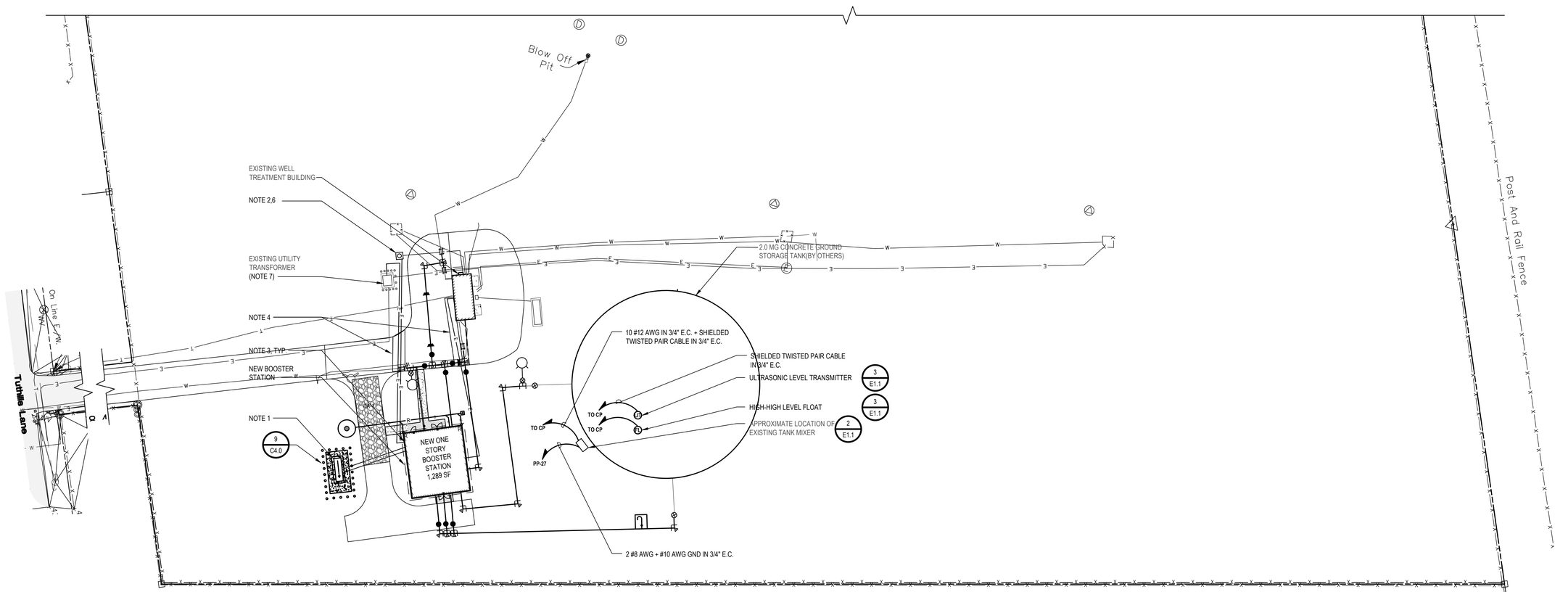
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ELECTRICAL SITE DEMOLITION PLAN

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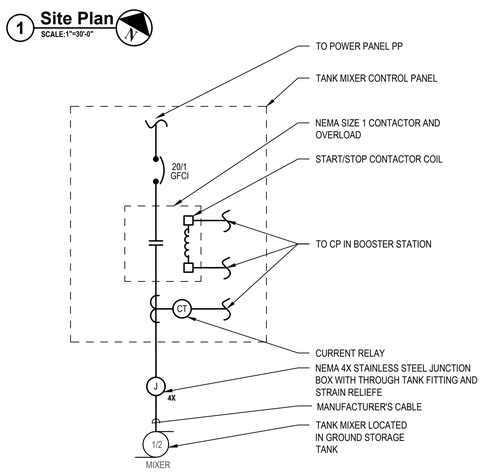
SHEET No. 36 OF 51

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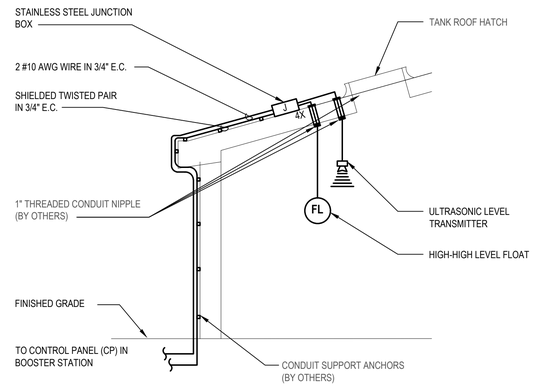


1 Site Plan
SCALE:1"=30'-0"

GRAPHIC SCALE
30 0 15 30
(IN FEET)
1 inch = 30 ft.



2 Mixer Control Panel Schematic
SCALE:NTS



3 Ground Storage Tank Level Transmitter Detail
SCALE:NTS

NOTES:

1. CONTRACTOR SHALL INTERFACE CURRENT SWITCH OUTPUT CONTACT TO PLC IN CP CABINET FOR MIXER RUN INDICATION. CONTRACTOR SHALL PROVIDE, INSTALL, AND ADJUST CURRENT SWITCH (CS-150 BY F.W. BELL) TO CLOSE WHEN NORMAL MIXER OPERATING FLA CURRENT IS MEASURE TO IDENTIFY MIXER IS RUNNING.
2. ALL INTERNAL COMPONENTS NOT SHOWN FOR CLARITY. PROVIDE ALL FUSES, OVERLOADS, RELAYS, AND ACCESSORIES AS REQUIRED.

ELECTRICAL SITE PLAN GENERAL NOTES:

G1. REFER TO E1.0 FOR ELECTRICAL SITE PLAN GENERAL NOTES AND LEGEND.

ELECTRICAL SITE PLAN KEY NOTES:

1. NEW GENERATOR AND CONCRETE FOUNDATION.
2. NEW PULL BOX. SITE PLAN SHOWS MINIMUM REQUIRED PULL BOXES, PROVIDE ADDITIONAL PULL BOXES AS REQUIRED BY NEC AND UTILITY SERVICE.
3. CONTRACTOR SHALL STUB ALL CONDUITS INTO BUILDINGS BELOW GRADE, NO EXTERIOR CONDUITS PERMITTED TO RUN EXPOSED ON EXTERIOR WALLS, CORE DRILL FOUNDATIONS AS REQUIRED. SEAL ALL CONDUIT PENETRATIONS WITH LINK SEALS ON EXTERIOR AND DUCT SEAL ON INTERIOR..
4. AREA INDICATED SHALL BE EXCAVATED BY CONTRACT 'G', COORDINATE AS REQUIRED.
5. LINK SEALS FOR EXTERIOR CONDUITS AND DUCT SEAL ON INTERIOR CONDUIT.
6. CONTRACTOR SHALL INSTALL NEW PULL BOX AND INTERCEPT EXISTING CONDUIT TO EXISTING WELL TREATMENT BUILDING. SPLICE IN NEW WELL TREATMENT BUILDING BACKFEED FEEDER FROM NEW BOOSTER STATION MCC.
7. CONTRACTOR SHALL PROVIDE ALL HARDWARE AND ACCESSORIES AND COORDINATE WITH UTILITY AS REQUIRED TO INSTALL NEW SECONDARY FEEDERS FROM EXISTING UTILITY TRANSFORMER TO NEW BOOSTER BUILDING.

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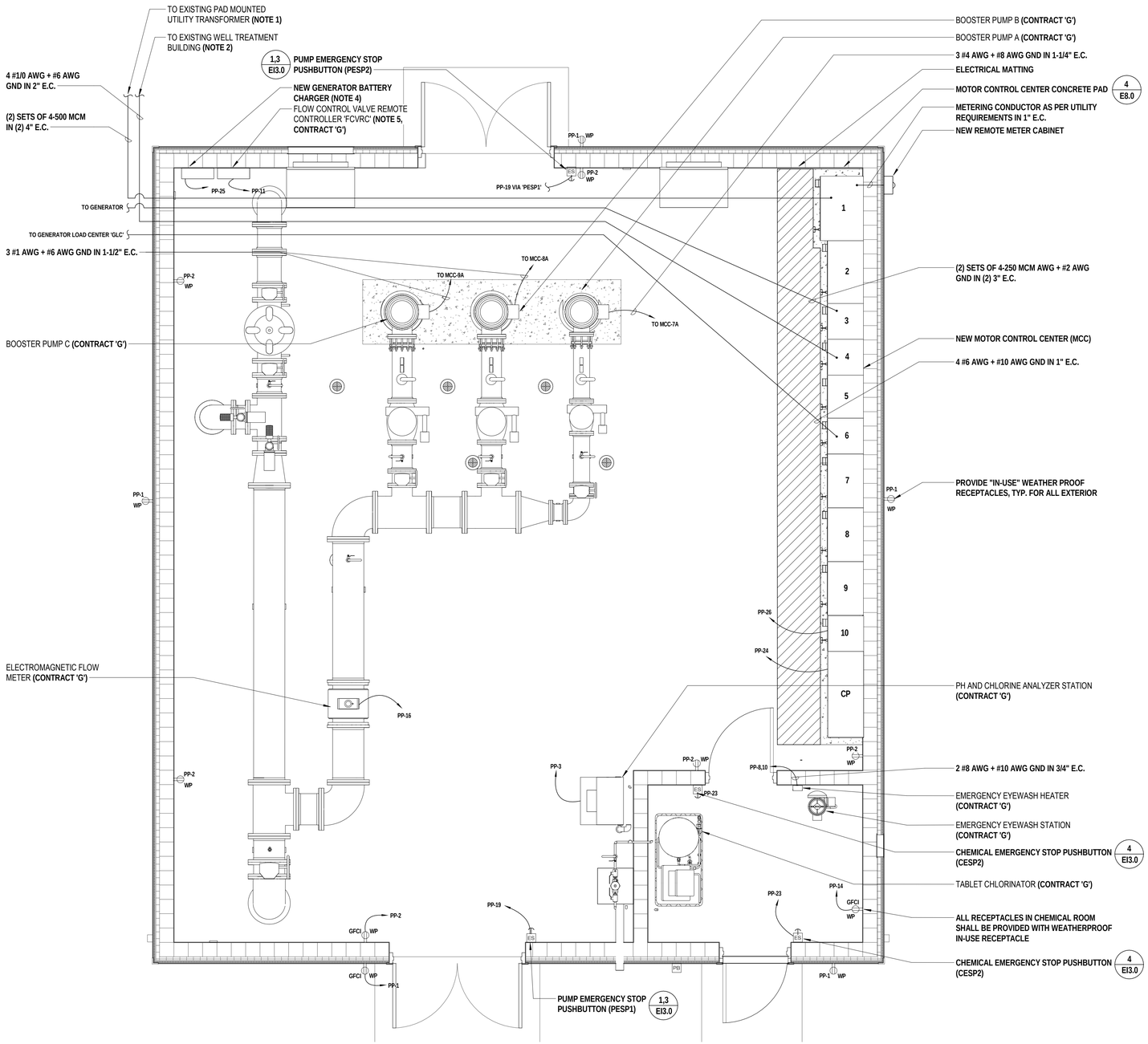
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ELECTRICAL SITE PLAN

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1 Electrical Power Plan

SCALE 3/8" = 1'-0"

ELECTRICAL KEY NOTES:

1. CONTRACTOR SHALL PROVIDE ALL HARDWARE AND ACCESSORIES AS REQUIRED TO INSTALL NEW SECONDARY FEEDERS FROM EXISTING UTILITY TRANSFORMER TO NEW BOOSTER STATION.
2. NEW FEEDERS FROM NEW BOOSTER BUILDING MCC TO EXISTING WELL TREATMENT BUILDING SHALL BE SPLICED WITH EXISTING TREATMENT BUILDING FEEDERS IN NEW PULL BOX SHOWN ON E1.1. AFTER EXISTING SECONDARIES ARE DISCONNECTED FROM EXISTING UTILITY TRANSFORMER.
3. PROVIDE AND INSTALL S.O. CORD WITH MATCHING PLUG END, SIZED IN ACCORDANCE W/ NEC.
4. PROVIDE NEW BATTERY CHARGER FOR EXISTING GENERATOR CUMMINS MODEL NO. 275DFBF RELCOATED FROM PLANT NO. 12. CONFIRM EXISTING BATTERY CHARGER IN FIELD AND REPLACE IN-KIND AT NEW LOCATION SHOWN.
5. CONTRACTOR SHALL PROVIDE, POWER VIA CIRCUIT PP-11, AND INSTALL A 120VAC TO 24VDC TRANSFORMER FOR THE FLOW CONTROL VALVE REMOTE CONTROLLER (FCVRC). COORDINATE WITH CONTROL VALVE MANUFACTURER FOR REQUIRED TRANSFORMER SPECIFICATIONS.
6. EQUIPMENT INDICATED SHALL BE PROVIDED BY CONTRACT 'G' AND WIRED BY CONTRACT 'E'.

ELECTRICAL GENERAL NOTES:

G1. COORDINATE ALL REQUIRED POWER CIRCUITS WITH 'EI' DRAWINGS.

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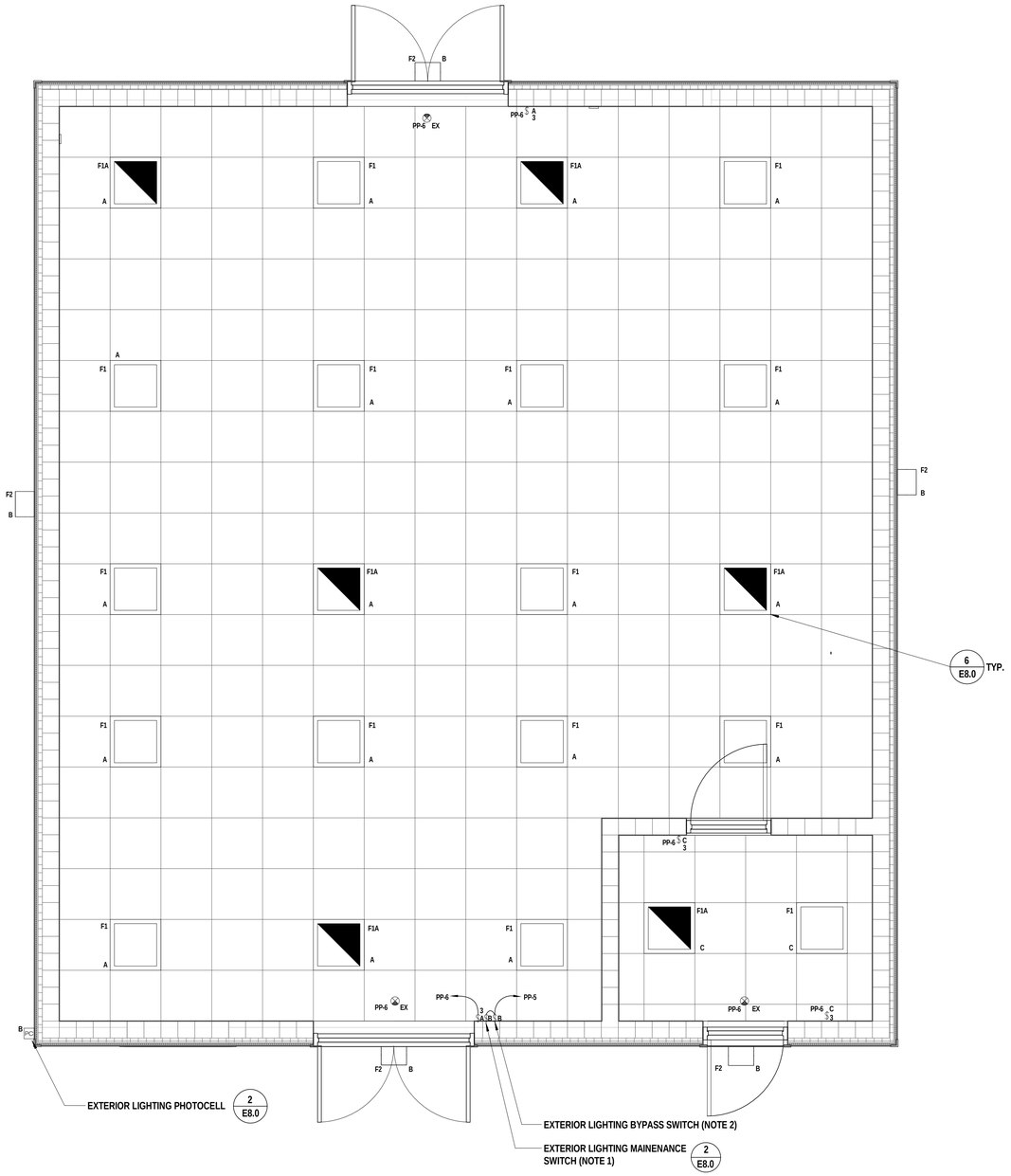
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E2.0	38 OF 51

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1 Electrical Lighting Plan

SCALE 3/8" = 1'-0"

GENERAL LIGHTING NOTES:

G1. PROVIDE ALL REQUIRED WIRING NECESSARY BETWEEN SWITCHES, CONTROLLERS, AND/OR OCCUPANCY SENSORS FOR COMPLETE LIGHTING CONTROL. WHERE 3 OR 4 WAY SWITCHES ARE USED, PROVIDE ALL REQUIRED WIRING BETWEEN SWITCHES. WIRE SIZE SHALL EQUAL POWER FEED SIZE.

G2. CONTRACTOR SHALL LOCATE AND INSTALL ALL LIGHT FIXTURES IN MECHANICAL ROOMS TO PROVIDE CLEARANCE FROM ALL MECHANICAL EQUIPMENT. COORDINATE WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLING FIXTURES, SWITCHES, CONDUIT AND WIRING.

G3. FIXTURES INDICATED WITH CIRCUIT DESIGNATIONS SHALL BE CONNECTED TO LINE SIDE OF CIRCUIT.

G4. FIXTURES INDICATED WITH LETTER DESIGNATIONS SHALL BE CONNECTED TO THE SWITCH, OCCUPANCY SENSOR AND/OR POWER PACK WITH CORRESPONDING LETTER DESIGNATION.

G5. PROVIDE AND INSTALL A DEDICATED NEUTRAL FOR EACH CIRCUIT. CONTRACTOR IN NOT PERMITTED TO USE COMMON NEUTRALS.

G6. PROVIDE BOX AND ACCESSORIES AS PER MANUFACTURER'S RECCOMENDATION FOR ALL SWITCHES, OCCUPANCY SENSORS, AND/OR POWER PACKS.

G7. VERIFY EXACT LOCATIONS AND MOUNTING HEIGHTS WITH ARCHITECT/ENGINEER IN FIELD.

G8. ALL CEILING MOUNTED FIXTURES WITH EMERGENCY BALLASTS AND ALL FIXTURES THAT ARE PART OF AN EMERGENCY LIGHTING SYSTEM, FED FROM AN EMERGENCY GENERATOR OR CENTRAL BATTERY SYSTEM SHALL BE LABELED. THESE LABELS SHALL BE EASILY READ FROM THE FLOOR LEVEL AND STATE THAT THE FIXTURE IS AN EMERGENCY FIXTURE AND CONTAIN THE PANEL NAME AND CIRCUIT NUMBER THAT IT IS FED FROM.

G9. WIRING FOR EMERGENCY BALLAST IS NOT SHOWN ON PLANS. FIXTURES WITH EMERGENCY BALLASTS SHALL BE PROVIDED WITH AN UNSWITCHED POWER FEED FROM CIRCUIT FEEDING LIGHT POLE FIXTURE.

G10. PROVIDE ALL HARDWARE AND ACCESSORIES TO MOUNT FIXTURES SECURELY. COORDINATE EXACT MOUNTING HEIGHT WITH ARCHITECT/ENGINEER IN FIELD.

G11. CONTRACTOR SHALL USE SILICONE WATER PROOF SEALANT TO SEAL TOP, LEFT AND RIGHT EDGES OF LIGHT FIXTURES TO WALL TO PREVENT MOISTURE FROM ACCUMULATING BEHIND FIXTURE. BOTTOM EDGE SHALL BE LEFT UNSEALED FOR DRAINAGE. COLOR OF SILICONE SHALL MATCH EITHER WALL COLOR OR FIXTURE COLOR. (TYP. OF ALL EXTERIOR WALL MOUNTED FIXTURES).

NOTES:

1. CONTRACTOR SHALL PROVIDE 2" X 4" PHENOLIC NAME PLATE STATING "MAINTENANCE SWITCH" TURN TO "ON" POSITION FOR NORMAL OPERATION. TURN TO "OFF" POSITION TO PREVENT LIGHTS FROM TURNING "ON".
2. FUNCTION NAMEPLATE DESCRIPTION:
   MAINTENANCE SWITCH - TURN TO "ON" POSITION FOR NORMAL OPERATION.
   TURN TO "OFF" POSITION TO PREVENT LIGHTS FROM TURNING ON.
   BYPASS SWITCH - TURN TO "OFF" POSITION FOR NORMAL OPERATION.
   TURN TO "ON" POSITION TO TURN ON LIGHT FIXTURES. (MAINTENANCE SWITCHES MUST BE IN "ON" POSITION.

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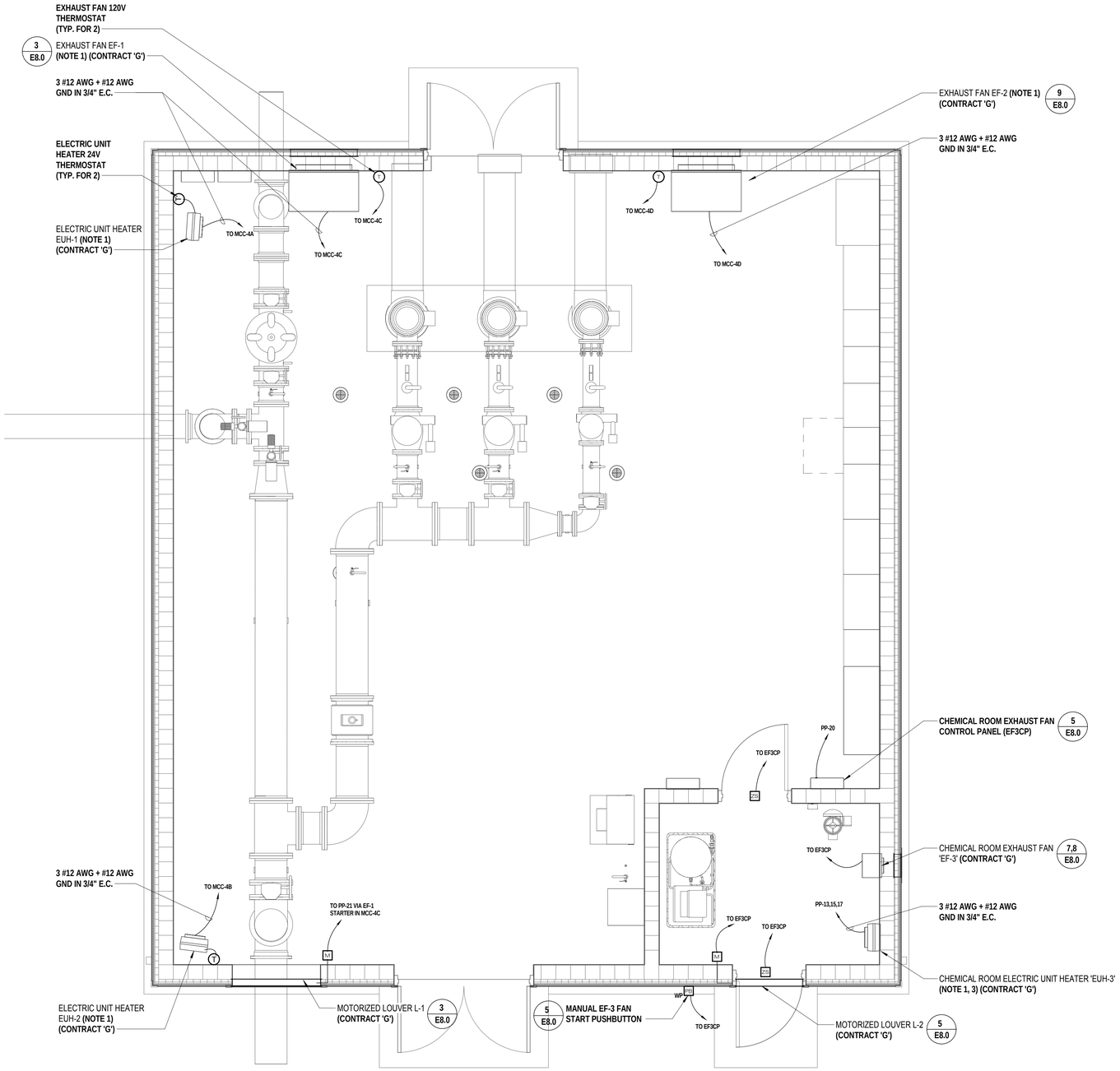
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1 Electrical HVAC Power Plan

SCALE 3/8" = 1'-0"

NOTES:

1. DISCONNECT SWITCH INTEGRAL TO UNIT PROVIDED BY MANUFACTURER. CONTRACTOR IS REPSONSIBLE TO INSTALL/INTEGRATE WITH UNIT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. COORDINATE WITH MEHCANICAL CONTRACTOR FOR EXACT MOUNTING HEIGHTS IN FIELD.
3. THERMOSTAT INTEGRATE TO UNIT PROVIDED BY MANUFACTUER. CONTRACTOR IS REPSONSIBLE TO INSTALL/INTEGRATE WITH UNIT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
4. CONTRACTOR SHALL PROVIDE INSULATED BACKPLATE FOR ALL THERMOSTATS MOUNTED ON EXTERIOR WALLS.

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ELECTRICAL HVAC POWER PLAN

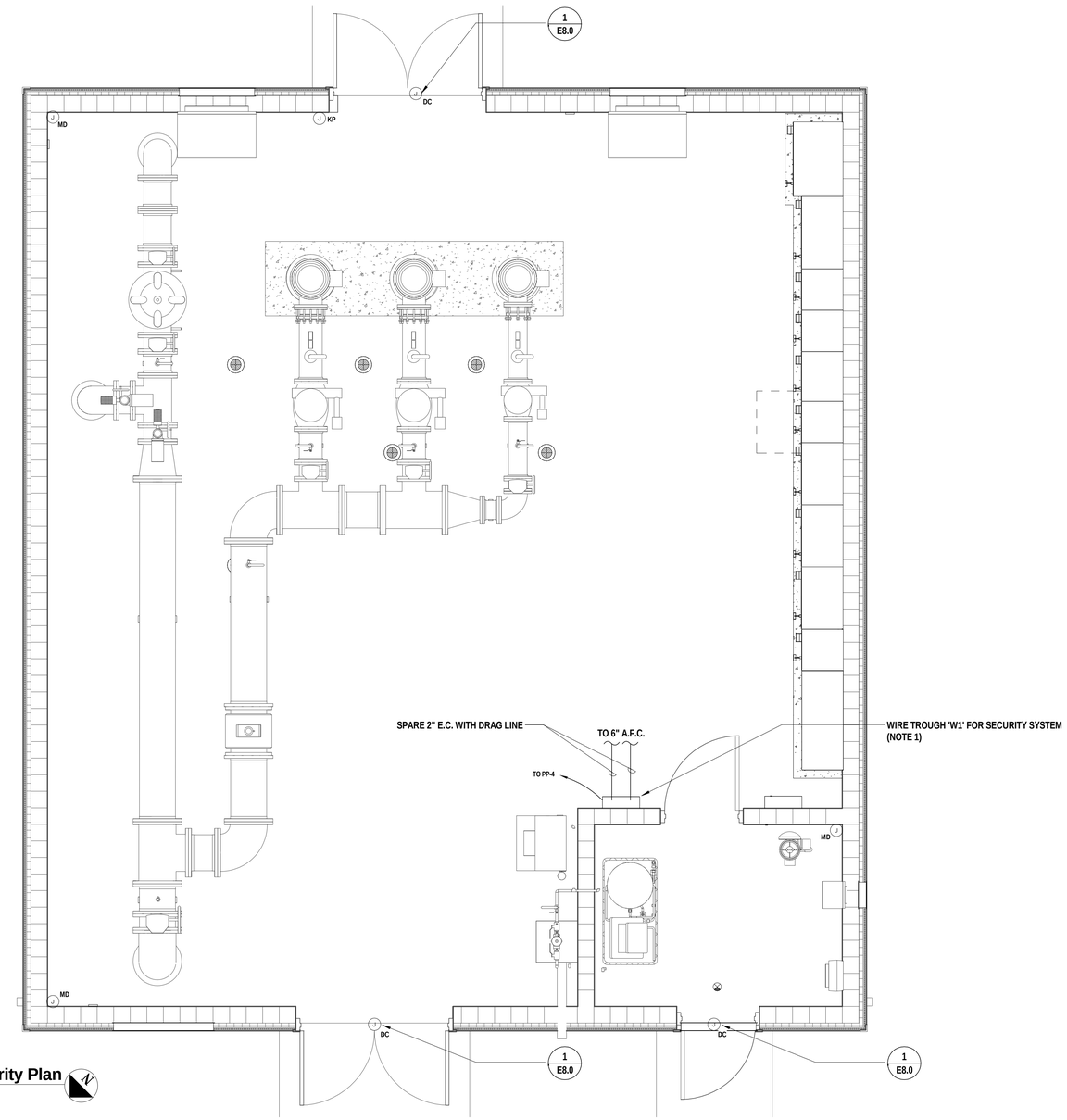
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1 Electrical Security Plan

SCALE 3/8" = 1'-0"

NOTES:

1. CONTRACTOR SHALL PROVIDE (2) 2" SPARE E.C. WITH DRAG LINES FROM WIRE TROUGH TO ABOVE FINISHED CEILING. SPARE CONDUIT SHALL TERMINATE 6" A.F.C.
2. EXACT MOUNTING LOCATION OF ALL SECURITY JUNCTION BOXES TO BE COORDINATED WITH ENGINEER IN FIELD.

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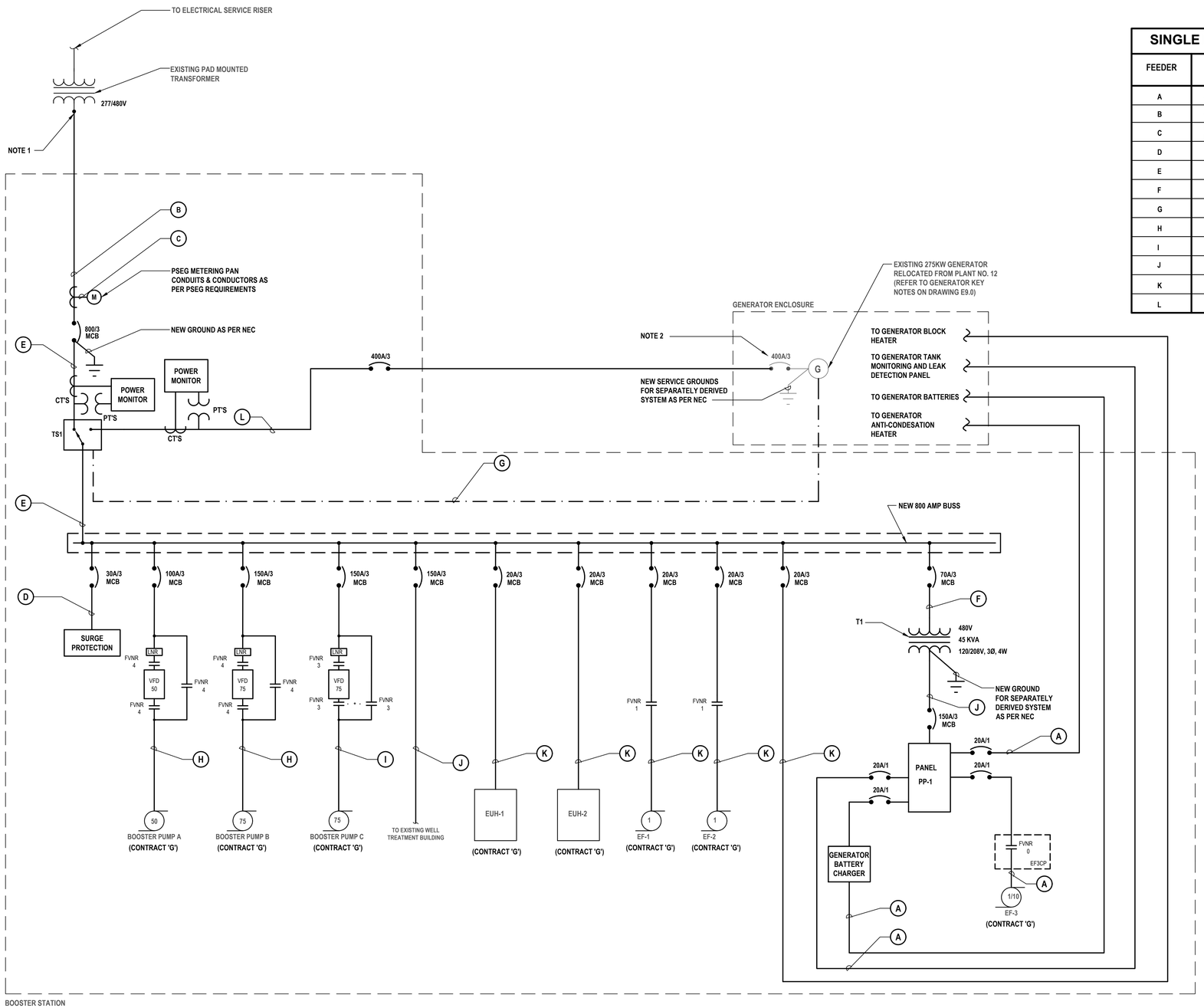
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ELECTRICAL SECURITY PLAN

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E5.0	41 OF 51

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Single Line Diagram

SCALE: NO SCALE

GENERAL NOTES:

G1. REFER TO DRAWING E10.0 FOR THE TRANSFORMER AND TRANSFER SWITCH SCHEDULE.

NOTES:

1. CONTRACTOR SHALL PROVIDE ALL HARDWARE AND ACCESSORIES AND COORDINATE WITH UTILITY AS REQUIRED TO INSTALL NEW SECONDARY FEEDERS FROM EXISTING UTILITY TRANSFORMER TO NEW BOOSTER STATION.
2. CONTRACTOR SHALL REPLACE EXISTING 400A RATED/160A TRIP CIRCUIT BREAKER WITH NEW 400A RATED/400A TRIP CIRCUIT BREAKER. COORDINATE WITH GENERATOR MANUFACTURER AS REQUIRED.

SINGLE LINE POWER DIAGRAM SCHEDULE

FEEDER	DESCRIPTION	FEEDER	DESCRIPTION
A	2 #12 AWG + #12 AWG GND IN 3/4" E.C.	M	-
B	(2) SETS OF 4-500 MCM IN (2) 4" E.C.	N	-
C	METERING CONDUCTOR AS PER UTILITY REQUIREMENTS IN 1" E.C.	O	-
D	MICRO-Z CABLES (LOW IMPEDANCE)	P	-
E	800A BUS DETAIL	Q	-
F	3 #6 AWG + #8 AWG GND IN 1" E.C.	R	-
G	10 #14 AWG + BELDEN 9729 CABLE IN 1-1/4" E.C.	S	-
H	3 #1 AWG + #6 AWG GND IN 1-1/2" E.C.	T	-
I	3 #4 AWG + #8 AWG GND IN 1-1/4" E.C.	U	-
J	4 #1/0 AWG + #6 AWG GND IN 2" E.C.	V	-
K	3 #12 AWG + #12 AWG GND IN 3/4" E.C.	W	-
L	(2) SETS OF 4-250 MCM AWG + #2 AWG GND IN (2) 3" E.C.		

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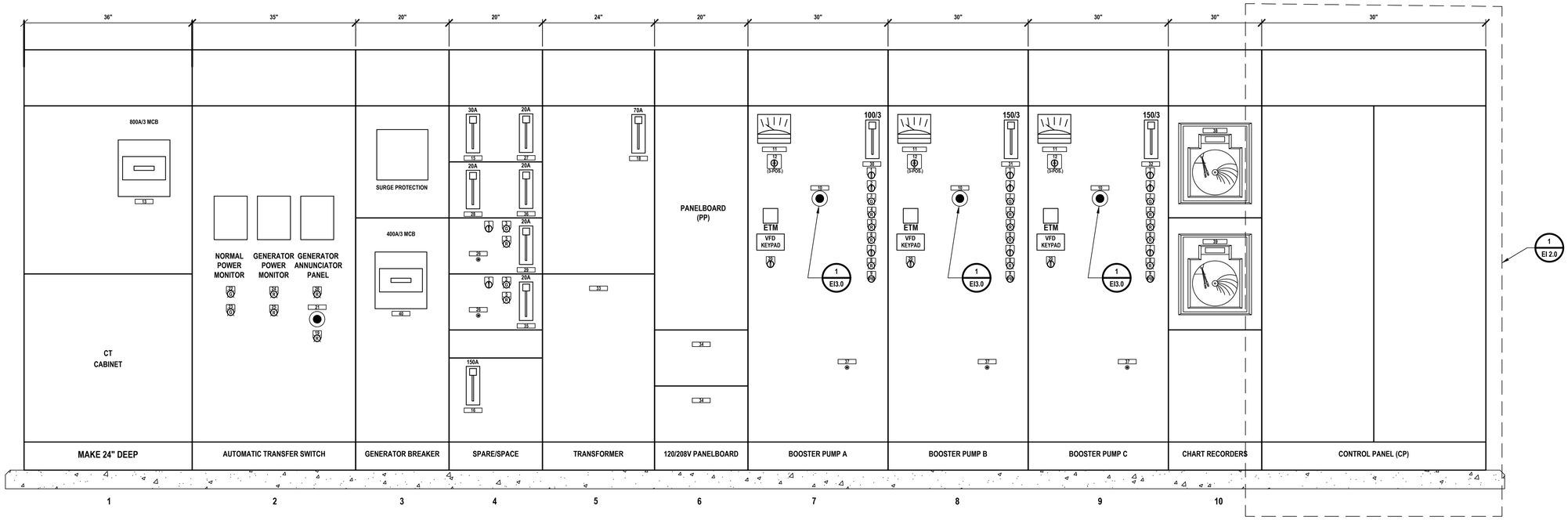
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ELECTRICAL SINGLE LINE DIAGRAM

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1 Motor Control Center Elevation

SCALE: 1" = 1'-0"

CONTROL ELEVATION SCHEDULE

ITEM	DESCRIPTION	COLOR/TYPE
1	H-O-A SWITCH	SEL3
2	NORMAL/BY-PASS SELECTOR SWITCH	SEL2
3	RUN	GREEN
4	BYPASS	RED
5	OVERLOAD	RED
6	FAULT	RED
7	HIGH PRESSURE ENABLE / DISABLE	SEL2
8	HIGH PRESS FAILURE	RED
9	RESET	PB
10	EMERGENCY STOP	PB-M
11	AMMETER	-
12	A-B-C-OFF SELECTOR	SEL4
13	PLANT 15 BOOSTER BUILDING MAIN CIRCUIT BREAKER	-
14	GENERATOR MCB	-
15	SURGE SUPPRESSION CIRCUIT BREAKER	-
16	TREATMENT BUILDING FEED	-
17	OVERLOAD RESET	PB
18	TRANSFORMER T1 MCB	-
19	GENERATOR ALARM	-
20	SPEEDPOT	-
21	GENERATOR KILL SWITCH	PB-M
22	NORMAL POWER AVAILABLE	GREEN
23	NORMAL POWER ON	GREEN
24	EMERGENCY POWER AVAILABLE	RED
25	EMERGENCY POWER ON	RED
26	AC POWER LOSS	RED
27	EUH-1	-
28	EUH-2	-
29	EF-1 STARTER	-
30	BOOSTER PUMP A	-
31	BOOSTER PUMP B	-
32	BOOSTER PUMP C	-
33	TRANSFORMER T-1	-
34	SPACE	-
35	EF-2 STARTER	-
36	GENERATOR BLOCK HEATER	-
37	OVERLOAD RESET	PB
38	BOOSTER PUMP FLOW CHART RECORDER	-
39	TANK LEVEL CHART RECORDER	-
40	GENERATOR CIRCUIT BREAKER	-

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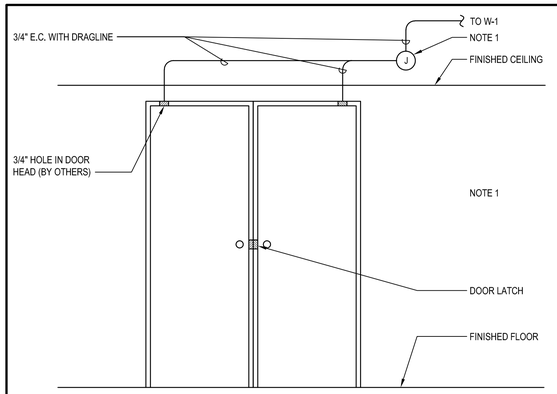
ELECTRICAL EQUIPMENT ELEVATION

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E7.0

SHEET No. 43 OF 51

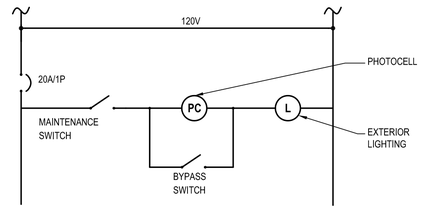
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NOTES:

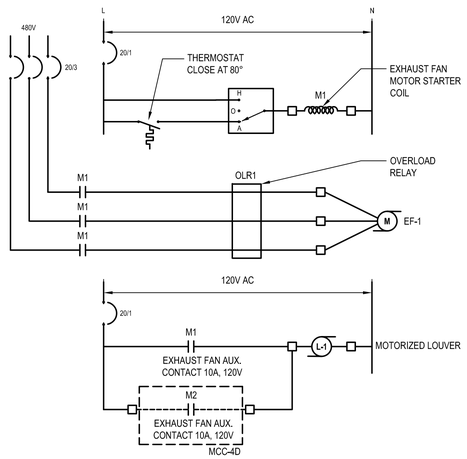
1. CONTRACTOR SHALL INSTALL NEW JUNCTION BOX. COORDINATE INSTALLATION AND EXACT MOUNTING HEIGHT AND LOCATION WITH ARCHITECT/ENGINEER IN FIELD.

1 Security System Conduit Detail
SCALE:NTS

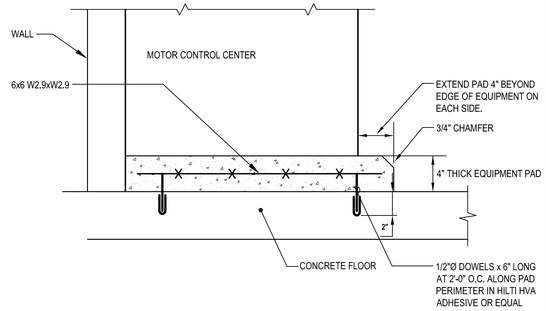


1. FUNCTION NAMEPLATE DESCRIPTION:
   MAINTENANCE SWITCH - TURN TO "ON" POSITION FOR NORMAL OPERATION. TURN TO OFF POSITION TO PREVENT LIGHTS FROM TURNING ON
   BYPASS SWITCH - TURN TO "OFF" POSITION FOR NORMAL OPERATION. TURN TO "ON" POSITION TO TURN ON LIGHT FIXTURES. (MAINTENANCE SWITCH MUST BE IN "ON" POSITION).

2 Exterior Lighting Wiring Detail
SCALE:N.T.S.



3 Exhaust Fan EF-1 Control Diagram
SCALE:N.T.S.



NOTE:

1. CONTRACTOR SHALL PRIME AND PAINT CONCRETE PAD BEFORE INSTALLING MCC.

4 Motor Control Center Concrete Equipment Pad
SCALE:NTS

5 Chemical Room Exhaust Fan 3 Control Panel (EF3CP) Elevation
SCALE: N.T.S.

6 Typical Detail of Light Fixture with Emergency Ballast
SCALE:NTS

7 Chemical Room Exhaust Fan Control Panel Schematic (EF3CP)
SCALE: N.T.S.

NOTE:

1. PROVIDE AND INSTALL NEW STARTER, CONTROL WIRING, RELAYS, CONTACTORS, AND SENSORS. INSTALL CONTROLS AND CONTACTORS IN NEMA 1 HINGED DOOR ENCLOSURE. PROVIDE LOCKABLE HANDLE.
2. SEE DETAIL NO. 1 THIS SHEET FOR PANEL FACE ELEVATION.

CHEMICAL ROOM EXHAUST FAN CONTROL PANEL PROCEDURE

FAN OPERATION SWITCH:
AUTOMATIC OPERATION:
TURN THE "FAN OPERATION SWITCH" TO THE "AUTO" POSITION. (FAN WILL TURN ON UPON ENTRY TO ROOM THROUGH CHEMICAL ROOM ENTRANCE DOOR, OR UPON CLOSURE OF "DAILY OPERATION TIMER" CONTACT, OR UPON OPERATOR PRESSING ONE OF THE "MANUAL FAN STARTER" PUSH BUTTONS, AND REMAIN ON FOR AN ADJUSTABLE PRESET TIME.)

HAND OPERATION:
TURN "DOOR OPERATION SWITCH" TO THE "HAND" POSITION. (FAN WILL TURN ON AND REMAIN ON UNTIL "FAN OPERATION SWITCH" IS SET TO "OFF" OR SET TO "AUTO".)

OFF OPERATION:
TURN THE "FAN OPERATION SWITCH" TO THE "OFF" POSITION. (FAN WILL NOT TURN ON.)

DOOR LIMIT SWITCH ENABLE/DISABLE:
ENABLE DOOR OPERATION:
TURN THE "DOOR LIMIT SWITCH ENABLE/DISABLE" SELECTOR TO THE "ENABLE" POSITION. (FAN WILL TURN ON UPON ENTRY TO ROOM THROUGH CHEMICAL ROOM ENTRANCE DOOR AND REMAIN ON FOR AN ADJUSTABLE PRESET TIME, IF THE "FAN OPERATION SWITCH" IS IN THE "AUTO" POSITION.

DISABLE DOOR OPERATION:
TURN THE "DOOR LIMIT SWITCH ENABLE/DISABLE" SELECTOR SWITCH TO THE "DISABLE" POSITION. (FAN WILL NOT TURN ON UPON ENTRY TO ROOM.)

DAILY OPERATION TIMER:
FAN WILL TURN ON FOUR TIMES AT A PRESET TIME EVERY 24 HOURS AND REMAIN ON FOR AN ADJUSTABLE PRESET TIME IF "FAN OPERATION SWITCH" IS IN THE "AUTO" POSITION.
(COORDINATE PRESET AND DURATION TIMES WITH OWNER IN FIELD.)

8 Chemical Room Exhaust Fan Procedure Nameplate
SCALE:N.T.S.

9 Exhaust Fan EF-2 Control Diagram
SCALE:N.T.S.

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CJD	MGL/ARC		

PROJECT No.:	DATE:	SCALE:
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Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

CONTRACT
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ELECTRICAL CONSTRUCTION

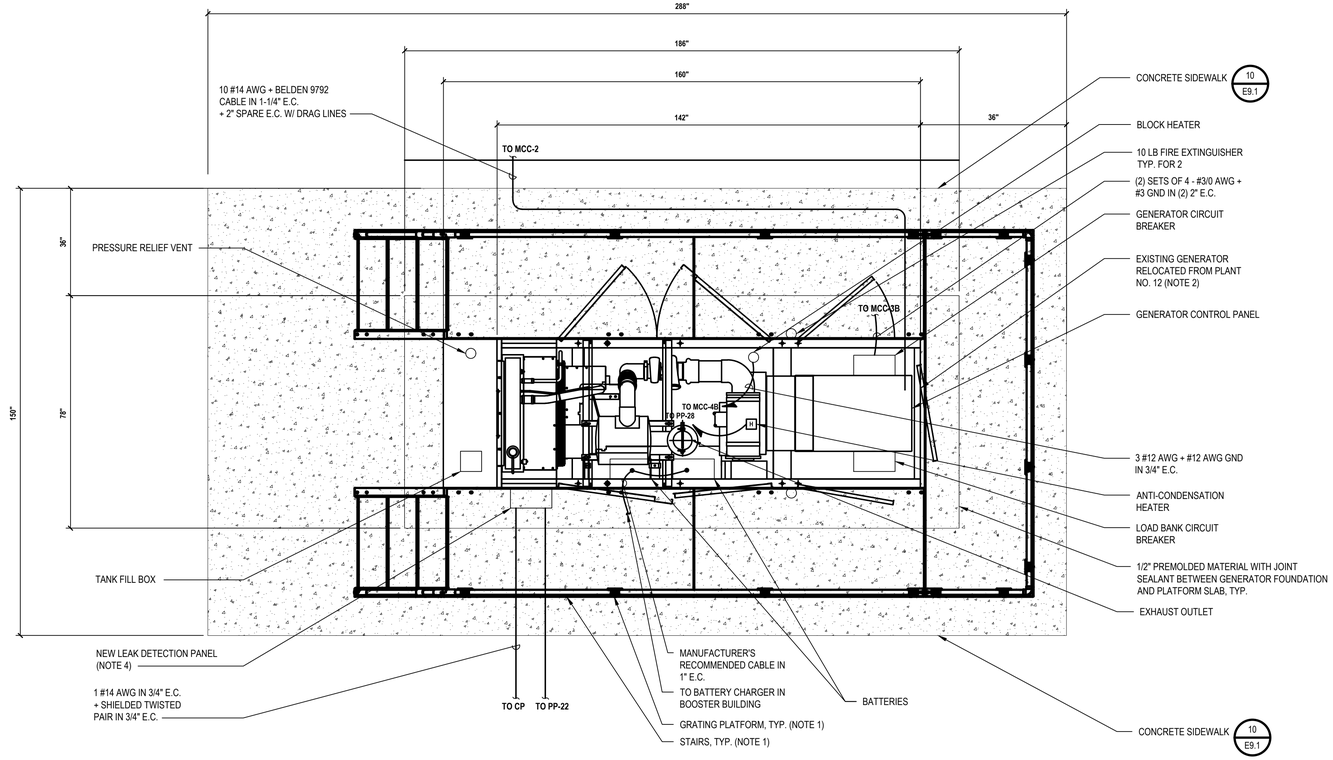
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ELECTRICAL DETAILS

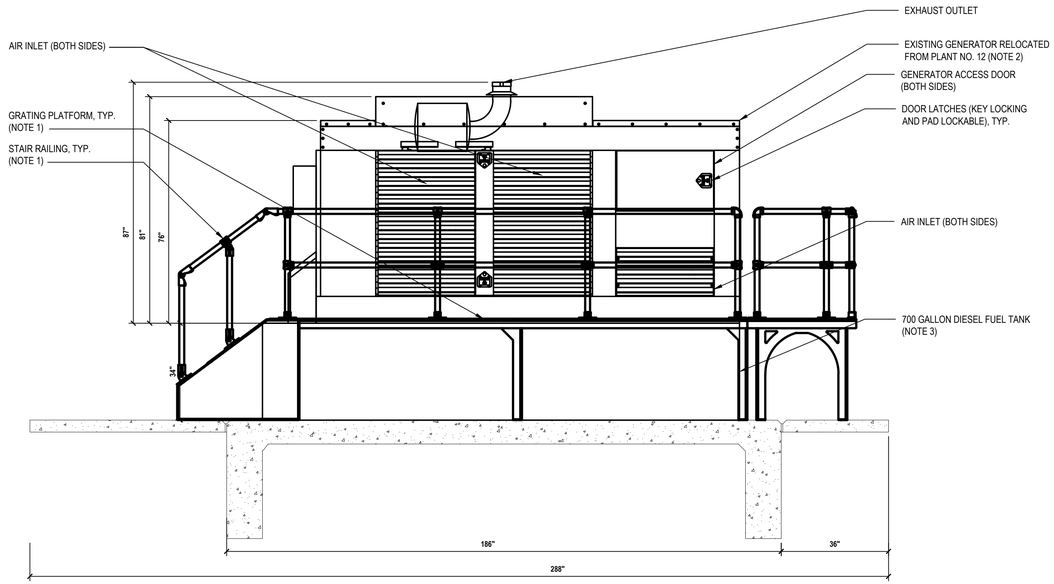
DRAWING No.
E8.0

SHEET No.
44 OF 51

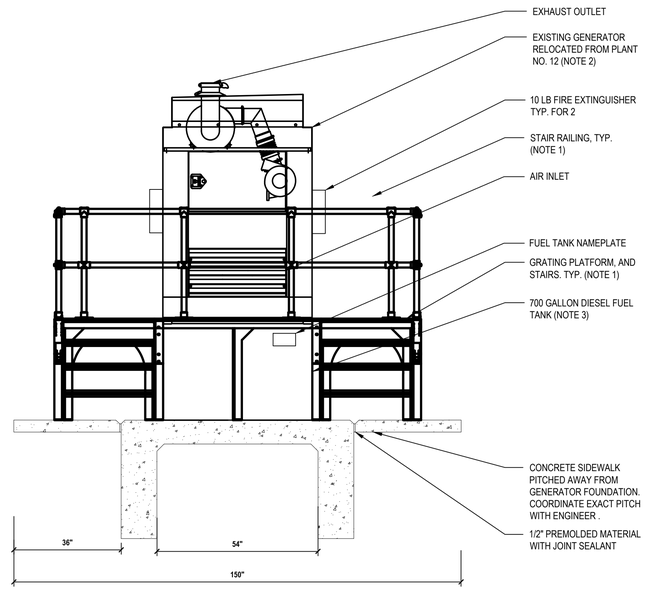
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1 **Generator Layout Plan**
SCALE:1/2" = 1'-0"



2 **Generator Elevation Plan**
SCALE:1/2" = 1'-0"



3 **Generator Elevation Plan**
SCALE:1/2" = 1'-0"

GENERATOR GENERAL NOTES:

1. NEW PLATFORM, STAIRS, HANDRAILS, AND ALL ASSOCIATED WORK SHALL BE INCLUDED AS AN ADD ALTERNATE. REFER TO PROPOSAL SHEETS FOR ADDITIONAL DETAIL. COORDINATE FINAL HEIGHT, DIMENSIONS, ETC. WITH NEW DIESEL FUEL TANK MANUFACTURER.
2. EXISTING 275KW CUMMINS DIESEL FUELED GENERATOR MODEL NO. 275DFBF SHALL BE RELOCATED FROM PLANT NO. 12 TO PLANT NO. 15, AS SHOWN ON DRAWING E1.1. CONTRACTOR SHALL BE RESPONSIBLE FOR DISCONNECTION AND REMOVAL OF EXISTING SUB-BASE DIESEL FUEL TANK IN ACCORDANCE WITH LOCAL AUTHORITY HAVING JURISDICTIONS (AHJ) REQUIREMENTS, INCLUDING ALL LABOR, MATERIAL, MACHINERY, APPLICATION FEES AND PERMITTING, CONTRACTOR SHALL BE RESPONSIBLE FOR RIGGING EXISTING GENERATOR TO NEW LOCATION AT PLANT NO. 15 AND PLACEMENT AND CONNECTION TO NEW 700 GALLON FUEL TANK IN ACCORDANCE WITH AHJ REQUIREMENTS INCLUDING ALL LABOR, MATERIAL, MACHINERY, APPLICATION FEES AND PERMITTING.
3. CONTRACTOR SHALL PROVIDE NEW 700 GALLON DIESEL FUEL TANK AT PLANT NO. 15 FOR PLACEMENT AND CONNECTION TO EXISTING GENERATOR RELOCATED FROM PLANT NO. 12. NEW DIESEL FUEL TANK SHALL MEET OR EXCEED ALL LOCAL CODES AND REQUIREMENTS. CONTRACTOR IS RESPONSIBLE FOR ALL MATERIALS, LABOR, MACHINERY, APPLICATION FEES, AND PERMITTING. CONTRACTOR IS RESPONSIBLE FOR ALL RIGGING OF EXISTING GENERATOR FROM PLANT NO. 12 TO PLANT NO. 15 AND PLACEMENT OF EXISTING GENERATOR ON NEW FUEL DIESEL TANK INCLUDING ALL ASSOCIATED INTERCONNECTIONS BETWEEN GENERATOR AND NEW TANK INCLUDING BUT NOT LIMITED TO STRUCTURAL CONNECTIONS, FUEL DISTRIBUTION CONNECTIONS, TANK GAUGING, LEAK MONITORING, VENTING, ETC. IN ACCORDANCE WITH LOCAL AHJ REQUIREMENTS. CONTRACTOR SHALL USE JAMES WOERNER INC., 130 ALLEN BLVD, FARMINGDALE, NY 11735. 631-454-9330 OR APPROVED EQUAL FOR NEW FUEL TANK CONSTRUCTION AND DELIVERY, EXISTING GENERATOR RIGGING AND ALL INTERCONNECTIONS AND FINAL TERMINATIONS.
4. PROVIDE NEW TANK MONITORING/LEAK DETECTION PANEL OMNTEC MODEL NO. L1PD2 TO REPLACE EXISTING PANEL.

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CONSULTANTS:

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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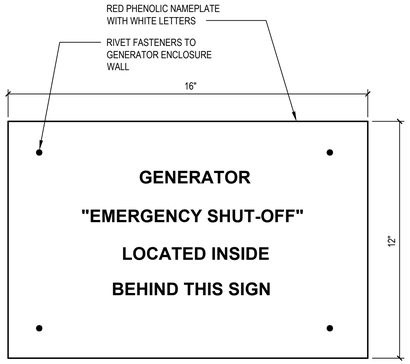
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SHEET TITLE
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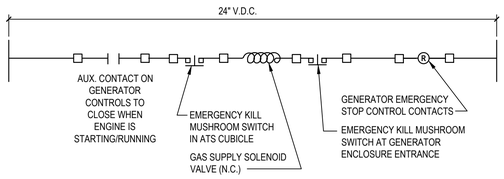
DRAWING No.
E9.0

SHEET No.
45 OF 51

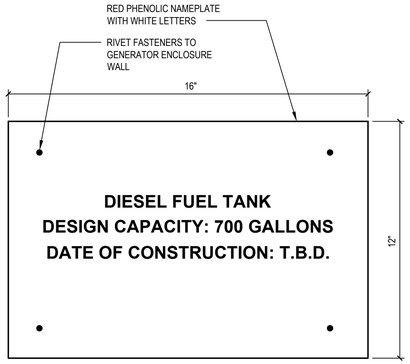
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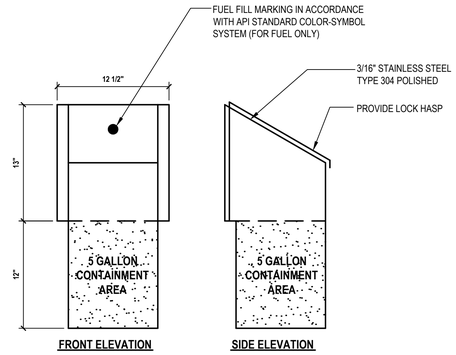
1 Emergency Shut-Off Name Plate
SCALE:NTS



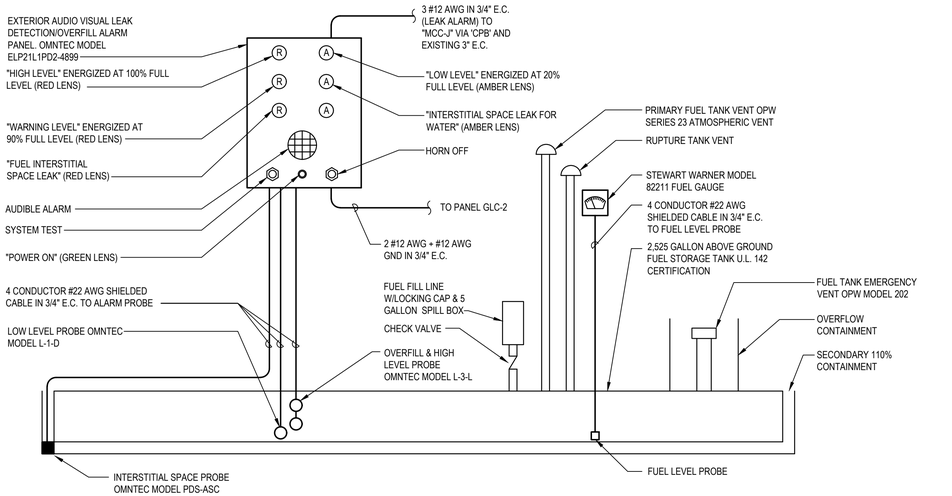
2 Generator Emergency Shutoff Control Circuit
SCALE:NTS



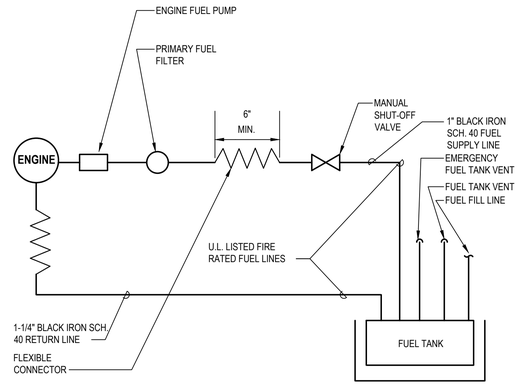
3 Fuel Tank Name Plate
SCALE:NTS



4 Spill Box Detial (Fuel Fill and Drain Lines)
SCALE:NTS



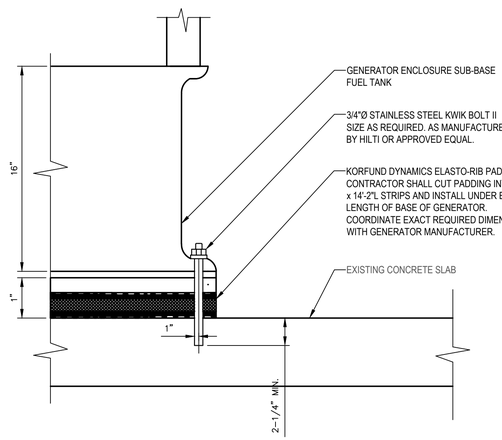
5 Leak Detection/Overfill Alarm Controls
SCALE:NTS



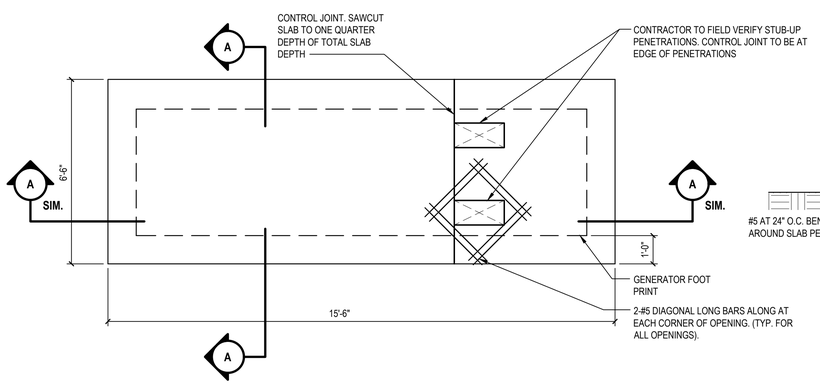
NOTE:

1. FLEXIBLE CONNECTION FOR FUEL LINES SHALL BE FIRE RATED STAINLESS STEEL HOSE ANNUFLUX AF 4750, OR EQUAL

6 Fuel Supply Schematic
SCALE:NTS



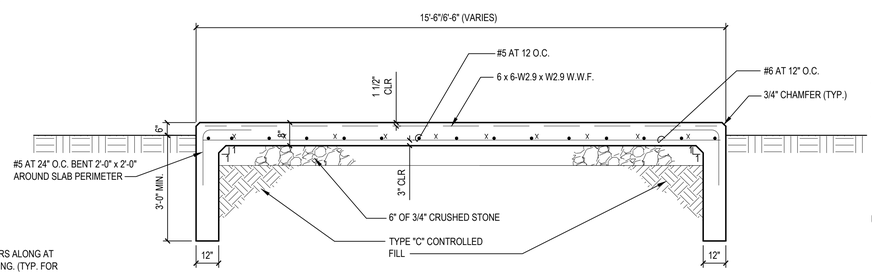
7 Generator Enclosure Anchoring Detail
SCALE:NTS



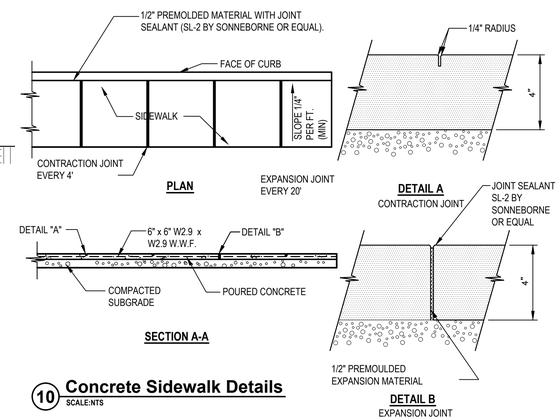
8 Generator Pad Plan
SCALE:NTS

NOTES:

1. PAD DIMENSION BASED ON SPECIFIED EQUIPMENT. 1'-0" MIN ALL AROUND



9 Section A-A
SCALE:NTS



10 Concrete Sidewalk Details
SCALE:NTS

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Riverhead Water District

Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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ELECTRICAL CONSTRUCTION

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SHEET TITLE

ELECTRICAL GENERATOR DETAILS

DRAWING No.: **E9.1**

SHEET No.: 46 OF 51

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Name

Panelboard: PP | **Voltage:** 208Y/120 | **Phase:** 3 | **Wire** 4 | **A.I.C. Rating:** 42,000 AMPS SYMMETRICAL

Manufacturer: SIEMENS | **Mains:** 150 MCB | **Mains Rating:** 225 A

Panel Type: P2 | **Mounting:** SURFACE | **Options:** | **Notes:**

NEMA Type Enclosure NEMA 1

Load Description	Breaker Option	Trip	Poles	Circ No.	A	B	C	A	B	C	Circ No.	Poles	Trip	Breaker Option	Load Description
EXTERIOR RCPT		20 A	1	1	900 VA			1080 VA			2	1	20 A		INTERIOR RCPT
PH/CHLORINE ANALYZER		20 A	1	3		300 VA			250 VA		4	1	20 A		WIREWAY W-1
EXTERIOR LIGHTING		20 A	1	5			170 VA			750 VA	6	1	20 A		CHEMICAL AND PUMP LIGHTING
MOTORIZED VALVE MBV-2		20 A	1	7	500 VA			2400 VA			8	2	35 A	HACR	EMERGENCY EYEWASH HEATER
TABLET CHLORINATOR PUMP...		20 A	1	9		180 VA			2400 VA		10				
CONTROL VALVE		20 A	1	11			500 VA			500 VA	12	1	20 A		MOTORIZED VALVE MBV-1
CHEMICAL ROOM UNIT HEATER	HACR	20 A	3	13	1600 VA			180 VA			14	1	20 A		CHEMICAL ROOM RECEPTACLE
				15		1600 VA			150 VA		16	1	20 A		ELECTROMAGNETIC FLOW METER
				17			1600 VA			500 VA	18	1	20 A	--	CHART RECORDERS
FLASHING PUMP E-STOP		20 A	1	19	500 VA			450 VA			20	1	20 A		EF3CP
MOTORIZED LOUVER L-1		20 A	1	21		500 VA			250 VA		22	1	20 A	--	GENERATOR LEAK DETECTION...
FLASHING CHEM ROOM E-STOP		20 A	1	23			1000 VA			0 VA	24	1	20 A		CP
GENERATOR BATTERY CHARGER		20 A	1	25	450 VA			250 VA			26	1	20 A		CHART RECORDERS
TANK MIXER CONTROL PANEL	--	20 A	1	27		0 VA			500 VA		28	1	20 A	--	GENERATOR ANTI-COND. HEATER
SPARE	--	20 A	1	29			0 VA			0 VA	30	1	20 A	--	SPARE
SPARE	--	20 A	1	31	0 VA			0 VA			32	1	20 A	--	SPARE
SPARE	--	20 A	1	33		0 VA			0 VA		34	1	20 A	--	SPARE
SPARE	--	20 A	1	35			0 VA			0 VA	36	1	20 A	--	SPARE
SPARE	--	20 A	1	37	0 VA			0 VA			38	1	20 A	--	SPARE
SPARE	--	20 A	1	39		0 VA			0 VA		40	1	20 A	--	SPARE
SPARE	--	20 A	1	41			0 VA			0 VA	42	1	20 A	--	SPARE

Connected Totals:
A 8.0 kVA
B 5.9 kVA
C 4.8 kVA
Total: 18.0 kVA
Amps 50 A

(All Phases to be balanced to within 7% Actual Load Totals)

Breaker Option

AS - Powerlink AS Breaker
LO - Handle Lock-off Device
ST - Shunt Trip Type
AUX - Auxillary Contacts
PA - Handle Padlock Attchment
GFCI - Ground Fault Circuit Interrupter
HACR - Heating, A/C & Refrigeration
SF - Subfeed
TC - Time Clock Control

TRANSFORMER SCHEDULE

ID	SIZE	PRIMARY	SECONDARY	TYPE	ENCLOSURE	MOUNTING
T1	45KVA	480, 3Ø	208V, 3Ø, 4W	DRY	OPEN	MCC

TRANSFER SWITCH SCHEDULE

ID	TYPE	ENCLOSURE	VOLTS	PHASE	POLES	AMPS
TS1	AUTOMATIC	OPEN	480V	3Ø	4	800

LIGHTING FIXTURE SCHEDULE

TYPE	MFG.	MODEL NO.	LAMPS			VOLTAGE	MOUNTING	REMARKS	MOUNTING HEIGHT
			NO. PER FIXTURE	TYPE	WATTS				
F1	COLUMBIA LIGHTING	LJT22-40MLG-FSA12125-EDU-G3	1	LED	31	120	RECESSED	W/ TRIPLE GASKETING	CEILING
F1A	COLUMBIA LIGHTING	LJT22-40MLG-FSA12125-EDU-ELL14-G3	1	LED	31	120	RECESSED	W/ 90 MIN BATTERY BACK-UP AMD TRIPLE GASKETING	CEILING
F2	SPAULDING LIGHTING	QSP1-12L-30-457-3-U-DB-E	1	LED	34	120	WALL	W/ 90 MIN BATTERY BACK-UP	10'-0" A.F.F.
EX	COMPASS	CER	1	LED	2	120	WALL	-	6" ABOVE DOOR FRAME

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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INSTRUMENTATION AND CONTROL LEGEND

SYMBOL	DESCRIPTION	COMMENTS
IL X	INDICATING LIGHT - LETTER DENOTES LENS COLOR: W-WHITE; G-GREEN; A-AMBER; R-RED; B-BLUE; C-CLEAR	
AIT	ANALYSIS INDICATING TRANSMITTER	
FIT	FLOW INDICATING TRANSMITTER	
FS	FLOW SWITCH	
H	HORN	
LIT	LEVEL INDICATING TRANSMITTER	
LS	LEVEL SWITCH	
LE	LEVEL ELECTRODES	
ZS	POSITION (LIMIT) SWITCH	
PS	PRESSURE SWITCH	
PIT	PRESSURE SWITCH INDICATOR	
SV	SOLENOID VALVE	
LNR	LINE REACTOR	
SL	STROBE LIGHT	
TS	TEMPERATURE SWITCH	
TIT	TEMPERATURE INDICATING TRANSMITTER	
T	THERMOSTAT	
DP	DIFFERENTIAL PREASSURE SWITCH	
	CONTACT - NORMALLY OPEN	
	CONTACT - NORMALLY CLOSED	
	CONDUCTOR CROSSOVER	
	CONNECTION / TERMINATION	
	REMOTE CONTACT	
HWL	HIGH WATER LEVEL SWITCH	
	REMOTE TERMINATION	
ETM	ELAPSED TIME METER	
	GROUND	
PB	PUSH BUTTON	
TD	TIME DELAY	
M	MOTOR	
M	MOTORIZED ACTUATOR	
ES	EMERGNECY STOP PUSH BUTTON	
	SWITCH - TOGGLE	
	SOLENOID VALVE COIL	
	MOMENTARY CONTACT PUSH BUTTON - NORMALLY OPEN	
	MOMENTARY CONTACT PUSH BUTTON - NORMALLY CLOSED	
	SWITCH - TEMPERATURE - NORMALLY OPEN	
	SWITCH - TEMPERATURE - NORMALLY CLOSED	
	SWITCH - FLOW - NORMALLY OPEN	
	SWITCH - FLOW - NORMALLY CLOSED	
	SWITCH - LIMIT - NORMALLY OPEN	
	SWITCH - LIMIT - NORMALLY CLOSED	
	CONTACT - "ON" TIME DELAY - NORMALLY OPEN	
	CONTACT - "ON" TIME DELAY - NORMALLY CLOSED	
	CONTACT - "OFF" TIME DELAY - NORMALLY OPEN	
	CONTACT - "OFF" TIME DELAY - NORMALLY CLOSED	
	SWITCH - LIQUID LEVEL- NORMALLY OPEN	
	SWITCH - LIQUID LEVEL - NORMALLY CLOSED	
	SWITCH - PRESSURE- NORMALLY OPEN	
	SWITCH - PRESSURE - NORMALLY CLOSED	

SYMBOL	DESCRIPTION	COMMENTS
TC	TIME	
	2 #12 AWG + #12 AWG GND IN 3/4" E.C. CONCEALED IN WALL OR	
LP1-35	DEDICATED HOME RUN TO PANEL LP1 FOR CIRCUIT No. 35 ONLY. 2 #12 AWG + #12 AWG GND IN 3/4" E.C. CONCEALED IN WALL OR CEILING	
	DUPLEX RECEPTACLE: 120V, 20A. COORDINATE MOUNTING HEIGHT WITH MECHANICAL CONTRACTOR TO CLEAR BASEBOARDS.	
3W 125V TL 20A	TWISTED LOCK RECEPTACLE: 125V, 20A, 3 WIRE; UNLESS OTHERWISE	
S1	MAGNETIC STARTER "S1"; SEE STARTER	
DS1	DISCONNECTION SWITCH "DS1"; SEE DISCONNECT SWITCH	
J	JUNCTION	
J 4X	NEMA 4X STAINLESS STEEL JUNCTION BOX WITH GASKET	
T T1	TRANSFORMER "T1"; SEE TRANSFORMER	
P1	ELECTRICAL PANEL "P1", SURFACE MOUNT; SEE PANEL SCHEDULE.	
P1	ELECTRICAL PANEL "P1", RECESSED; SEE PANEL SCHEDULE.	
	CONDUIT GOING UP.	
	CONDUIT GOING DOWN.	
	PULLBOX	
100AF 100AT	CIRCUIT BREAKER WITH TRIP AND POLES AS NOTED; 100 AMP FRAME, 100 AMP	
5	MOTOR, NUMBER INDICATES HORSEPOWER	

ABBREVIATION	DESCRIPTION
AFF	ABOVE FINISH FLOOR
AFC	ABOVE FINISH CEILING
AFG	ABOVE FINISH GRADE
AMP, A	AMPERE
ATS	AUTOMATIC TRANSFER SWITCH; SEE TRANSFER SWITCH SCHEDULE
AWG	AMERICAN WIRE GUAGE
BFC	BELOW FINISHED CEILING
CL	CENTERLINE
CT	COUNTERTOP
EC	ELECTRICAL CONDUIT
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INDICATOR
PSEG	PUBLIC SERVICE ELECTRIC AND GAS COMPANY (LOCAL ELECTRIC UTILITY)
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUGS ONLY
NTS	NOT TO SCALE
UON	UNLESS OTHERWISE NOTED
UC	UNDERCOUNTER
V	VOLTS
VAC	VOLTS ALTERNATING CURRENT
VDC	VOLT DIRECT CURRENT
X-FMR	TRANSFORMER
WP	WEATHERPROOF

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RDWD 17-02	MARCH 2018	AS SHOWN

CLIENT

Riverhead Water District

Booster Pumping Station at Plant No. 15

TOWN OF RIVERHEAD 1792

Tuthills Lane, Jamesport

CONTRACT

CONTRACT E
ELECTRICAL CONSTRUCTION

STATUS

FINAL BID DOCUMEMT

SHEET TITLE

ELECTRICAL INSTRUMENTATION AND CONTROL LEGENDS

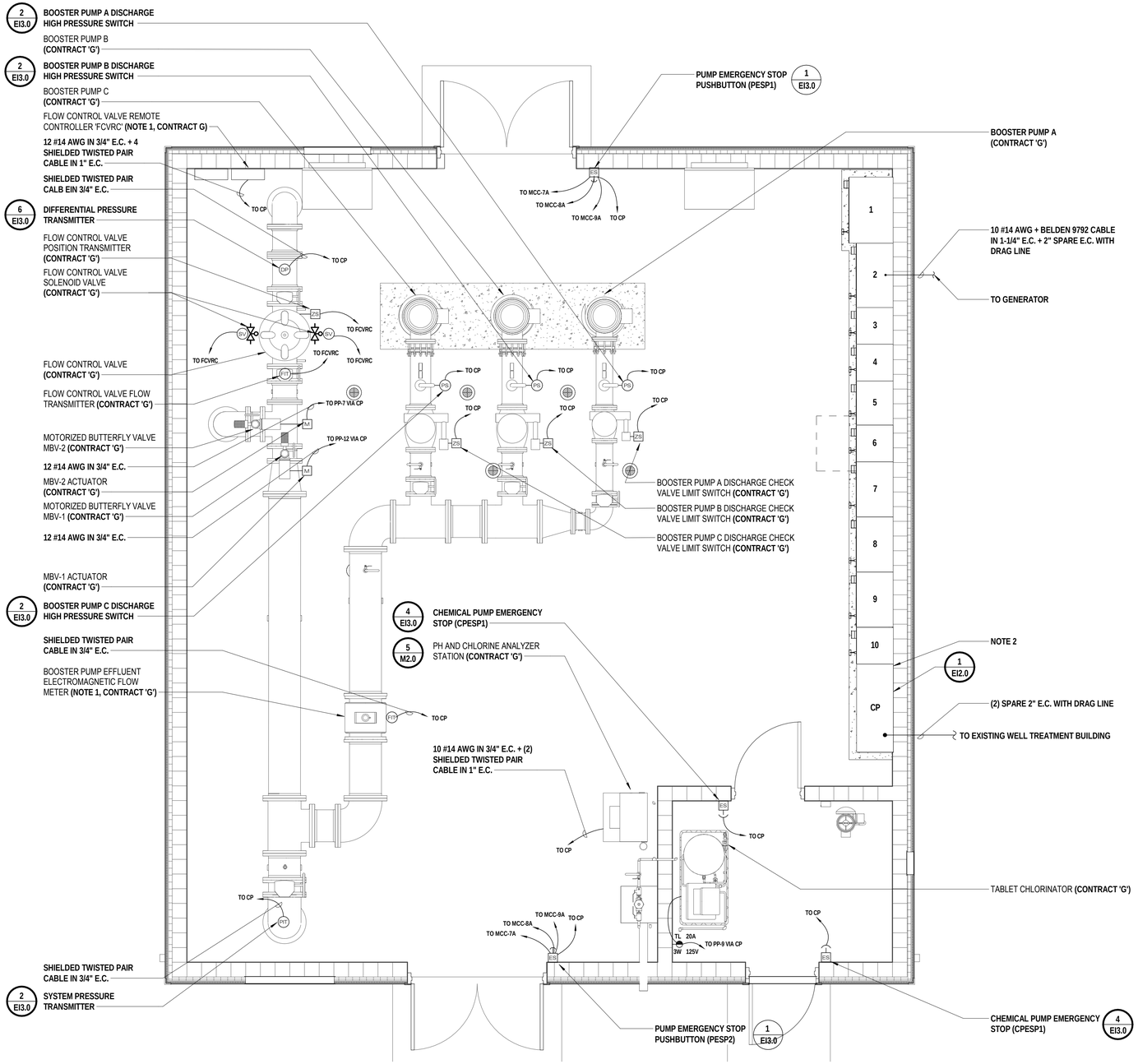
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SHEET No. 48 OF 51

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1 Electrical Instrumentation Floor Plan

SCALE 3/8" = 1'-0"

ELECTRICAL KEY NOTE:

1. EQUIPMENT INDICATED SHALL BE PROVIDED BY CONTRACT 'G' AND WIRED BY CONTRACT 'E'.
2. INTERCONNECTING WIRING BETWEEN MCC AND CONTROL PANEL IS NOT SHOWN. CONTRACTOR IS RESPONSIBLE TO PROVIDE AND INSTALL ALL INTERCONNECTING WIRING BETWEEN MCC AND CONTROL PANEL IN ACCORDANCE WITH SPECIFICATION 265011 AND 265012, AND CONTRACT DRAWINGS AS REQUIRED FOR COMPLETE CONTROL SYSTEM.

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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ELECTRICAL INSTRUMENTATION FLOOR PLAN

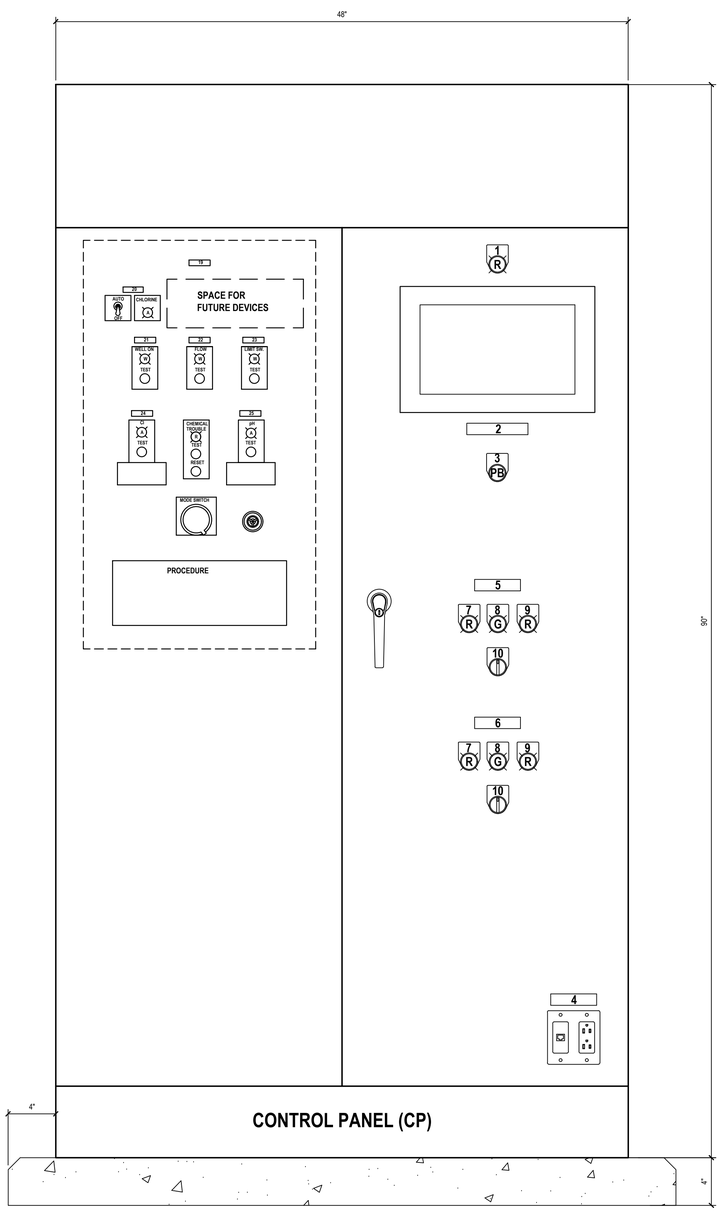
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1 Control Panel (CP) Elevation

SCALE: 2" = 1'-0"

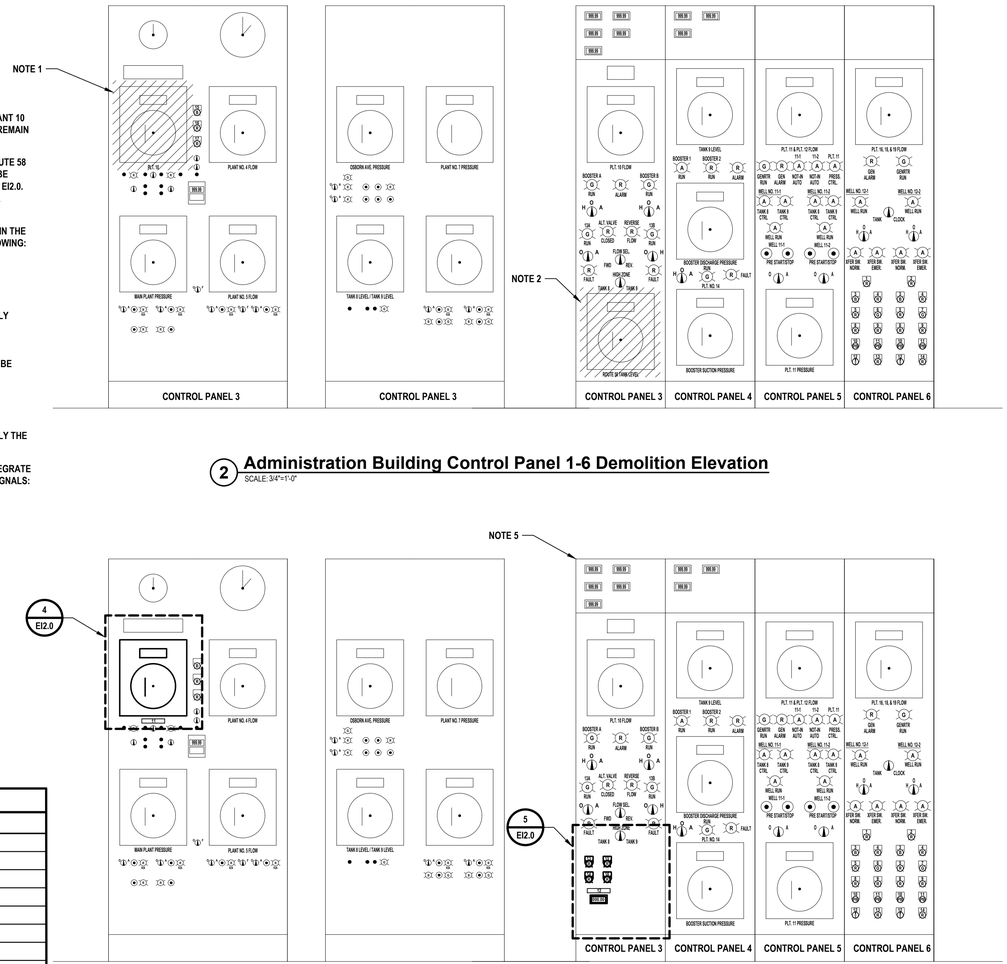
NOTES:

1. CONTRACTOR SHALL REMOVE AND RETURN TO THE DISTRICT THE EXISTING PLANT 10 TANK LEVEL CHART RECORDER. ALL ASSOCIATED TANK LEVEL WIRING SHALL REMAIN INTACT AND TERMINATED TO NEW CHART RECORDER.
2. CONTRACTOR SHALL REMOVE AND RETURN TO THE DISTRICT THE EXISTING ROUTE 58 TANK LEVEL CHART RECORDER. ALL ASSOCIATED TANK LEVEL WIRING SHALL BE EXTENDED TO NEW CHART RECORDER AS INDICATED ON DETAIL 4 OF DRAWING EI2.0. MOUNT A COVER-PLATE ON THE LOCATION OF THE EXISTING CHART RECORDER CUT-OUT FOR THE INSTALLATION OF NEW PILOT DEVICES.
3. CONTRACTOR SHALL PROVIDE AND INSTALL NEW PUSH-TO-TEST PILOT LIGHTS IN THE EXISTING ADMINISTRATION BUILDING CONTROL PANEL 3 TO INDICATE HE FOLLOWING:
   - PLANT NO. 15 GENERATOR RUN
   - PLANT NO. 15 GENERATOR ALARM LIGHT
   - PLANT NO. 15 ALARM
   - PLANT NO. 15 BOOSTER RUN

   CONTRACTOR SHALL MODIFY EXISTING DOOR AS REQUIRED AND PROVIDE AND INSTALL ALL MOUNTING HARDWARE AND ACCESSORIES REQUIRED TO SECURELY MOUNT THE PILOT DEVICES.
4. CONTRACTOR SHALL INSTALL NEW 3 PEN CHART RECORDER IN THE EXISTING ADMINISTRATION BUILDING CONTROL PANEL 3. THE FOLLOWING INPUTS SHALL BE EXTENDED AND TERMINATED TO THE NEW CHART RECORDER:
   - PLANT NO. 10 TANK LEVEL
   - ROUTE 58 TANK LEVEL
   - PLANT NO. 15 TANK LEVEL

   CONTRACTOR SHALL MODIFY EXISTING DOOR AS REQUIRED AND PROVIDE AND INSTALL ALL MOUNTING HARDWARE AND ACCESSORIES REQUIRED TO SECURELY THE NEW CHART RECORDER.
5. CONTRACTOR IS RESPONSIBLE FOR ALL PLC PROGRAMMING REQUIRED TO INTEGRATE AND COMMUNICATE WITH THE PLC IN PLANT NO. 15. OBTAIN THE FOLLOWING SIGNALS:
   - PLANT NO. 15 GENERATOR RUN
   - PLANT NO. 15 GENERATOR ALARM LIGHT
   - PLANT NO. 15 ALARM
   - PLANT NO. 15 BOOSTER RUN

   PROVIDE ALL HARDWARE AN D ACCESSORIES REQUIRED TO INTEGRATE ABOVE SIGNALS WITH THE PILOT LIGHTS INDICATED ON DETAIL 5 ON DRAWING EI2.0.



2 Administration Building Control Panel 1-6 Demolition Elevation

SCALE: 3/4"=1'-0"

3 Administration Building Control Panel 3-6 Elevation

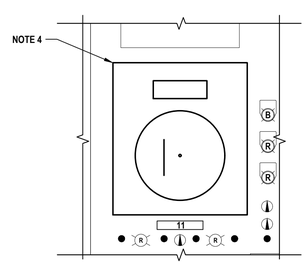
SCALE: 3/4"=1'-0"

CONTROL ELEVATION SCHEDULE

1	GENERAL ALARM	-
2	OPERATOR INTERFACE TERMINAL	-
3	RESET	PB
4	CONVENIENCE DATA JACK AND POWER RECEPTACLE	-
5	MOTORIZED VALVE MBV-1	-
6	MOTORIZED VALVE MBV-2	-
7	"OPEN"	RED
8	"CLOSED"	GREEN
9	INCOMPLETE VALVE CYCLE	RED
10	OPEN-STOP-CLOSE-AUTO SELECTOR SWITCH	SEL4
11	PLANT NO. 10, PLANT NO. 15, AND ROUTE 58 TANK LEVEL	SEL4
12	PLANT NO. 15 BOOSTER PUMP EFFLUENT FLOW	-
13	PLANT NO. 15 GENERATOR RUN	BLUE
14	PLANT NO. 15 GENERATOR ALARM	RED
15	PLANT NO. 15 ALARM	RED
16	PLANT NO. 15 BOOSTER RUN	RED
17	NOTE USED	-
18	NOT USED	-
19	CHEMICAL TREATMENT PANEL	-
20	CHLORINE	AMBER
21	WELL RUN SAFETY	WHITE
22	FLOW SWITCH SAFETY	WHITE
23	CHECK VALVE LIMIT SWITCH SAFETY	WHITE
24	CL2 SAFETY	AMBER
25	pH SAFETY	ABMER

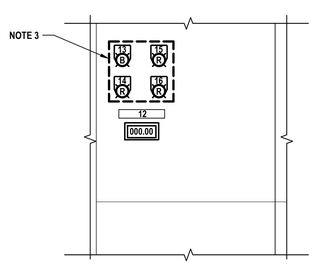
CONTROL PANEL LEGEND

PB	PUSH BUTTON SWITCH - MOMENTARY
SEL4	SELECTOR SWITCH - FOUR POSITION



4 Three-Pen Chart Recorder Elevation

SCALE: NTS



5 Plant No. 15 Control/Status Elevation

SCALE: NTS

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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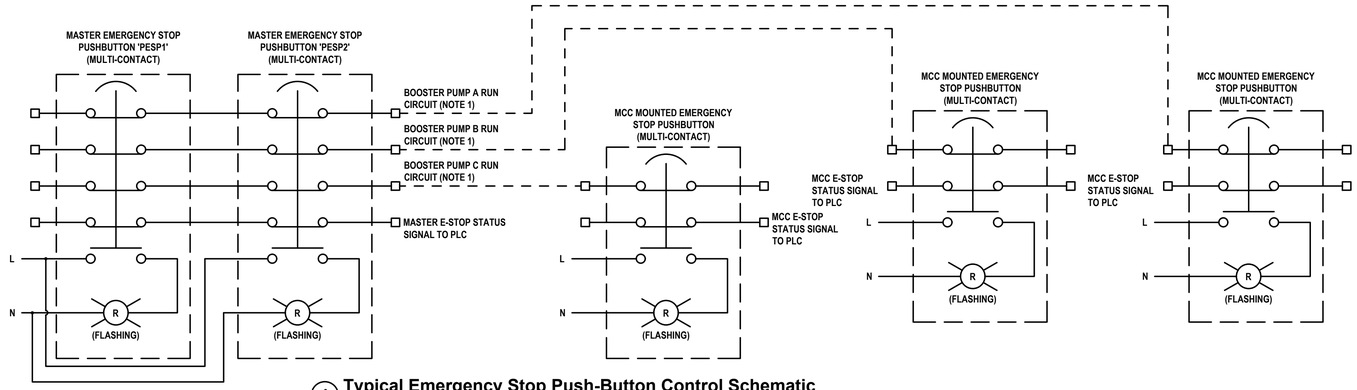
ELECTRICAL INSTRUMENTATION EQUIPMENT ELEVATIONS

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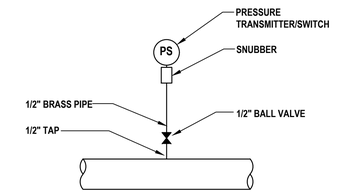


1 Typical Emergency Stop Push-Button Control Schematic

SCALE: N.T.S.

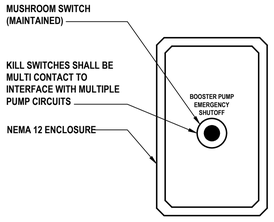
NOTES:

1. ACTIVATION (PRESS) OF E-STOP PUSH-BUTTON SHALL PREVENT ALL ASSOCIATED PUMPS FROM RUNNING REGARDLESS OF ANY ASSOCIATED H-O-A SWITCH POSITION.
2. PROVIDE ADDITIONAL CONTACTS AS REQUIRED TO INTERFACE ALL ASSOCIATED PUMPS IN ACCORDANCE WITH FLOOR PLANS.
3. ALL E-STOPS SHALL BE FLASHING WHEN PRESSED.



2 Pressure Transmitter/Switch Detail

SCALE: N.T.S.

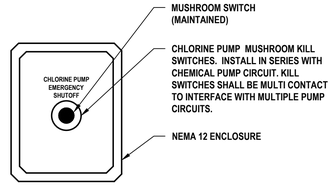


3 Booster Pump Emergency Shutoff Panel

SCALE: NTS

NOTES:

1. MUSHROOM SWITCHES SHALL BE ILLUMINATED AND FLASHING WHEN SWITCH IS IN DEPRESSED POSITION.

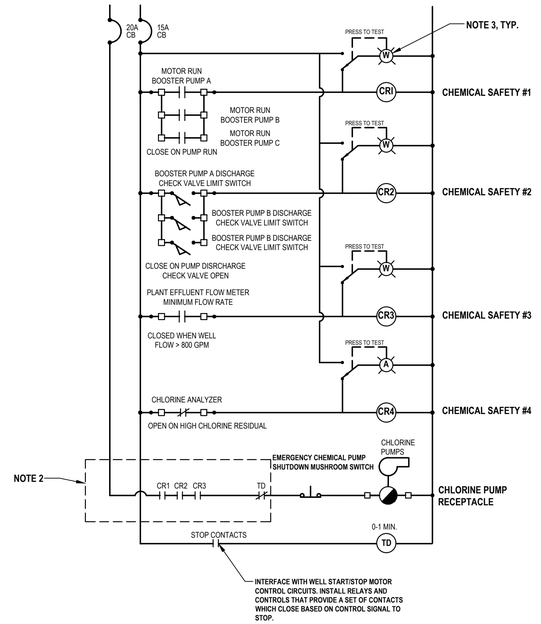


4 Emergency Chemical Shutoff Panel (CESP1/CESP2)

SCALE: N.T.S.

NOTES:

1. MUSHROOM SWITCHES SHALL BE ILLUMINATED AND FLASHING WHEN SWITCH IS IN DEPRESSED POSITION.

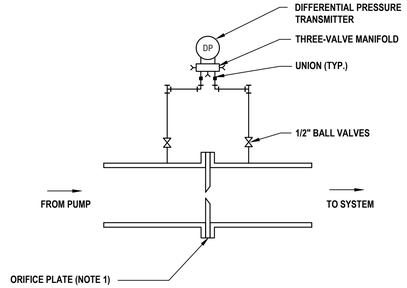


5 Chemical Treatment Safety Panel Control Diagram

SCALE: N.T.S.

NOTE:

1. LOGIC SHOWN IS FOR INTERLOCKING OF CHEMICAL TREATMENT SAFETIES. REFER TO SPECIFICATIONS FOR ADDITIONAL CONTROLS NOT SHOWN.
2. CONTACTORS INDICATED ARE PHYSICAL NEMA RATED CONTACTORS WHICH ARE LOCATED THE CONTROL PANEL 'CP' AND HARDWIRED TO THE RESPECTIVE CHEMICAL PUMP.
3. ALL PILOT LIGHTS SHOWN SHALL BE MOUNTED ON THE FACE OF THE CONTROL PANEL 'CP'.



6 Piping Schematic of Flow Switch and Transmitter

SCALE: N.T.S.

NOTES:

1. ORIFICE PLATE SHALL BE PROVIDED AND INSTALLED BY CONTRACT 'G', WIRED BY CONTRACT 'E'.
2. ALL PRESSURE PIPING, VALVES, TRANSMITTERS, AND SWITCHES TO BE INSTALLED BY CONTRACT 'E'.

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Booster Pumping Station at Plant No. 15

Tuthills Lane, Jamesport

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ELECTRICAL INSTRUMENTATION DETAILS AND SCHEMATICS

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SHEET No. 51 OF 51

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